

# NVR7800 Series

## User Manual

Release 1.0

# Revision History

Version	Description	Date
1.0	Initial release	October. 2016

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# Safety Precautions



## Electric Shock Warning

This equipment may cause electric shocks if not handled properly.

- Access to this equipment should only be granted to trained operators and maintenance personnel who have been instructed of, and fully understand the possible hazardous conditions and the consequences of accessing non-field-serviceable units such as the power supplies.
- The system must be unplugged before moving, or in the event that it becomes damaged.



## Reliable Grounding

Particular attention should be given to prepare reliable grounding for the power supply connection. It is suggested to use a direct connection to the branch circuit. Check for proper grounding before powering on the device.



## Overloading Protection

The device should be installed according to specifications. Provide a suitable power source with electrical overload protection. Do not overload the AC supply branch circuit that provides power to the device.



## ESD Precautions

Please observe all conventional anti-ESD methods while handling the device. The use of a grounded wrist strap and an anti-static work pad are recommended. Avoid dust and debris in your work area.

## Device Installation/Site Selection

The device should be installed according to specifications. This device should be operated at a site that is:

- Clean, dry, and free of excessive airborne particles.
- Well-ventilated and away from heat sources such as direct sunlight and radiators.
- Clear of vibration or physical shock.
- Away from strong electromagnetic fields produced by other devices.
- Available with properly grounded wall outlet for power. In regions where power sources are unstable, apply surge suppression.
- Available with sufficient space behind the device for cabling.

Never install or use, unless waterproof or dust-resistant is listed as a feature, the device in the following locations:

- Areas where chemicals are used.
- Areas where dust, debris, or pollen is in excess.
- Areas where corrosive gas, sea water or high humidity is present.
- Areas where steam vapor or flammable environments is generated.
- Areas where radiation, X-rays, strong electric waves, or magnetism is generated.
- Areas outside of the allowable ambient operating temperature range.
- Areas subject to impact or rigorous vibration.

## Energy Hazards Precaution

The device should be installed according to specifications. This device should be operated at a site that is:

This equipment is intended to be used in Restrict Access Location, like computer room. The access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the metal chassis of the equipment is have energy hazards that service persons have to pay special attention or take special protection before touching it. Further, the access is through the use of key or security identity system. Only authorized by well trained professional person can access the restrict access location.

# Chapter 1. Product Overview

## 1.1. Product Overview

This manual introduces NVR7800 systems that support 3Gbps, 6Gbps SAS, Near Line SAS and SATA hard drives. The systems utilize 3.5” hard drives. Drive capacity can be expanded by attaching expansion hard drive enclosures (JBODs). The NVR7800 systems combine RAID storage and server characteristics into one, offering the best of both worlds! It allows for operating system installation that best suit ones needs and offer massive and safe data storage capabilities!

The NVR7800 Series with pre-loaded Milestone XProtect VMS is an enterprise-grade security solution, which supports up to 150 CH 3MP cameras with continuous recording and 316 HDDs with high density 4U 60-bay expansion enclosure (maximum capacity of up to 2.5 PB with 8TB HDD). Its hybrid and cableless design ensures excellent system reliability and easy maintenance for medium to large applications.

## 1.2. Specifications for the NVR7800 Series

### 1.2.1. Hardware Specifications

Product Series	<b>NVR7800</b>
Product Name	<b>NVR7812(2U/12-bay) NVR7816(3U/16-bay)</b>
Controller	Single controller
System Processor	<ul style="list-style-type: none"> <li>➤ Intel® Xeon E3-1225 quad-core 3.2G or</li> <li>➤ Intel® Xeon E3-1275 quad-core 3.2G</li> </ul>
System Memory	DDR3 8GB (up to 32GB)
Operating System	N/A
Supported OS (64-bit)	Windows Server 2012 / 2012 R2 Windows Embedded Industry Pro 8.1 Windows 7 Embedded Standard SP1 / Professional SP1 Linux Ubuntu 13.04 *For the latest OS support details, please contact our sales representatives
System Drive	Support two 2.5" SATA HDD <ul style="list-style-type: none"> <li>➤ Install two SATA HDDs with RAID1</li> </ul>
Storage	12 or 16 x 3.5" SATAII/SATAIII hard disk drives
Max. Disk Supported	NVR7812 <ul style="list-style-type: none"> <li>➤ 312 disks (1 x NVR7812 + 5 x 4U 60-bay JBOD)</li> <li>➤ 180 disks (1 x NVR7812 + 14 x 2U 12-bay JBOD)</li> </ul> NVR7816 <ul style="list-style-type: none"> <li>➤ 316 disk (1 x NVR7816 + 5 x 4U 60-bay JBOD)</li> <li>➤ 240 disk (1 x NVR7816 + 14 x 3U 16-bay JBOD)</li> </ul>
DIMM Slot	DDR3 slot x 4
Memory Capacity	Default <ul style="list-style-type: none"> <li>➤ 8GB(2 x 4GB) with non-ECC</li> </ul> Upgradable <ul style="list-style-type: none"> <li>➤ 8GB(2 x 4GB) with ECC</li> <li>➤ 16GB(2 x 8GB) with ECC or non ECC</li> <li>➤ 32GB(4 x 8GB) with ECC or non ECC</li> </ul>
Disk Support	3.5" 7,200 RPM NL-SAS HDD 3.5" 7,200 RPM SATA HDD
Drive Interface	6Gb/s SAS
JBOD Expansion	6Gb/s SAS wide port x 1
PCIe Gen3 Slot	PCI-E 3.0 x 8 / slot x 1
I/O Interface	Gigabit Ethernet x 4 USB2.0 x 2 (rear panel) USB3.0 x 2 (rear panel) VGA x 1 HDMI x 2 Mic. In port x 1 Speaker out port x 1
Service Port	Service port x 1 (mini USB connector - RS 232 interface)

RAID	RAID 0, 1, 5, 6, 10, 50, 60
Electrical	Dual Redundant PSU (460W)
Operating Environment	Temperature: 5° C to 40° C Humidity: 5% to 80% (non-condensing)
LED Indicator	Yes
Dimensions (mm)	NVR7812: 2U 19-inch rackmount with chassis ears: (H)88.00mm x (W)447.40mm x (L)524.41mm NVR7816: 3U 19-inch rackmount with chassis ears: (H)130.00mm x (W)447.40mm x (L)524.20mm
Weight	NVR7812: 13.60kg/ 29.98lbs (without HDDs) NVR7816: 21.54kg/ 47.49lbs (without HDDs)
Certificate	FCC Class A, CE Class A, UL, CB
Warranty	3 years

### 1.2.2. Software Specifications

Enterprise Storage Server	<ul style="list-style-type: none"> <li>➤ Server-storage hybrid design for best cost-performance ratio</li> <li>➤ Cableless design with hot swappable redundant component for easy maintenance</li> <li>➤ Built-in RAID function for data protection</li> <li>➤ Built-in SAS expansion for JBODs with up to 316 HDDs</li> <li>➤ Intuitive set-up page for hassle-free installation</li> </ul>
EonOne Lite	<ul style="list-style-type: none"> <li>➤ Easy device management</li> <li>➤ Easy to use and web-based GUI</li> </ul>

### 1.3. Applicable Models

The naming rules for systems are explained in the example below

Model	Part Number	Description
NVR7812	NVR7812A1-BB-xxxx	2U12 bay, E3-1225 CPU, 8G RAM
	NVR7812A2-BB-xxxx	2U12 bay, E3-1275 CPU, 8G RAM
NVR7816	NVR7816A1-BB-xxxx	3U16 bay, E3-1225 CPU, 8G RAM
	NVR7816A2-BB-xxxx	3U16 bay, E3-1275 CPU, 8G RAM

### 1.4. Model Variations

The NVR7800 systems are available in a variety of form factors.



2U enclosure



3U enclosure

## 1.5. Major Components



### NOTE

Upon receiving your system, check the package contents against the included **Unpacking Table of Quick Installation Guide**. If module(s) are missing, please contact your system vendor immediately.

### Controller and Interface

The controller interface of the system represents the server component of the system with Ethernet, VGA / HDMI output, USB 2.0 / 3.0, mini USB COM port, etc. for various connection and expansion capabilities.

### JBOD Controller and Interface

The enclosure is managed by expander controllers that distribute data flow to individual disk drives and report operating status through a proprietary enclosure service via in-band protocols. The enclosure, along with other JBODs, connects to a RAID system and serves as a building block of a scalable configuration.

In terms of supported protocols, the firmware supports communications with enclosure devices, SAS/SATA disk drives and as RAID system featuring 12Gbps SAS expansion ports.

In terms of physical connection, the SAS interface provides ease of cabling through Mini-SAS connectors. With a backplane adapting SAS or SATA drives, the system supports enterprise-class SAS, Near-line SAS, cost-effective SATA-

II or SATA-III hard drives, and is ideal for adding large capacity to a storage pool.

### **Power Supply Unit with Built-in Cooling Module**

Cooling module is built into the power supply unit (PSU) to protect the system from overheating. The two hot-swappable PSUs provide constant power to the system. The modular nature of the system and the easy accessibility to all major components ensure ease of maintenance.

### **The Rear Panel**

Main components are the rear side of the system consists of two power supplies at the two ends with a controller in the middle.

### **Connection between RAID and JBOD**

The following rule applies when connecting RAID and JBOD(s):

- 2U systems connect to 2U JBODs.
- 3U systems connect to 3U JBODs

### **Chassis**

The RAID chassis is a rugged storage chassis divided into front and rear sections. The chassis is designed to be installed into a rack or cabinet.

## Internal Backplane

An integrated backplane separates the front and rear sections of the chassis. This circuit board provides logic level signals and low voltage power paths. Thermal sensors and I<sup>2</sup>C devices are embedded to detect system temperatures and PSU/cooling module operating status. This board contains no user-serviceable components.

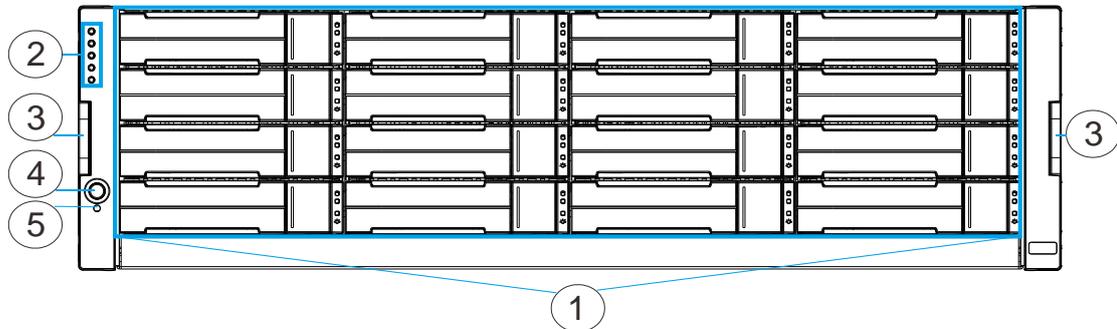


### WARNING

Accessing the backplane board may lead to fatal damage of the system. Also, physical contact with the backplane board may cause electrical hazards.

# Chapter 2. Hardware Overview

## 2.1. Front Panel



**① Drive trays:**

Each drive tray is hot-swappable and holds a 3.5-inch hard drive.

**② LED Panel:**

The panel has Service / Power / Cooling Fan / Thermal / System LEDs.

**③ Handles:**

There are handles on both sides of the enclosure for users to pull / push the enclosure out and into the cabinet when the enclosure is installed on a slide rail rackmount system.

**④ Power Switch:**

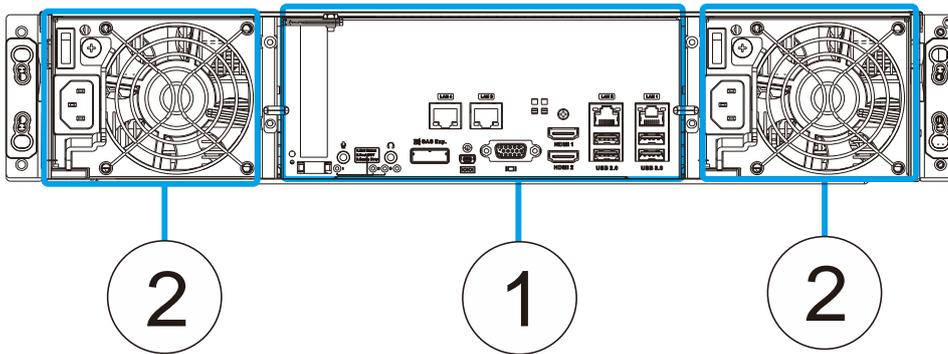
The power switch turns on the system.

**⑤ Mute Button:**

The mute button is to mute an alarm when sound or to indicate to the administrator the system requires service.

## 2.2. Rear Panel

#	Description	#	Description
1	Controller	2	Power supply + cooling module



### ① Controller:

The controller module represents the server component of the system that contains a main circuit board with various output and connections at the rear.



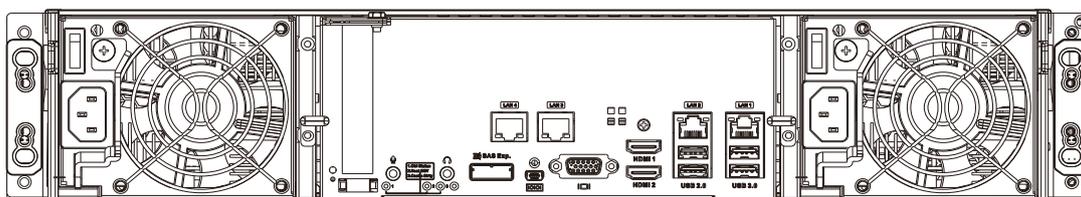
### WARNING

Do NOT remove the non-redundant components!

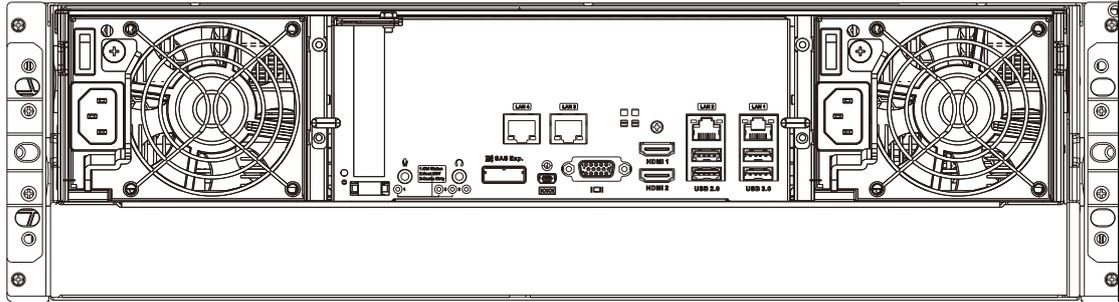
Do NOT remove redundant components without a replacement on hand!

### ② Power supply unit & cooling module:

The hot-swappable PSUs provide power to the system. There is a cooling module within each PSU.

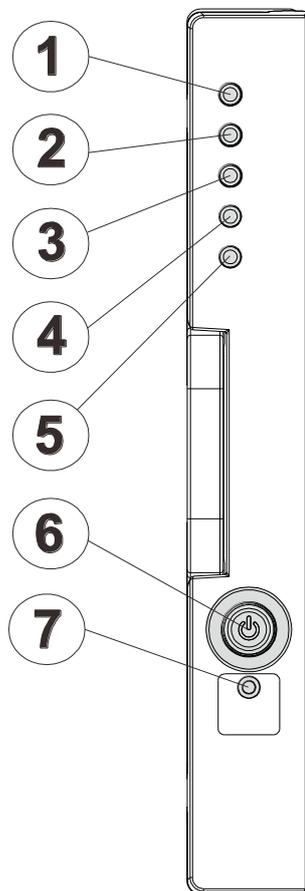


2U System



3U System

## 2.3. Front LED Panel



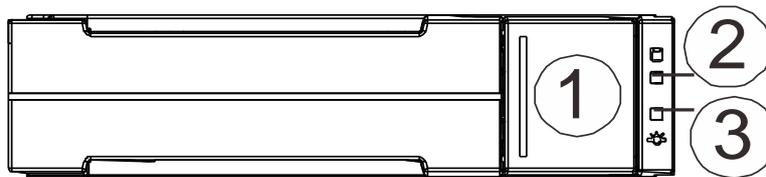
The LED panel can be located on the chassis ear. The LED panel contains Service LED ①, a power supply status LED ②, cooling module status LED ③, temperature sensor status LED ④, system fault LED ⑤, power button ⑥, mute service button ⑦.



#### WARNING

If critical faults are indicated on the LED panel, verify the cause of the problem as soon as possible and contact your system vendor and arrange for a replacement module.

## 2.4. Drive Tray Bezel



The drive tray is designed to accommodate separately purchased SAS or SATA interface hard disk drives. There is a release button ① that can be used when retrieving disk drives from the chassis. To the right of the bezel plate, there is a drive busy LED ② and a power status LED ③.



#### WARNING

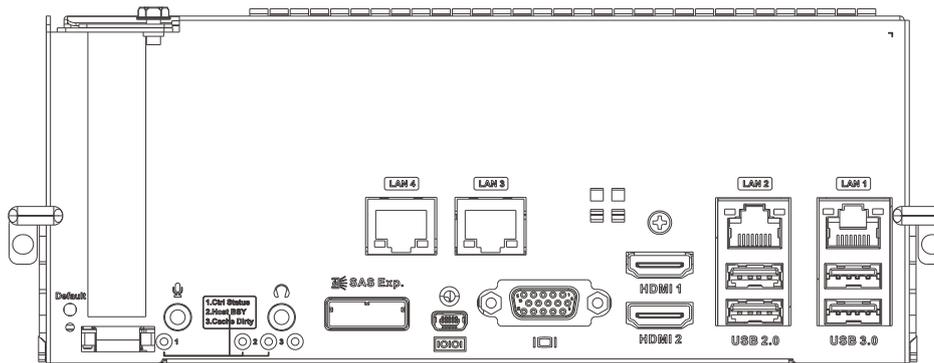
Be careful not to warp, twist, or contort the drive tray in any way (e.g., by dropping it or resting heavy objects on it). If the drive bay structure is deformed or altered, the drive trays may not fit into the drive bay.

## 2.5. Controller

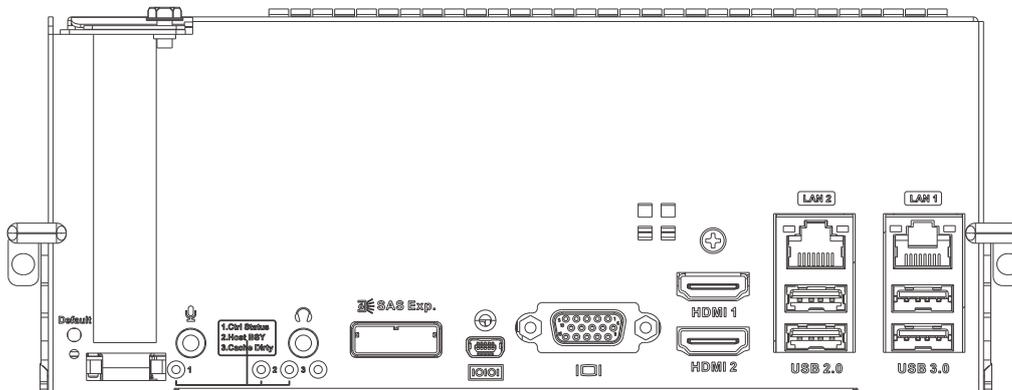
### 2.5.1 Controller Type

There are two types of controller panels. The main difference is the LEDs.

Type II controller will be used for illustration purposes.

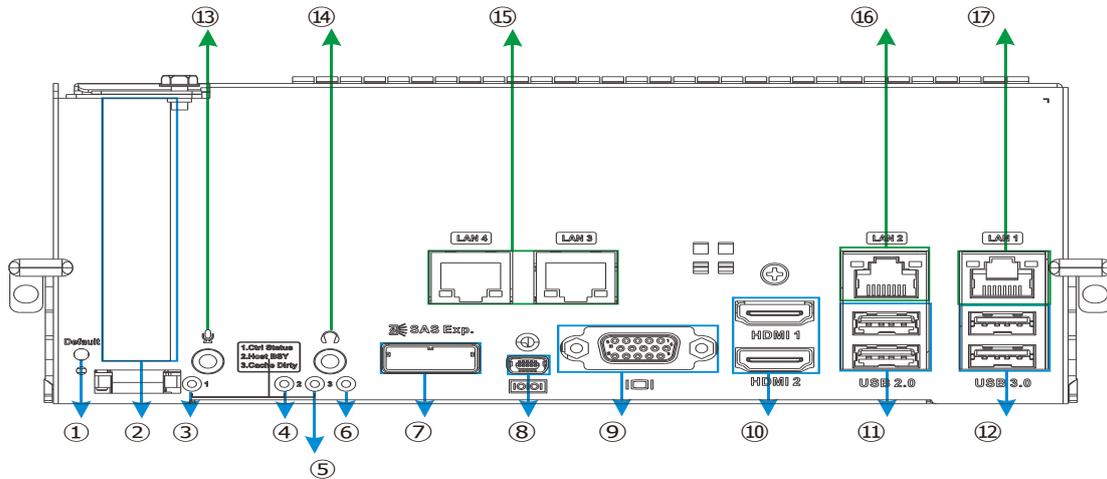


Type I



Type II

## 2.5.2. Controller Connections



①	Reset to default button and LED	⑩	HDMI port (Video only, Res: 1920 x1080@60Hz)
②	PCIe expansion slot	⑪	USB 2.0 port
③	Controller status LED	⑫	USB 3.0 port
④	Host Busy LED	⑬	3.5mm microphone jack
⑤	Cache Dirty LED	⑭	3.5mm headphone jack
⑥	Reserved LEDs	⑮	1 Gb/s Ethernet (Optional)
⑦	6Gb/s SAS expansion port	⑯	1 Gb/s Ethernet (Wake On LAN)
⑧	miniUSB COM port	⑰	1 Gb/s Ethernet
⑨	D-Sub VGA port (Res: 1920 x1080@60Hz)		



### NOTE

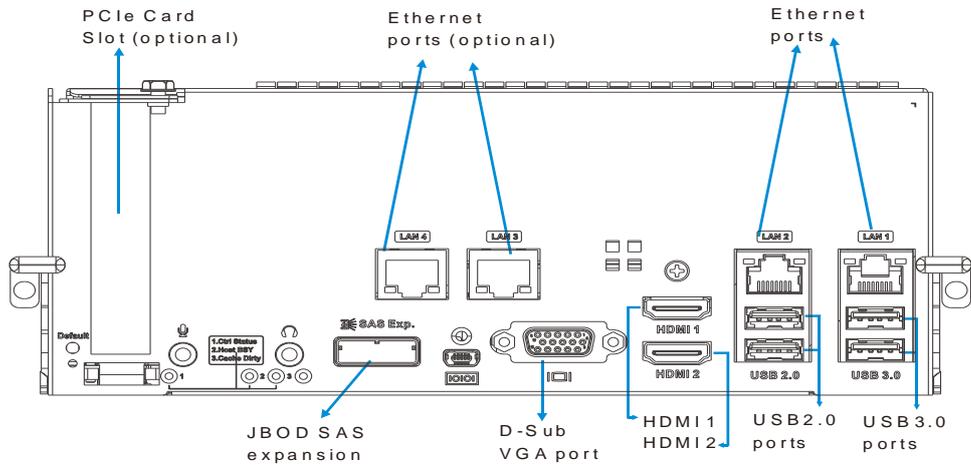
The management port supports only 100Mbps and 1000Mbps (1Gbps) speeds.  
PCI-E card is an optional add-on component!



### WARNING

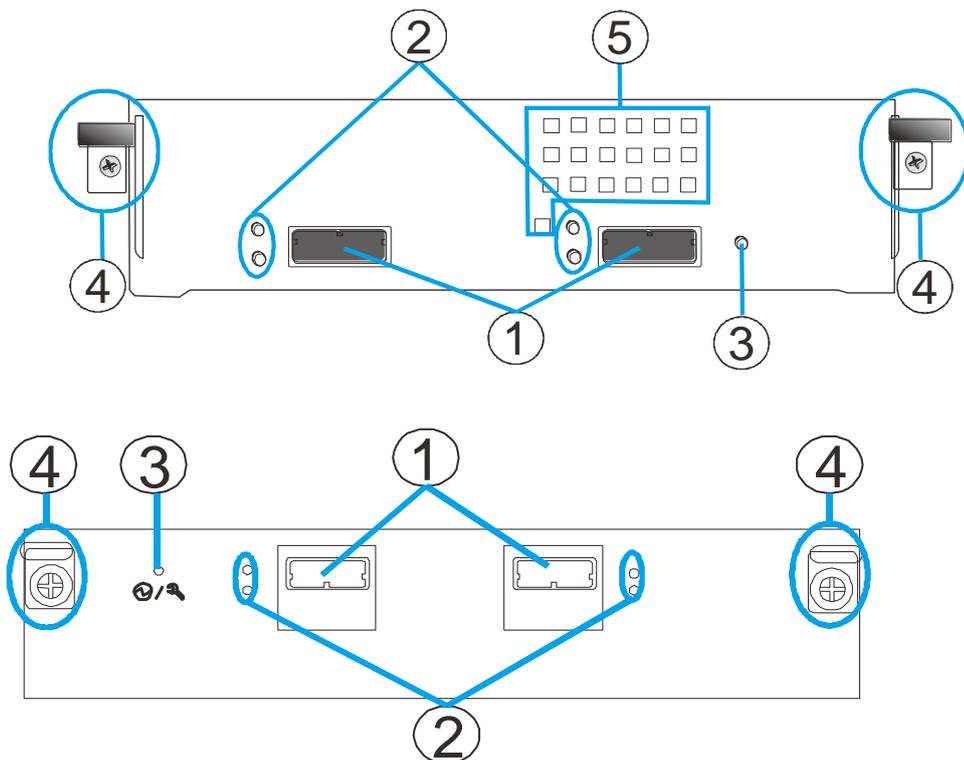
The only time you should remove the controller is to install/ replace the failed controller. The RAID controller is built of sensitive components and unnecessary tampering may damage the controller.

### 2.5.3 Controller Interfaces



### 2.6. Controller of JBOD Models

The expansion JBOD controllers features SAS expansion ports ①, SAS expansion port status LEDs ②, controller status LEDs ③, extraction levers and retention screws ④ and convection holes\* ⑤.



The expansion controller contains a circuit board within a metal canister, interfaced through hot-swap docking connectors at the back-end. Two SAS wide ports on the interface faceplate connect to a managing RAID system or other JBODs.

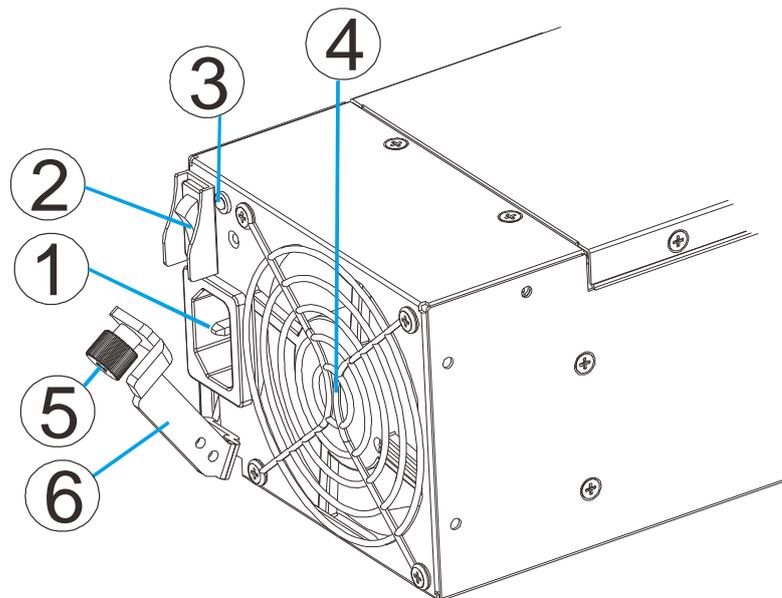


**WARNING**

The only time you should remove the controller is to install/ replace the failed controller. The RAID controller is built of sensitive components and unnecessary tampering may damage the controller.

## 2.7. PSU & Cooling Module

The two redundant, hot-swappable PSU has a power socket ①, power switch ②, PSU status LED ③, cooling module ④, retention screw ⑤ and an extraction handle ⑥.



The cooling modules can operate at three rotation speed settings. Under normal operating conditions, the cooling fans run at the low speed. Under the

following conditions, cooling fans raise their rotation speed to increase the airflow:

- Component failure: if a cooling module, PSU, or a temperature sensor fails.
- Elevated temperature: if the temperature breaches the upper threshold set for any of the interior temperature sensors.
- During the system initialization stage, the cooling fans operate at high speed and return to low speed once the initialization process has completed and no erroneous condition detected.



#### NOTE

There are two upper temperature thresholds: one for event notification and the other for triggering higher fan rotation speed. The preset-value for event notification can be changed using the firmware-embedded configuration utility, while the fan speed trigger cannot be changed. Refer to the Firmware Operation Manual for details.

## 2.8. System Monitoring Features

There are a number of monitoring approaches that provide the operating status of individual components.

### I<sup>2</sup>C Bus

The detection circuitry and temperature sensors are interfaced through a non-user-serviceable I<sup>2</sup>C bus. When JBODs are attached to RAID controllers,

JBOD component status is reported through in-band protocols over expansion links that is managed by a proprietary enclosure service.

### **Firmware(FW), EonOne Lite and SANWatch**

**Firmware:** The firmware (FW) is preloaded and is used to configure the system. The FW can be accessed through a terminal emulation program running on a management computer connected to the system's serial port.

**EonOne Lite:** EonOne Lite is a browser-based graphical user interface (GUI) software that can be installed onto NVR7800 system. The manager communicates with the array via the connection of the existing host links (SAS JBODs).

**SANWatch:** SANWatch is a browser-based graphical user interface (GUI) software that can be installed on a local/remote computer and accessed via the network. The manager communicates with the array via the connection of the existing host links or the Ethernet link to the array's Ethernet port.

### **Audible Alarms**

The system comes with audible alarms that are triggered when certain active components fail or when certain controller or system thresholds are exceeded. Whenever you hear an audible alarm, it is imperative that you determine the cause and rectify the problem immediately.

Event notification messages indicate the completion or status of array configuration tasks and are always accompanied by two or three successive

and prolonged beeps. The alarm can be turned off using the mute button on the front panel.



**WARNING**

Failing to respond when an audible alarm is heard can lead to permanent damage(s) to the system. When an audible alarm is heard, rectify the problem as soon as possible.

## 2.9. Expansion Enclosure Support

### Monitoring:

A managing RAID system is aware of the status of JBOD components including those of:

- Expander controller (presence, voltage and thermal readings)
- PSU
- Cooling module
- Enclosure thermal sensor
- Service (the Service signal to specify a specific enclosure)
- Disk drives

### JBOD Identifier:

The managing system will sound the alarm and deliver warning messages if there is a conflict between JBOD IDs.

If more than one JBOD is connected to the managing RAID system, each JBOD needs a unique enclosure ID set using the rotary switch on the LED panel. For example, the firmware automatically disconnects the second JBOD if it is connected online and comes with an ID identical to that of the first JBOD.



#### NOTE

The IDs for JBODs are #1 to #15. For details, please refer to JBOD connections.

### Cooling Module Speed Adjustment:

If any of the detected temperature readings breaches the temperature threshold, the firmware running on the managing RAID system automatically raises the rotation speed of all cooling fans.

## JBOD Enclosure Status Monitoring:

When connected with expansion JBODs, acquires the component status within other enclosures via a proprietary enclosure monitoring service using the in-band connectivity. No additional management connection is required.

## 2.10. Hot-swapping

The system comes with a number of hot-swappable components that can be exchanged while the system is still online without affecting the operational integrity. These components should only be removed from the system when they are being replaced.

The following components can be user-maintained and hot-swappable:

- PSU (including cooling modules)
- Hard drive



### NOTE

Normalized airflow ensures sufficient cooling of the system and is only attained when all components are properly installed. Therefore, a failed component should only be removed when a replacement is available. For instructions on how to replace these hot-swappable components, please refer to System Maintenance.

# Chapter 3. Hardware Installation

This chapter describes how to install modular components, such as hard drives into the enclosure.



## NOTE

Installation into a rack or cabinet should occur **BEFORE** hard drives are installed into the system.

## 3.1. Installation Prerequisites

**Static-free installation environment:** The system must be installed in a static-free environment to minimize the possibility of electrostatic discharge (ESD) damage.

**Component check:** Before installing the system, check to see that you have received all the required components using the **Unpacking Table of Quick Installation Guide** included in the package. If there are item(s) missing or appear damaged, contact your vendor for a replacement.

**Hard drives:** SAS/SATA hard drives must be purchased separately and be available prior to installing the system.

**Cabling:** All the cables that connect the system to the hosts must be purchased separately. Please refer to “System Connection” for sample topologies and configuration options. Contact your vendor for the list of compatible cables.

**Rack installation:** The rack slide rails are optional accessories and should you need to install it, please refer to the “Slide Installation” section.

Make sure you are aware of the related positions of each plug-in module and interface connector.

Cables must be handled with care and must not be bent. To prevent emission interference within a rack system and accidental cable disconnection, the routing paths must be carefully planned.

## 3.2. Installation Procedures Overview

Following all the instructions provided below can minimize system installation time. Detailed, illustrated instructions for each component are given in the following sections.

1. **Unpack:** Unpack the system and confirm all components have been received against the Unpacking Table of Quick Installation Guide.
2. **Rack/Cabinet installation:** If the system is going to be installed in a rack or cabinet, it should be installed prior to installing the hard drives. Installing the system into a rack or cabinet requires at least two people due to its weight. If you need to install the slide rails that came with the system, please go to “Slide Rail Installation”.
3. **Install hard drives:** Separately purchased SAS/SATA hard drives must be individually installed into the drive trays.
4. **Install drive trays:** After the hard drives have been installed into the drive trays, you can install the drive trays into the enclosure (install trays **AFTER** the enclosure has been mounted onto the rack).
5. **Cable connection:** Use the supplied power cords to connect the system to main power. It is recommended to connect power cords to separate and independent power sources (different circuit breakers for redundancy).
6. **Power up:** Once the components have been properly installed and all cables are properly connected, you can power up the system and configure the RAID array.

### 3.3. Unpacking the System

Compare the **Unpacking Table of Quick Installation Guide** included in the shipping package against the actual package contents to confirm that all required materials have arrived.

#### 3.3.1. Box contents

For detail content(s), please refer to the quick installation guide that came with the system.

The accessory items include a serial port cable, screws, **Quick Installation Guide**, a CD containing the **EonOne Lite** management software and its manual and **Firmware Operation Manual**, and a product utility CD containing the **Installation and Hardware Reference Manual** (this document).

#### 3.3.2. Preinstalled Components

Shown below are the components pre-installed in the system:

- Controllers with preinstalled OS hard drives
- LED front panels
- PSUs including cooling modules
- PCIe expansion card (optional)

#### 3.3.3. Components to Be Installed

You must install the following components:

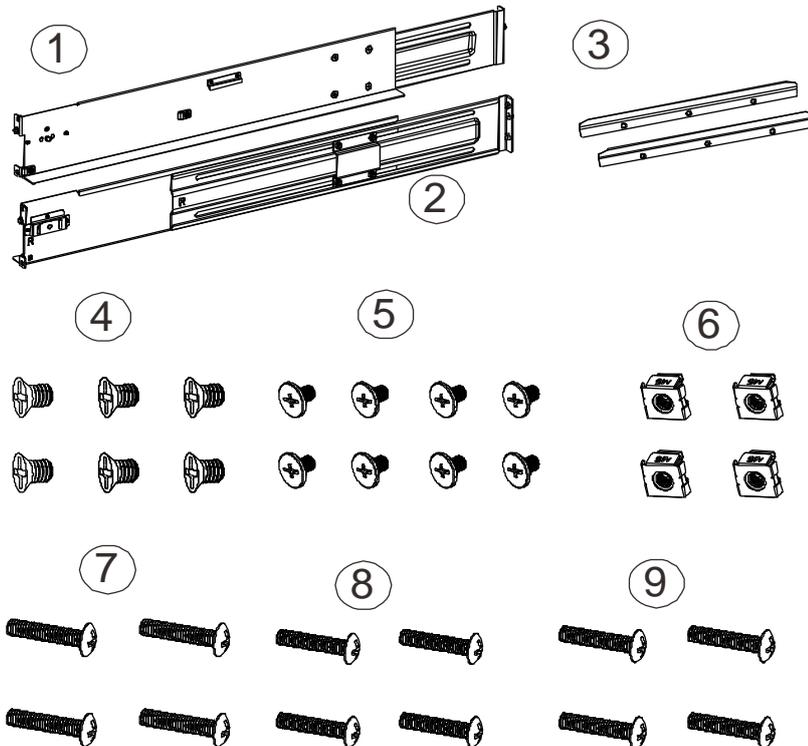
- The enclosure itself (please refer to the “Slide Installation”)
- Hard drives
- Cabling

### 3.4. Slide Installation

#### 3.4.1 Slide Rail Kit Contents

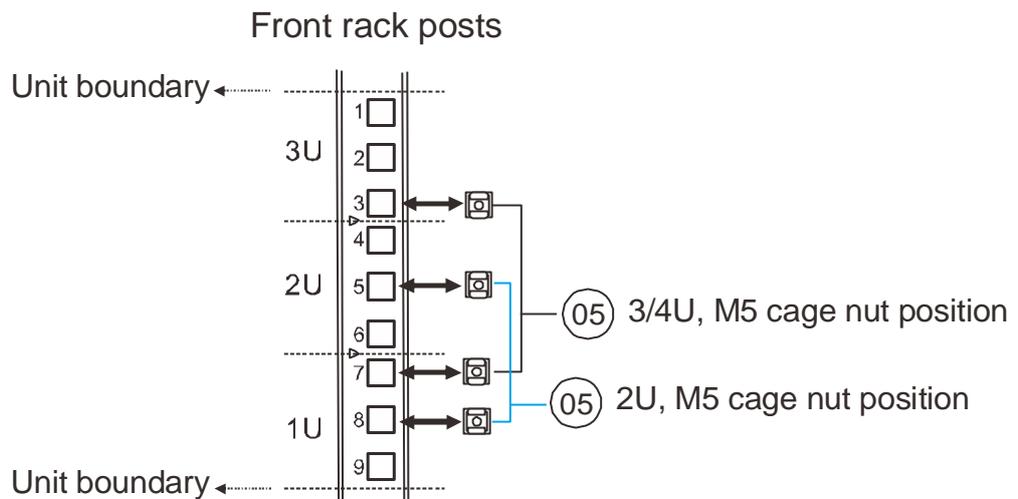
The following table shows all accessories that came with the slide rail kit.

Item	Description	Quantity
01	Mounting bracket assembly, left-side	1
02	Mounting bracket assembly, right-side	1
03	Inner glides	2
04	Flathead screws #6-32 L4	6
05	Truss head screws M5 x9.0mm	8
06	M5 cage nuts	4
07	M5 x 25mm	4
08	M6 x 25mm	4
09	#10-32 x 25.4mm	4

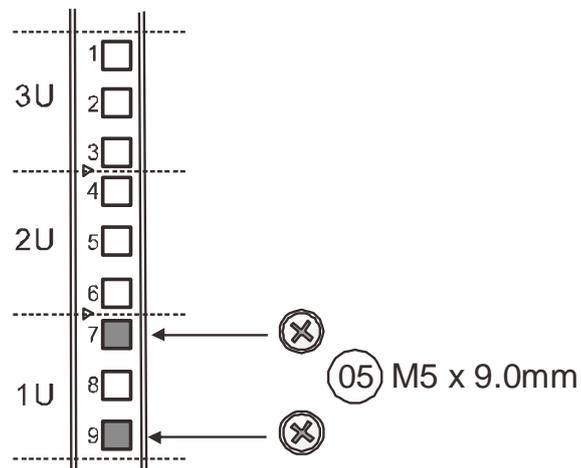


### 3.4.2. Installation Procedure

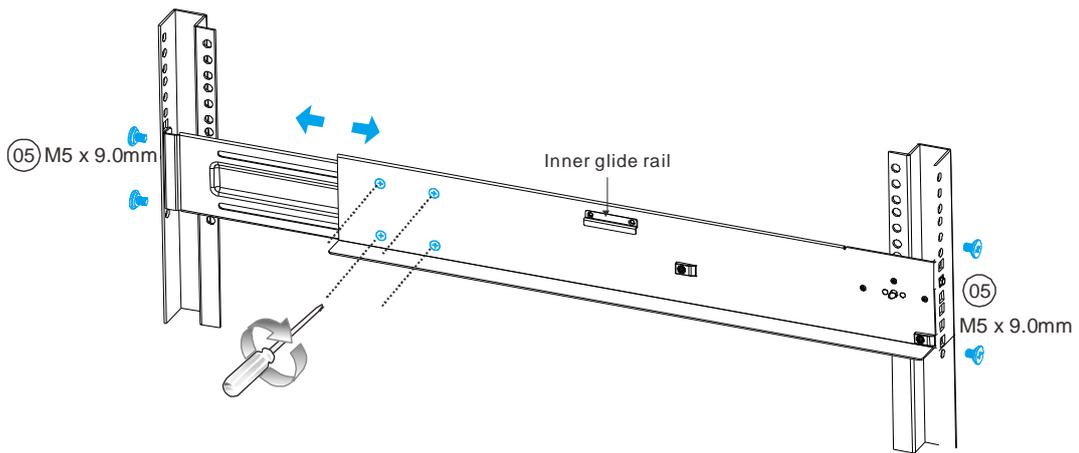
1. Determine the exact position for enclosure installation (front and rear rack posts).
2. Refer to the illustration below to insert cage nuts into the front rack post and truss head screws to secure the slide rail.



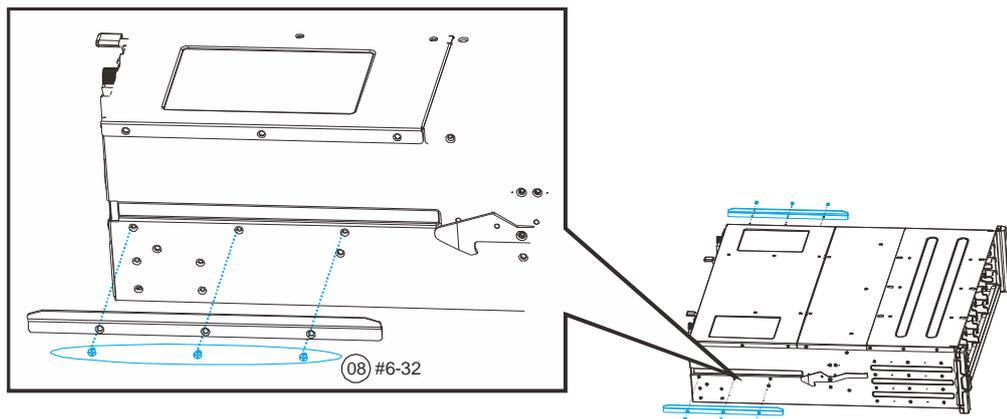
### Rear rack posts



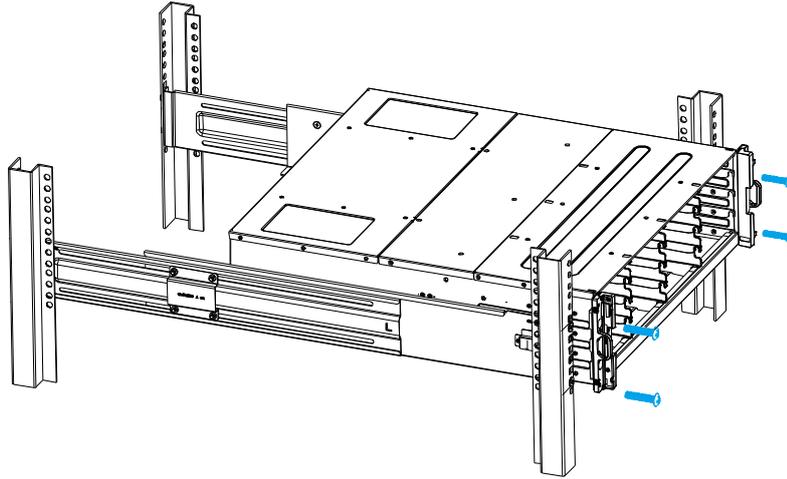
3. Adjust the length by loosening the four screws on the slide rail. Secure the slide rails to front and rear posts using truss head screws. Tighten the four screws on the slide to fix the length.



4. Attach the inner glides to BOTH sides of the enclosure using flathead screws #6-3.



5. With the assistance of another person, lift and insert the enclosure onto the slide rail.
6. Make sure the inner glides on both sides of the enclosure meets the inner glide rail. Secure the enclosure with M5 or M6 screws from the front.



### 3.5. Hard Drives Installation

Installation of hard drives should only occur after the enclosure has been rack-mounted!

Hard disk drives are purchased separately. When selecting hard disk drives (HDD), HDD manufacturers always urge users to choose enterprise/surveillance grade drives for 24/7 surveillance operations to ensure system stability. The surveillance hard drives on our Approved Vendor List (AVL) are engineered to work continuously, withstand high-temperature fluctuations and equipment vibrations found in any typical surveillance application. To reduce errors occurred on your RAID data and the chance of the recording performance being affected, it is highly recommended to use HDDs listed on our Approved Vendor List (AVL) to ensure reliability. Find the AVL on our web page: <http://www.surveon.com/support/hardware.asp>



#### **NOTE**

At least four (4) hard drives must be installed for RAID 5 or five (5) hard drives must be installed for RAID 6 to create an initial volume!

### 3.5.1. Prerequisites

Hard drives are separately purchased and when purchasing hard drives, the following factors should be considered:

**Capacity (MB/GB):** Use drives with the same capacity. RAID arrays use a “least-common-denominator” approach, meaning the maximum capacity used in each drive for composing a RAID array is the maximum capacity of the smallest drive.

**Drive Interface Type:** The enclosure accommodates SATA-II or SATA-III hard drives.



#### WARNING

Even hard drives by the same manufacturer, of the same model, and claiming the same rated capacity may actually carry different block numbers meaning that their capacity may not be exactly the same.

When configuring hard drives into a RAID array, you may use a slightly smaller capacity as the “**Maximum Disk Capacity**” in each individual hard drive. The configuration option can be found in the interface-specific firmware manual that came with your enclosure.

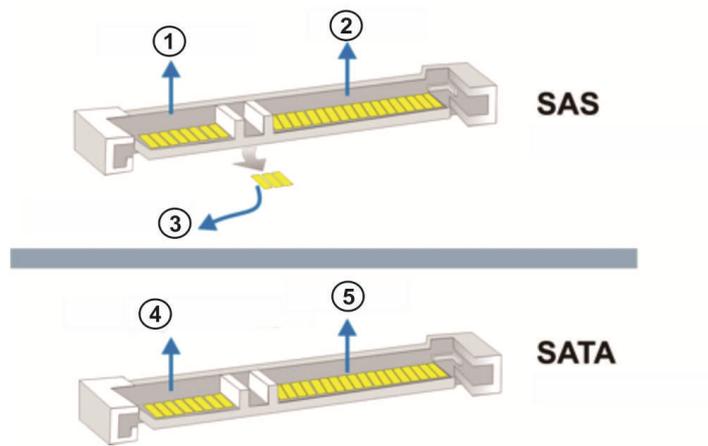
**Profile:** The drive trays and bays of the system are designed for 3.5” hard drives.

**Drive type:** The system uses SAS (3Gbps or 6Gbps), SATA and Near-line 3.5” hard drives. Please ensure that you purchase the correct hard drives.

### 3.5.2. SAS Interface

The SAS interface features a dual-ported connectivity with pins on both sides of its connector that include SAS primary links ①, power link ② and

underneath it, the SAS secondary links ③. The SATA drives have only one port that includes the SATA physical links ④ and the power link ⑤. In a redundant-controller system, the MUX-enabled drive trays must be separately purchased and applied. The single-controller JBODs do not require MUX kit.



Dual-ported SAS and Single-port SATA Connectors

 **WARNING**

The hard drives and drive trays should only be installed into the system after rack mounting. If the hard drives are installed first, the system will be too heavy to handle and the possible impact during installation may damage your hard drives.

Handle hard drives with extreme care and observe all ESD prevention methods when installing drives.

Only use screws supplied with the system package. Longer screws may damage the drive.

### 3.5.3. Hard Drive Designation

Illustrations shown below are system hard drive slot number designations. Please familiarize yourself with the designations to avoid withdrawing the hard drive(s) out of the enclosure.

The general alignment is from left to right and/ or top to bottom in numeric order as shown below.



**2U systems**



**3U systems**

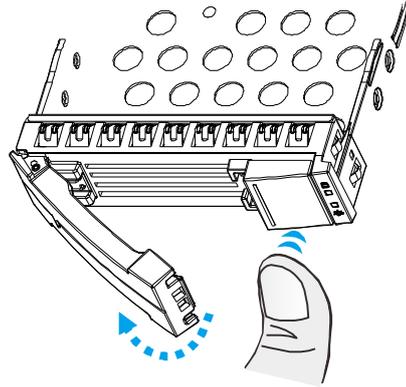


**NOTE**

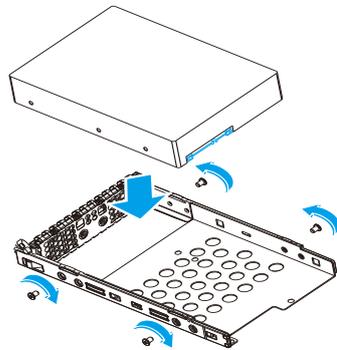
At least 4 hard drives must be installed for RAID 5 or 5 hard drives must be installed for RAID 6 to create an initial volume!

### 3.5.4. Installing the Hard Drive into Drive Tray

Open the bezel by pressing the release button and gently pull out the tray.



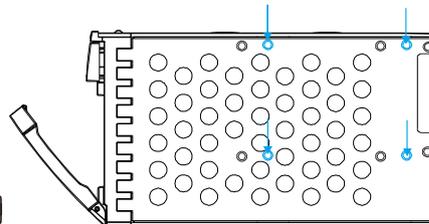
Place the hard drive into the drive tray, making sure that the interface connector is facing the open side of the drive tray and its label side facing up.



Secure the drive by fastening 4 of the supplied screws.



Front 3.5" screw holes location



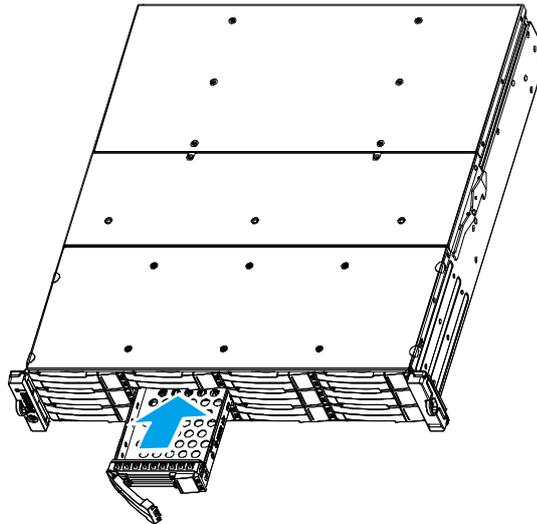
2.5" screw holes location

Adjust the drive location until the mounting holes in the drive tray are aligned with those on the hard drive. Secure the drive with four of the supplied flat-head screws.

### 3.5.5. Installing the Hard Drive into Drive Tray

Once the hard drives have been installed in the drive trays, the drive trays are ready to be installed into the system.

**With the tray bezel open,** insert the installed hard drive and tray into the enclosure. Once inserted, close the tray bezel.



#### WARNING

Each drive bay must be populated with a tray even if it does not contain a hard drive. With a bay empty, ventilation will be disrupted and the system will overheat.

### 3.6. PCIe Card Installation (Optional)

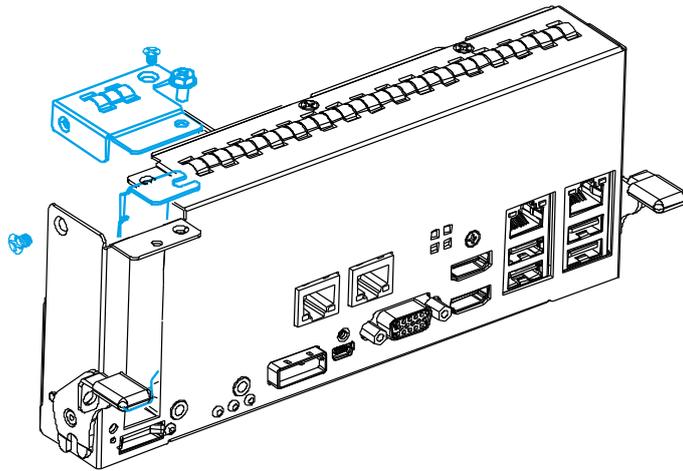
To install the PCI-E card, you need to remove the controller.



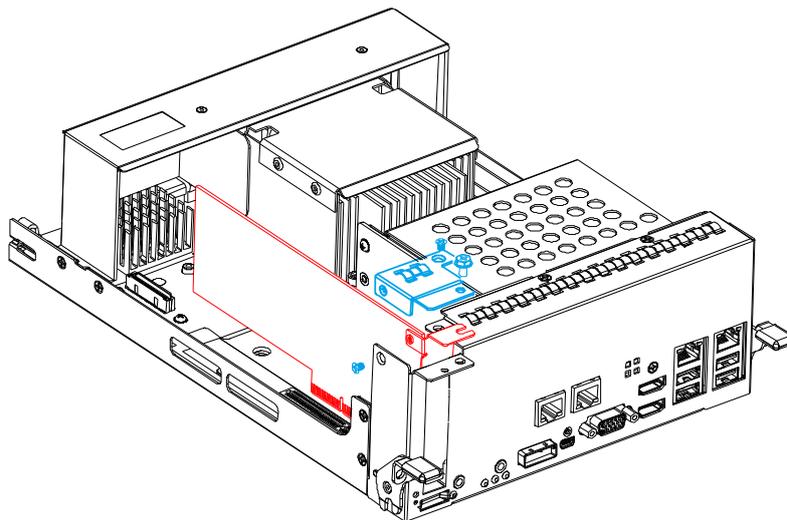
#### NOTE

Please confirm with support personnel on PCIe card qualification before purchase / installation!

1. Loosen the screws and remove the covers shown in the illustration below.



2. Install the PCI-E card into PCI-E slot, secure it with the cover and screws.



3. Insert the controller back into the enclosure, secure the screws underneath both levers.

### 3.7. Once Mounted

Once the enclosure has been mounted, you may refer to the Users' Manual that came with your system for further instructions on completing the hardware installation process. The User Manual will go on to explain details on installation /

maintenance of hard drives, controllers, optional modules, cooling modules, power supplies, cable connections, topology configurations, etc.

### **3.8. Safety Reminders**

#### **If you must relocate the enclosure after installation**

- Cease all input / output transactions, shutdown the system, disconnect all the cables (please refer to the User Manual for details)
- Empty all drive bays (hard drives + hard drive trays) and transport them separately in safe packaging
- Modules came installed within the enclosure need not be removed

#### **When the system is in operation**

- Module and drive bays must not be empty! They must have a dummy cover / plate in place to stabilized internal airflow!
- Should a module fail, leave it in its place until you have the replacement item on-hand to take its place
- Allow at least 18-20cm of clearance space at the rear of the enclosure for ventilation
- Avoid touching the PCB and gold-finger connections.

# Chapter 4. OS & Driver Installation

## 4.1. Installing Operating System

This section contains information on how to install an operating system on the internal hard drive(s) of your NVR7800 series.

---

### Supported OS platforms

Currently the following operating systems are supported by:

- Windows Server 2012 / 2012 R2
- Windows 10
- Windows Embedded Industry Pro 8.1
- Windows 7 Embedded Standard / Professional SP1
- Linux Ubuntu 13.04

---

### Prerequisites

- Make sure hardware setup has been completed. For detailed instructions, refer to the hardware quick installation guide available on the installation disc that came with your NVR7800 series.
- Make sure you have the installation package for the operating system (stored on a DVD disc or USB flash drive) ready. For example, if you want to install Windows on your NVR7800 series using a flash drive, refer to the following:  
<https://technet.microsoft.com/en-us/library/dn293258.aspx>
- If the installation package is stored on a DVD disc, make sure you have an external USB DVD-ROM at hand.  
**Note:** External USB DVD-ROMs with their name starting from "UEFI" are NOT supported by NVR7800 series.

---

### Step 2: Preparing OS installation package

Insert the operating system (OS) installation disc or flash drive that contains the OS installation package into the external USB DVD-ROM or the USB port of NVR7800 series.

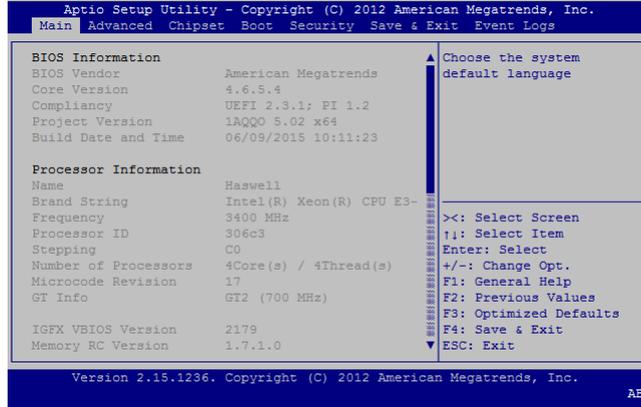
**Note:** If you want to install the OS from a DVD disc, make sure the external USB DVD-ROM has already been connected to the USB port of NVR7800 series.

---

### Step 3: Setting up BIOS to Boot up from USB flash or DVD

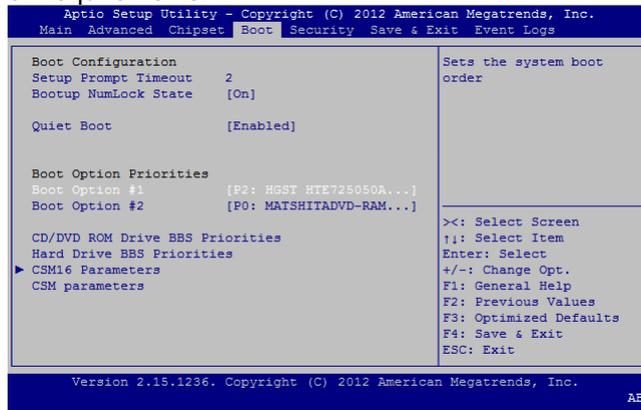
1. Start up NVR7800 series while pressing F2 on your keyboard to enter the BIOS setup utility.

disc



2. Use the arrow key to navigate to the Boot tab, select "Boot Option #1", and then select the DVD-ROM or USB flash drive (whichever contains the OS installation package) as the first OS boot option.

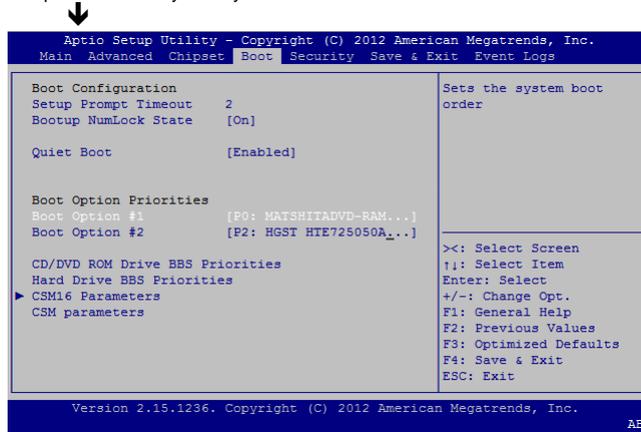
**Note:** You can set 2 boot option priorities for NVR7800 series based on requirements.



Use the arrow key to move to "Boot Option #1" and press Enter on your keyboard.



Select the DVD-ROM or USB drive you want and press Enter on your keyboard.



The DVD-ROM or USB drive is now set as the first boot option.

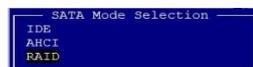
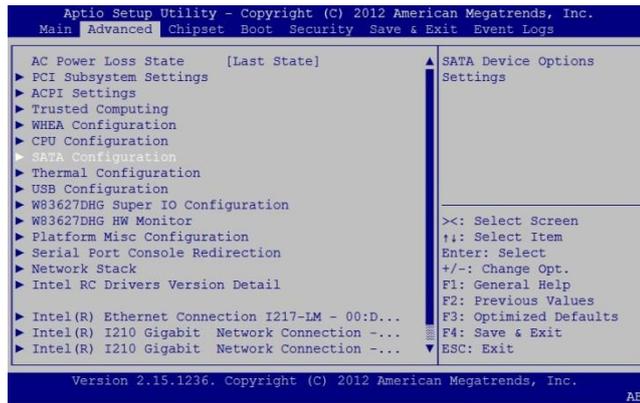
3. Under the Boot tab, use the arrow key to move to "Hard Drive BBS Priorities," and just like what you did in the press step, press Enter and

select "Boot Option #1," and then select the DVD-ROM or USB flash drive as the first boot option and press Enter.

- Depending on whether you want to set RAID configuration for internal hard drive(s), do either of the following:
  - If you do **NOT** want to set RAID configuration, press F4 on your keyboard to save the change, exit the BIOS, and reboot NVR7800 series. NVR7800 series will boot up from the DVD-ROM or USB drive you set as boot option #1. After that, skip the next section "Step 4: Setting RAID configuration for internal hard drives" and move directly to the instructions in "Step 5: Installing the operating system."
  - If you **DO** want to set RAID configuration, follow the instructions in the next section: "Step 4: Setting RAID configuration for internal hard drives."

#### Step 4: Setting RAID configuration for internal hard drives

- On the BIOS setup utility screen (which appears by pressing F2 when NVR7800 series starts up), use the arrow keys to navigate to the Advanced tab, go to SATA Configuration > SATA Mode Selection, select RAID, and then press Enter.



- Press F4 on your keyboard to save the change, exit the BIOS, and reboot NVR7800 series.
- When the "Intel Rapid Storage Technology" screen appears, press Ctrl + I to enter the storage configuration utility.

```

Intel(R) Rapid Storage Technology - Option ROM - 10.5.0.1034
Copyright(C) 2003-11 Intel Corporation. All Rights Reserved.

RAID Volumes:
None defined.

Physical Devices:
Port Device Model Serial # Size Type/Status(Vol ID)
2 HDC HD1600AAJS-7 HD-UMAP9B045721 149.0GB Non-RAID Disk
3 HDC HD1600AAJS-7 HD-UMAP9B046479 149.0GB Non-RAID Disk
Press [CTRL+I] to enter Configuration Utility...

```

- Select "1. Create RAID Volume", and press Enter.

```

Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.1.0.2101
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.

[1] Create RAID Volume
[2] Delete RAID Volume
[3] Reset Disks to Non-RAID
[4] Exit

RAID Volumes:
None defined.

Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
0 INTEL SSDSC2CW12 CU239202NE120BGN 111.76B Non-RAID Disk
1 INTEL SSDSC2CW12 CU252407U7120BGN 111.76B Non-RAID Disk

[11]-Select [ESC]-Exit [ENTER]-Select Menu

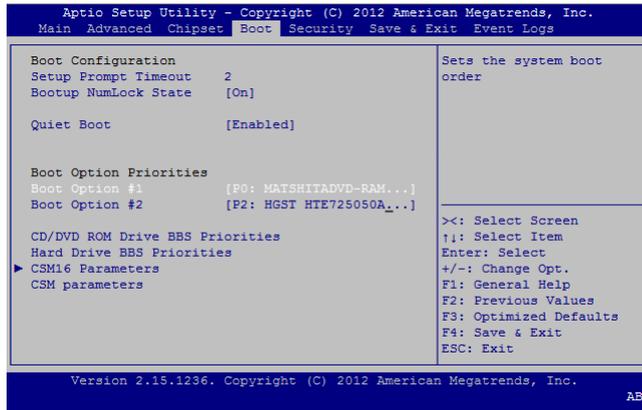
```

- Select RAID1(Mirror) and press Enter to set the RAID configuration.
- Wait until the volume is created, and then press ESC to save the changes and reboot NVR7800 series.

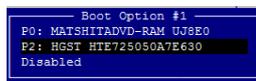
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**Step 5:**  
**Installing the**  
**operating**  
**system**

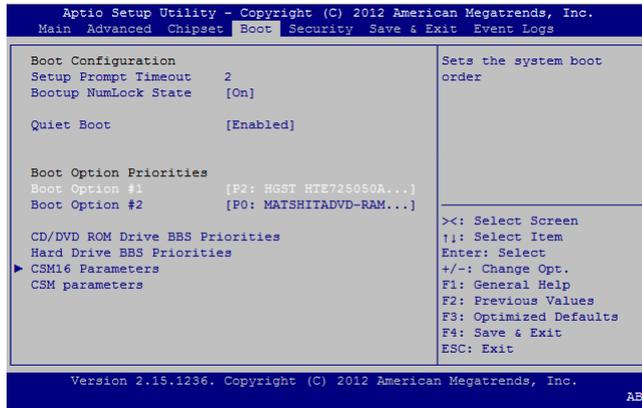
- Follow the onscreen instructions to install the operating system on the internal hard drives located at the back of your NVR7800 series.  
**Note:** For detailed information on how to install any of the OS platforms supported by NVR7800 series, refer to the Help documentation that came with the OS.
- After the operating system is installed, NVR7800 series will restart automatically.
- Remove the USB drive or DVD disc that contains the OS installation package.  
**Note:** You must set NVR7800 series' internal hard drives as the first boot option. For information on how to specify boot option #1 using the BIOS setup utility, refer to the previous section: "Step 1: Booting up from USB flash or DVD disc." The only difference that this time you need to specify the internal hard drives as boot option #1.



Use the arrow key to move to "Boot Option #1" and press Enter on your keyboard.

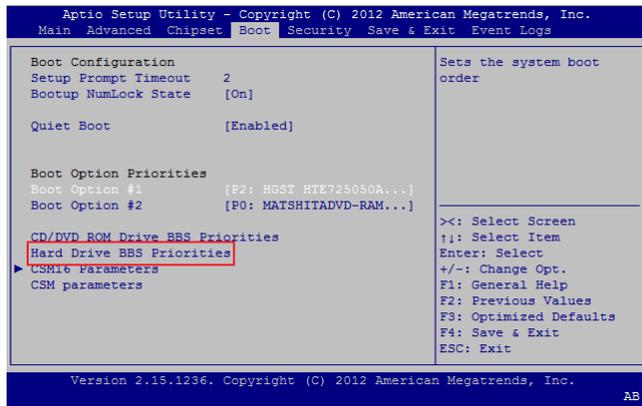


Select the internal hard drive and press Enter on your keyboard.



The internal hard drive is now set as the first boot option.

**Note:** You can also set boot priorities in Hard Drive BBS Priorities



**Important:** If enter Hard Drive BBS Priorities, in NVR7800 series you can see only one boot option, and please make sure this selected internal drive has installed required OS.

4. Set up the administrator password of the operating system when

prompted. Wait for the system to apply the settings, and then follow onscreen instructions to log in to the operating system with the newly-created password.

5. The final step for OS installation is to restart the operating system manually to have NVR7800 series boot up in a mode that can communicate with the internal storage array.

**Important:** To ensure a smooth process of installing the drivers introduced in the next chapter, manually restarting the operating system after initial login is required.

The OS installation is now complete. Refer to the next chapter for information on driver and management tool installation.

## 4.2. Installing Driver & Storage Management Interfaces

### 4.2.1. Installing System and RAID Drivers

After the operating system is installed, you can install the drivers required by the operating system and the hardware components, including the internal storage array.

---

<b>Prerequisites</b>	<ul style="list-style-type: none"><li>• Make sure you have the installation disc that came with your NVR7800 series at hand, which will be needed when installing the system drivers and the RAID driver.</li><li>• Installing system drivers for Linux requires that NVR7800 series has an active Internet connection.</li></ul>
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<b>Installing system drivers</b>	<table><tr><td><b>Windows</b></td><td><ol style="list-style-type: none"><li>1. Insert the NVR7800 series installation disc into the DVD-ROM of NVR7800 series.</li><li>2. From the auto-play menu that appears onscreen, select "Driver Installation Files" under "Software."</li><li>3. Select one of the following driver installation files:<ul style="list-style-type: none"><li>• LAN</li><li>• VGA</li><li>• USB</li></ul></li><li>4. Follow the instructions of the installation wizard to complete the setup.</li><li>5. Repeat the above steps to install the remaining drivers.</li></ol></td></tr><tr><td><b>Linux</b></td><td>Use the software update feature of your Linux operating</td></tr></table>	<b>Windows</b>	<ol style="list-style-type: none"><li>1. Insert the NVR7800 series installation disc into the DVD-ROM of NVR7800 series.</li><li>2. From the auto-play menu that appears onscreen, select "Driver Installation Files" under "Software."</li><li>3. Select one of the following driver installation files:<ul style="list-style-type: none"><li>• LAN</li><li>• VGA</li><li>• USB</li></ul></li><li>4. Follow the instructions of the installation wizard to complete the setup.</li><li>5. Repeat the above steps to install the remaining drivers.</li></ol>	<b>Linux</b>	Use the software update feature of your Linux operating
<b>Windows</b>	<ol style="list-style-type: none"><li>1. Insert the NVR7800 series installation disc into the DVD-ROM of NVR7800 series.</li><li>2. From the auto-play menu that appears onscreen, select "Driver Installation Files" under "Software."</li><li>3. Select one of the following driver installation files:<ul style="list-style-type: none"><li>• LAN</li><li>• VGA</li><li>• USB</li></ul></li><li>4. Follow the instructions of the installation wizard to complete the setup.</li><li>5. Repeat the above steps to install the remaining drivers.</li></ol>				
<b>Linux</b>	Use the software update feature of your Linux operating				

---

**(Ubuntu only)**

system to install the latest drivers.

**Note:** If the software update feature fails, check NVR7800 series' Internet connection and try again.

---

## Installing RAID driver

After the system drivers are installed, it is time to install the RAID driver which allows you to access and manage the storage array of NVR7800 series.

---

### Windows

1. Insert the NVR7800 series installation disc into the DVD-ROM of NVR7800 series.
  2. Select the model of your NVR7800 series from the auto-run menu that appears onscreen.
  3. Select the RAID driver.  
Note: If you want to use the OS file explorer to find the RAID driver, search for the file named "Virtual\_RAID.exe" on the installation disc, and then double-click on it.
  4. Follow onscreen instructions to complete the setup.
- 

### Linux (Ubuntu only)

On the installation disc of NVR7800 series, search for the following files and navigate to the folder which contains them:

- vscsihba.ko
- ift\_driver\_install.sh

Execute the following command, where the "i" option represents "install":

```
sudo sh ift_driver_install.sh i
```

To remove the driver, execute the following command, where the "r" option represents "remove":

```
sudo sh ift_driver_install.sh r
```

If driver removal or update fails, you might need to release the "vscsihba" module by doing the following:

1. Make sure all processes using the "vscsihba" are stopped.
2. Make sure all partitions created using SANWatch or EonOne Lite (refer to the "Installing EonOne Lite and SANWatch" section) has been unmounted.
3. If the "vscsihba" module is not released even when the above steps are done, restart NVR7800 series.

## 4.2.2. Updating RAID driver

This section contains information on how to update the RAID driver whenever there is an update to it.

**Prerequisites** The RAID driver is also available at Infortrend: [www.infortrend.com](http://www.infortrend.com)

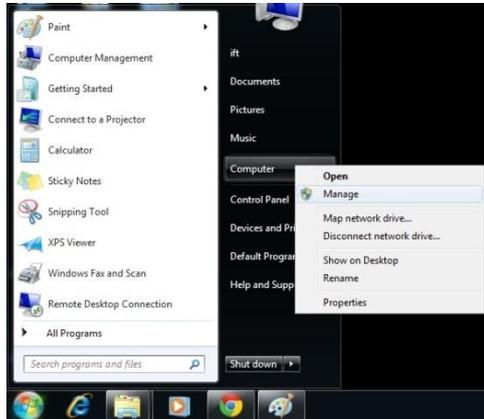
For more information on how to retrieve the updated RAID driver from Infortrend, contact Technical Support.

After downloading the archived update package from Infortrend, extract the archive to a folder.

### Steps

#### Windows

1. Go to Start > Computer, right-click on it and choose Manage from the contextual menu to open Device Manager.



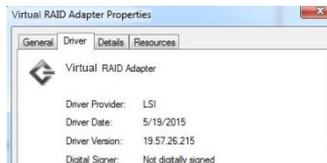
2. Locate Storage Controllers > Virtual RAID Adapter, right-click on it, and choose Update Driver Software from the contextual menu.



3. From the wizard that appears, select "Browse my computer for driver software," click Browse. Navigate to the folder where the RAID driver is placed and select it.



4. Keep clicking Next to complete the update process and close the wizard.
5. To check the driver version, locate Storage Controllers > Virtual RAID Adapter, right-click on it, and choose Properties from the contextual menu. The driver version can be viewed under the Driver tab.



### Linux (Ubuntu only)

Navigate to where the extracted update files are located, and then execute the following command, where the option "u" represents "update":

```
sudo sh ift_driver_install.sh u
```

If driver removal or update fails, you might need to release the "vscsihba" module by doing the following:

1. Make sure all processes using the "vscsihba" are stopped.
2. Make sure all partitions created using SANWatch or EonOne Lite have been unmounted.
3. If the "vscsihba" module is not released even when the above steps are done, restart NVR7800 series.

### 4.2.3. Installing EonOne Lite and SANWatch

When the operating system and all the necessary drivers are properly installed, you can install EonOne Lite and SANWatch to get started with array management.

#### What is EonOne Lite and

EonOne Lite is a web-based quick configuration utility which helps you easily discover and set up the internal storage array of NVR7800 series, create partition(s) on it, update its firmware, and monitor its status to

**SANWatch**

prevent potential crisis.

SANWatch, on the other hand, is a more advanced web-based management interface which allows for more sophisticated management tasks.

---

**Procedures**

For detailed instruction on how to install and use EonOne Lite and SANWatch, please refer to their user manuals available on the installation disc of NVR7800 series and also available on [Customer Support System](#).

# Chapter 5. Connections & Expansions

The operating systems and EonOne Lite has been pre-installed into NVR7800 system. Therefore, users don't need to install the OS and EonOne Lite by themselves. In this chapter, it indicates what considerations would be after the hard drives numbers are selected, the JBOD SAS Expansion configuration and the powers up notices for your reference.

## 5.1. Accessing EonOne Lite

1. Click the EonOne Lite shortcut on your Desktop to launch the web-based EonOne Lite interface, or go to either of the following addresses using a web browser:
  - HTTP access: <http://127.0.0.1:8816/>
  - HTTPS access: <https://127.0.0.1:8817/>
2. The default username and password are "admin".
3. Please refer to the EonOne Lite manual on the provided for more details.

## 5.2. Considerations

When selecting the number of hard drives to be included in a logical drive, the host channel bandwidth and the mechanical performance of individual disk drives should be considered.

It is a good practice to calculate performance against the host port bandwidth when designing an application topology. As an example, if eight members are included in a logical drive and this logical drive is associated with a host ID (LUN mapping), the combined performance of this logical drive

should approximate the channel bandwidth. If, for example, two 6-drive logical arrays are associated with two IDs residing on a single host channel, there may be a trade-off with performance.

It is recommended that you obtain more disk drives by attaching a JBOD so that you can create host-port corresponding 6-member logical drives (RAID-5) or 8-member logical drives (RAID-6). These logical drives leverage the bandwidth of each host port.

There are other considerations:

- For example, a spare drive carries no data stripes and will not contribute to disk-level performance. Refer to the documentation for your hard drives for performance data.
- The disk drives in the same logical array should have the same capacity, but it is preferred that all the drives within a chassis have the same capacity.
- Disk drives in the same logical drive should have the same capacity, but it is preferred that all the disk drives within a chassis have the same capacity. Tiered storage configuration is supported, e.g., 150GB SAS drives in your RAID enclosure and 750GB SATA drives in JBODs. However, you should not include both SAS and SATA drives in a logical drive.
- A spare drive should have a minimum capacity that is equivalent to the largest drive that it is expected to replace. If the capacity of the spare is less than the capacity of the drive it is expected to replace, the controller will not proceed with the failed drive rebuild.
- When cabling, follow all the specifications. Pay attention to signal quality and avoid electronic noise from adjacent interfaces, e.g., do not lay power cords on optical cables.
- When rack-mounted, leave enough slack in the cables so that they do not bend to a diameter of less than 76mm (3 inches).
- Route the cables away from places where it can be damaged by

other devices, e.g., foot traffic or fan exhaust.

- Do not over-tighten or bend the cables.

### 5.3. JBOD Connections



#### WARNING

All SAS cables are sensitive and must be handled with care. To prevent interference within a rack system, the cable routing path must be carefully planned and the cables must not be bent.

Please contact your vendor for a list of compatible components!

#### 5.3.1. JBOD SAS Expansion Configuration

The SAS expansion port connects to expansion JBOD enclosures.

A longer cable may be required if connections to JBODs are made from two opposite directions. Routing through two different connections can avoid loss of data links if one enclosure fails in between.

#### 5.3.2. Setting JBOD ID

There is a rotary ID switch on every expansion enclosure that is manually configured using a flat blade screwdriver.

Configuring enclosure IDs:

- The configurable IDs for JBODs are from 1 to 15. Usually the numbering starts from the one



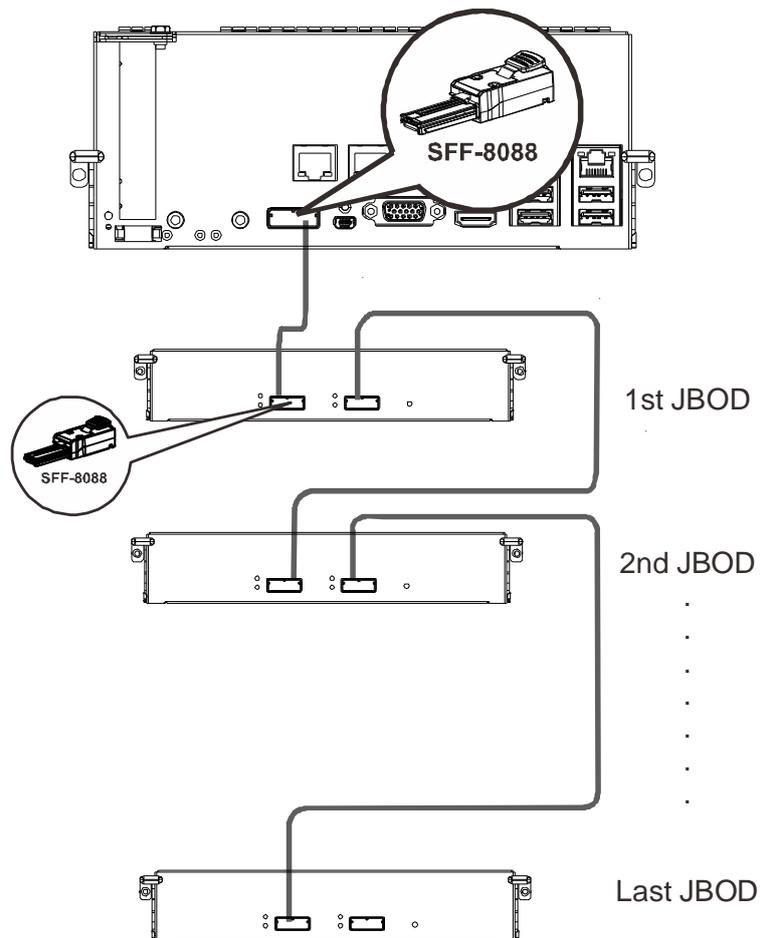
closest to the managing RAID enclosure.

- Make sure a unique ID is configured on each JBOD so that the SAS WWN addresses of disk drives can be properly assigned. NVR system firmware automatically manages these addresses.

### 5.3.3. JBOD Expansion Connections

- NVR7800er SAS exp. - 1st JBOD SAS-IN
- 1st JBOD SAS-OUT - 2nd JBOD SAS-IN

.... and so forth!





#### NOTE

For each storage device, users can create multiple RAIDs. Please note that do not create a RAID from cross-platform storage.

When operating, turn on JBOD chained firstly, and then turn on the machine to prevent error. Please follow this booting up sequence after connecting SAS cables between NVR and JBODs. **JBOD Last>...> JBOD2 > JBOD1> NVR.**

When create a RAID, please follow this booting up sequence: **JBOD Last>...> JBOD2 > JBOD1 > NVR.**

## 5.4. Power Connections

Once all hard drives have been properly installed and the I/O ports or management interfaces have been connected, the system can be powered on.

### 5.4.1. Checklist

**BEFORE** powering on the system, please check the following:

- **Hard drives:** Hard drives are correctly installed in the drive trays.
- **Drive trays:** All the drive trays, whether or not they contain a hard drive, have been installed into the system.
- **Cable connections:** The system has been correctly connected to host computer(s), management computers, or external networking devices.
- **Ambient temperature:** Make sure the surrounding environment temperature is not higher 35 degrees Celsius.

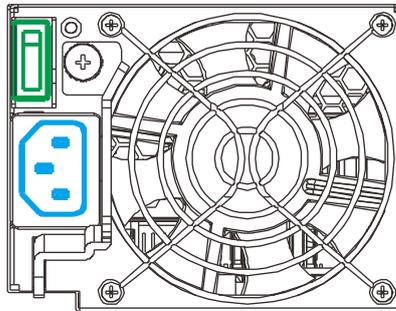


#### NOTE

Make sure you use the power cables provided that are at least 1.2 meters in length. **DO NOT** use extension cables as the power cables are designed to connect **ONLY and DIRECTLY** to relocate power taps (RPTs) on server cabinets.

### 5.4.2. Connecting Power Cords

Use the included cables and connect them to the power sockets (in blue) for both PSUs.



### 5.4.3. Power-On Procedure

Before you power on the system, please power on the expansion JBOD storage systems first if your network configuration has multiple arrays.

To power on the system please follow the procedures below.

Turn on the power switches to the “on” position for every PSUs’ power switches (shown above in green), for both PSUs from left to right.



#### NOTE

Make sure all power supply modules’ switches are turned on!

1. Power on the networking devices, e.g. switches.

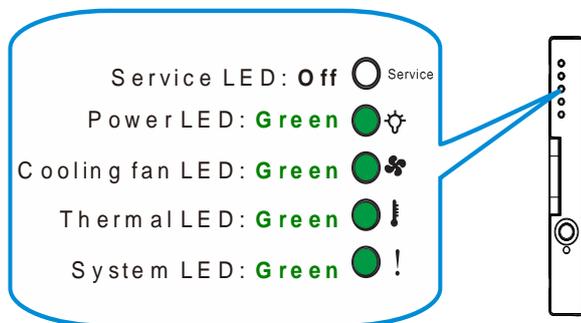
2. Press the power button at the front panel.

#### 5.4.4. Power-On Status Check

##### Verify the status LEDs (Front Panel)

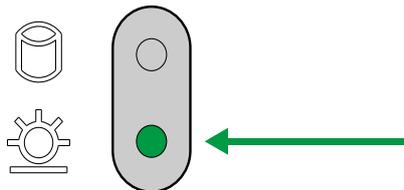
Observe the front of the enclosure. If the LED indicators show different status than described below, or if you hear an audible alarm, please contact customer support.

##### Front panel LEDs:



##### Drive tray:

- Power Status LED: On (green)



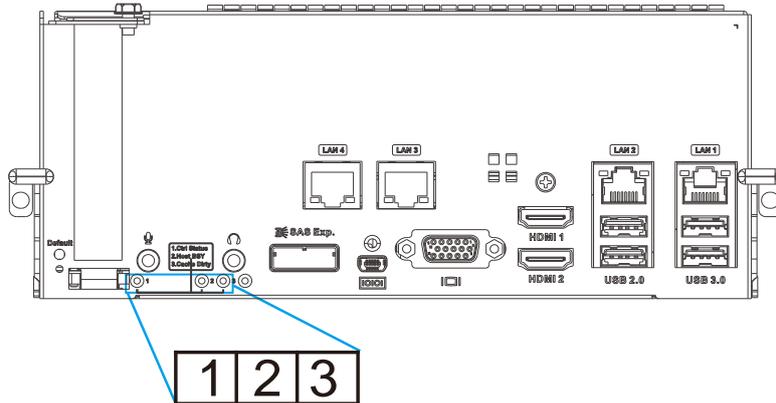
##### Verify the status LEDs (Rear Panel)

As a general rule, once the system has been powered on, there should **NOT** be LED(s) that light up **red** / **amber** nor should you hear an audible alarm from the system. You should begin verifying system statuses via the following monitoring interfaces:

- LEDs on rear chassis, including controller module, PSUs, and cooling modules (refer to “System Monitoring”).

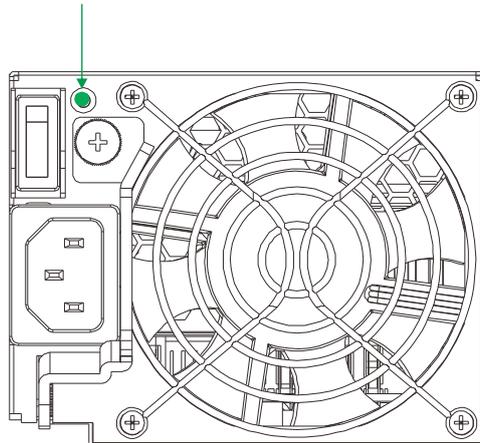
**Controller LEDs:**

Item	Description	Status
1.	Ctrl Status LED	Green
2.	Host Busy	Green
3.	Cache Dirty LED	Amber



**PSU & Cooling Module LEDs:**

PSU LED: On (green)



### 5.4.5. Power-Off Procedure

If you wish to power down the system, please follow these steps:



#### NOTE

If you wish to power down the system, please ensure that no time-consuming processes, like “Regenerate Logical Drive Parity” or a “Media Scan,” are taking place.

#### 1. Stop I/O access to the system

Close your applications to stop all I/O access to the system.

#### 2. Flush the cache

Locate the Cache Dirty LED on the controller module to check if there is still cached data in the DRAM (if the LED is lit up in **amber**).

#### 3. Use the Shutdown function to flush all cached data (please refer to the EonOne Lite manual)

#### 4. Once the cache has been flushed, you may proceed to power down the system.

# Chapter 6. System Monitoring

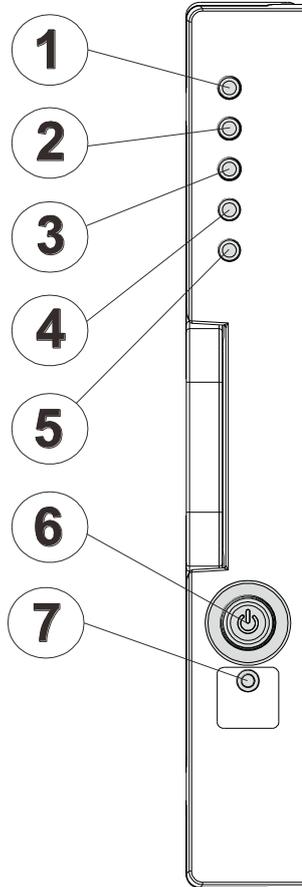
The NVR7800 series is equipped with a variety of self-monitoring features that help keep system managers aware of system operation statuses.

## 6.1. Monitoring Features

You may monitor the system through the following features:

- **EonOne Lite:** EonOne Lite is a browser-based Graphical User Interface (GUI) that can monitor and manage the system. For more details, please refer to manuals on the CD-ROM.
- **LEDs:** LED indicators notify users of system status, events, and failures. LEDs are located on both the front and rear panel of the chassis. For details, see and subsequent sections.
- **Audible alarm:** Audible alarm will be triggered in case of system failures. For details, see “PSU/Cooling Module LEDs”.

### 6.1.1. LED Panel Status

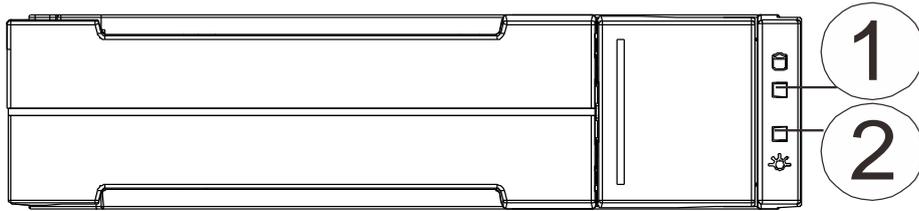


Name	Color	Status
① Service	White	White indicates that the system is being serviced or is requiring services. OFF indicates that the system is not being serviced nor is requiring services.
② Power	Green/ Amber	Green indicates that the system is powered properly. Amber indicates that there is a power failure in the system.
③ Cooling fan	Green/ Amber	Green indicates that the cooling fan is operating properly. Amber indicates that there is a cooling fan failure in the system.

④ Thermal	Green/ Amber	<p>Green indicates that the internal temperature is within the safety threshold.</p> <p>Amber indicates that the internal temperature has gone over the safety threshold.</p>
⑤ System fault	Green/ Amber	<p>Green indicates that the system is operating normally.</p> <p>Amber indicates that the system has encountered abnormal conditions:</p>
⑥ Power button	N/A	<p>Press and release instantly to turn on the system.</p> <p>To force system to shutdown, press and hold till system shuts down!</p> <p>Note: Some systems' power button is located at the rear.</p>
⑦ Mute/ service button	N/A	<p>Press the button once mutes the audible alarm.</p> <p>Press and hold for more than two seconds to mute the alarm and activates the service LED.</p>

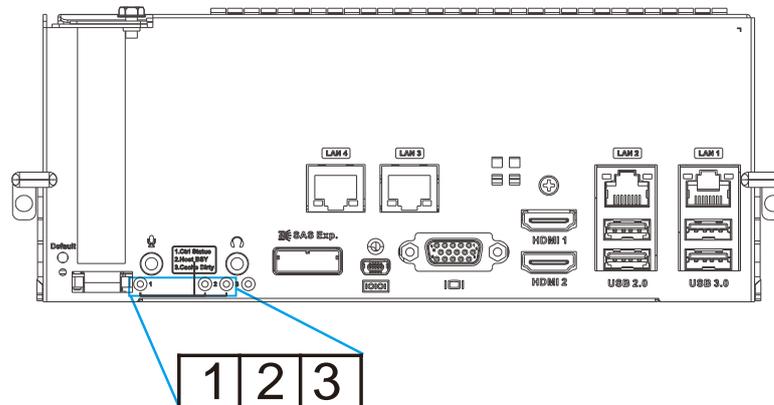
### 6.1.2. Drive Tray LED

Two LED indicators are located on the right side of each drive tray. When notified by a drive failure message, you should check the drive tray indicators to find the correct location of the failed drive.



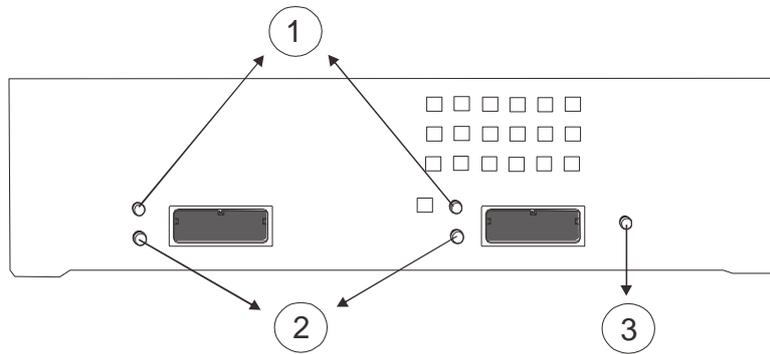
Name	Color	Status
① Drive Busy	Blue	<b>Flashing Blue</b> indicates data is being written to or read from the drive. The drive is busy. <b>Steady Blue</b> indicates that a hard drive is plugged-in but there is no activity on the disk drive.
② Power Status	Green / Red	<b>Green</b> indicates that the drive bay is populated and is working normally. <b>RED</b> indicates that the disk drive has failed, or a connection problem occurred.

## 6.2. Controller LED



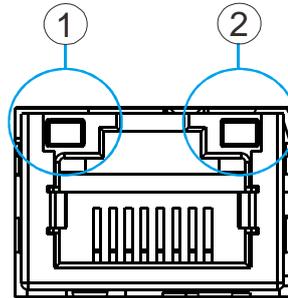
Name	Color	Status
1. Ctrl Status	Green/ Amber	<b>Green</b> indicates that a RAID controller is operating healthily. <b>Amber</b> indicates that a component failure has occurred, or inappropriate RAID configurations have caused system faults. It is also lit during the initialization process.
2. Host Busy	Green	<b>Blinking Green</b> to indicate traffic on the host bus.
3. Cache Dirty	Amber	<b>OFF</b> indicates that the cache is clean, and that the battery backup unit is capable of sustaining memory in case of power loss. <b>Blinking Amber</b> indicates cached data is being transferred to the flash module after the occurrence of a power outage. Once the transfer is done, all LEDs will turn off.

### 6.2.1. Controller LED for JBOD Models



Name	Color	Status
1. SAS Link	Green	<p><b>Steady green</b> indicates all 4 PHYs are validly linked to external devices.</p> <p><b>Blinking green</b> indicates one of the 4 PHYs links has failed.</p> <p><b>OFF</b> indicates all 4 PHYs are offline.</p>
2. SAS Speed	Green / Amber	<p><b>Green</b> indicates 6Gbps link speed.</p> <p><b>Amber</b> indicates 3Gbps link speed.</p> <p><b>OFF</b> indicates no connection.</p>
3. Ctrl Status	Green / Amber	<p><b>Green</b> indicates the controller is operating normally.</p> <p><b>Amber</b> indicates a component failure has occurred. It is also lit during the initialization process.</p>

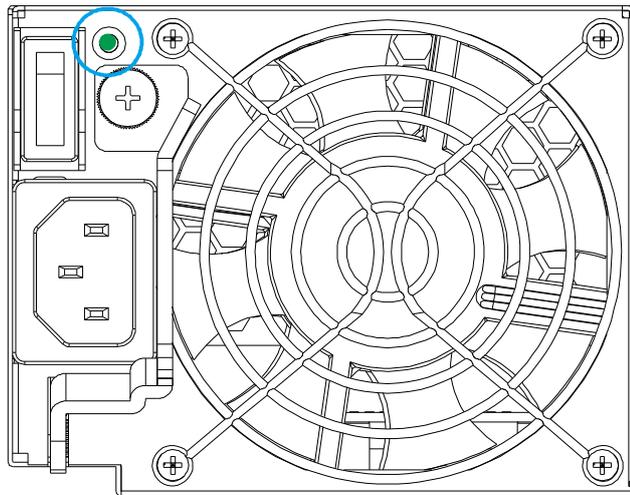
## 6.2.2. Ethernet Port LEDs



Name	Status	Status
1. Speed status LED	Green	Green indicates 1Gb connection established.
	Off	Off indicates 10/100Mb connection established or no connection established.
2. Link / activity	Amber	Steady amber indicates a connection has been established. Flashing amber indicates data I/O.
		Off indicates connection not established.

### 6.3. PSU/Cooling Module LEDs

The PSU (Power Supply Unit) contains the LEDs for the PSU and the cooling module statuses. When either of the unit fails, you need to replace the PSU as soon as possible. For details, please refer to “Replacing the Power Supply Module”.



#### PSU & Cooling Module Status LED

Status	Description
Flashing (Green)	The system is connected to power supply but the power switch has not turned on.
On (Green)	The PSU / cooling module is operating normally.
On (Red)	The PSU / cooling module is faulty.

### 6.4. Alarms and I<sup>2</sup>C Bus

Other monitoring schemes include audible alarms and I<sup>2</sup>C bus.

### 6.4.1. Audible Alarms

If any of the following components fails, the audible alarm will be triggered:

- Cooling fan modules
- PSU modules
- Hard disk drives
- Sensors or presence detection circuitries

If the system administrator hears an alarm, the manager must read the error message on the terminal or SANWatch screen to determine what has triggered the alarm, and then take appropriate actions to rectify the problem.

The alarm can be turned off using the mute button on the front panel.



#### NOTE

When temperature exceeds a preset threshold, the controller's charger circuits will stop charging. You will then receive a message that reads "Thermal Shutdown/Enter Sleep Mode." When the temperature falls back within normal range, the battery will resume charging.

### 6.4.2. I<sup>2</sup>C

The operating status of PSU and cooling fan modules are collected through an I<sup>2</sup>C serial bus. If either of those modules fails, the failure will be detected and you will be notified through the same methods as in the audible alarms.

## Chapter 7. System Maintenance



### WARNING

Do not remove a failed component from the system until you have a replacement on hand. If you remove a failed component without immediate replacement, it will disrupt the internal airflow.

Qualified engineers who are familiar with the system should be the only ones who make component replacements.

When inserting a removable module, do not use excessive force. Forcing or slamming a module can damage the connector pins either on the module itself or on the backplane.

The following components can be replaced:

- PSU module: please refer to “Replacing the Power Supply Module”
- Hard drive: please refer to “Replacing the Hard Disk Drive”

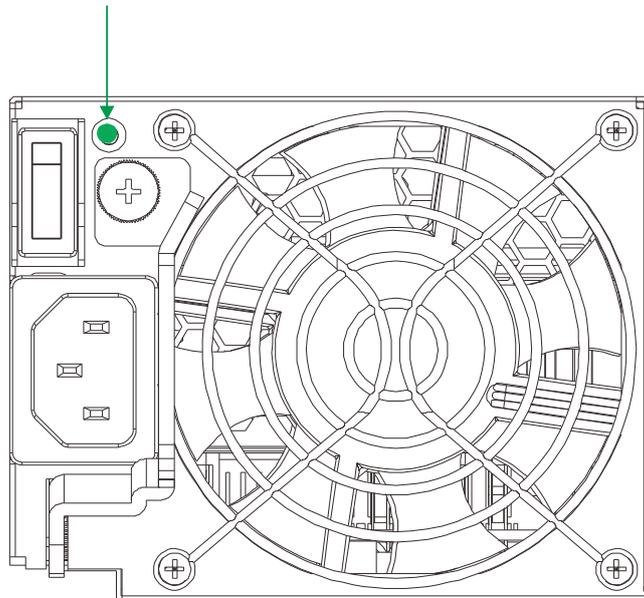
## 7.1. Replacing the Power Supply Module / Cooling Module

The power supply units (PSU) are configured in a redundant configuration with each PSU housed in a robust steel canister.

### 7.1.1. Detecting a Failed PSU

If a PSU module fails, the system notifies you through the following indicators:

- PSU status LED locations



- Audible alarm (refer to “Audible Alarms”)
- Firmware utility (refer to Firmware User Manual in the CD-ROM for details)
- SANWatch manager software (refer to SANWatch User Manual in the CD-ROM for details)

## 7.1.2. Replacing Power Supply Unit

A failed PSU should be replaced as soon as possible, but only when you have a replacement module in your hand. Contact your vendor for more details.

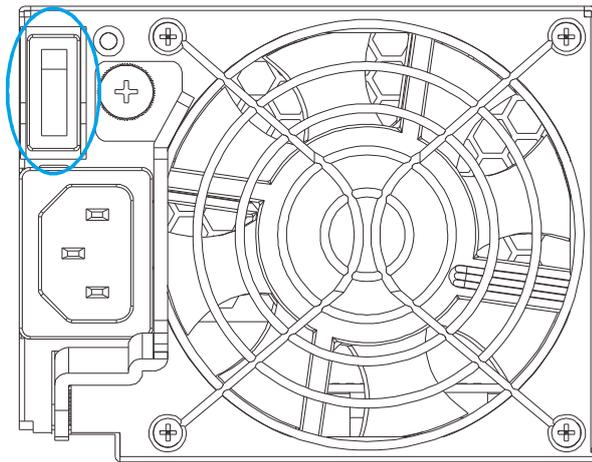


### WARNING

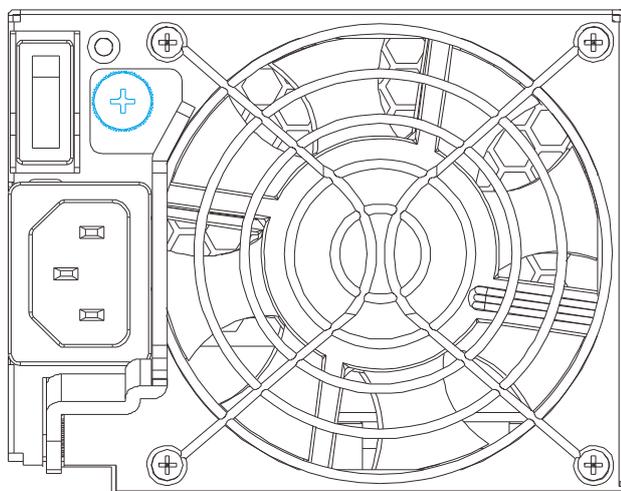
Although the system can operate with a failed PSU in a system, it is not recommended to run the system with a failed PSU for an extended period of time. The failed spare redundant PSU should be replaced as soon as possible!

To replace a PSU, follow these steps:

1. Power off the system, turn off the PSU and unplug the power cord.

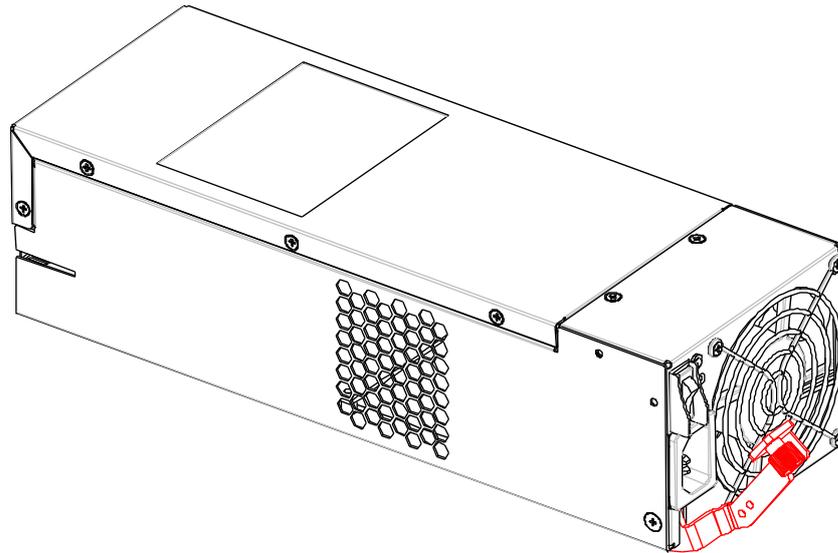


2. Loosen the retention screw that secures the extraction handle to the chassis.

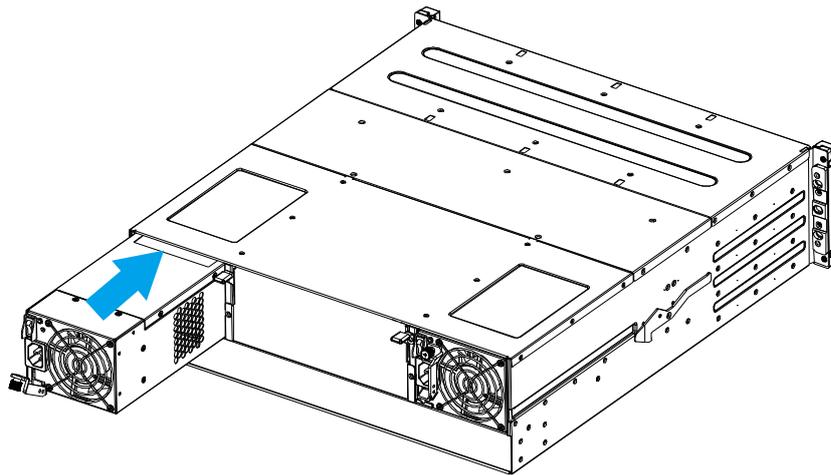


3. To remove the PSU module, pull the extraction handle downwards to disconnect the PSU from the backplane connectors. Once dislodged, gently pull the PSU out of the system. If the system is mounted in a

rackmount rack, use another hand to support its weight while removing the module.



4. Insert the replacement module. Make sure the extraction handle is pointing outwards. Push the replacement PSU into the chassis, and when you feel the contact resistance, push the extraction handle towards the PSU module and it should engage the back-end connectors.



5. Fasten the thumb screw.
6. Reconnect the power cord.
7. Power on the PSU module.

## 7.2. Replacing a Hard Drive



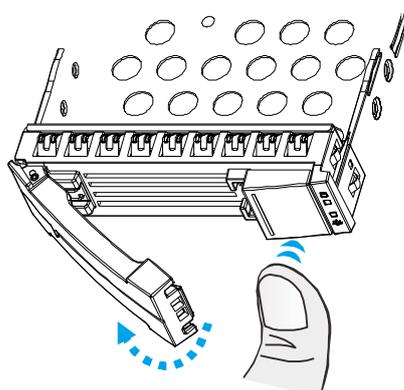
### WARNING

Keep a replacement on hand before replacing the hard drive. Do not leave the drive tray open for an extended period of time or the internal airflow will be disrupted.

Handle the hard drives with extreme care. Carry them only by the edges and avoid touching their circuits part and interface connectors.

To replace a hard drive, follow these steps.

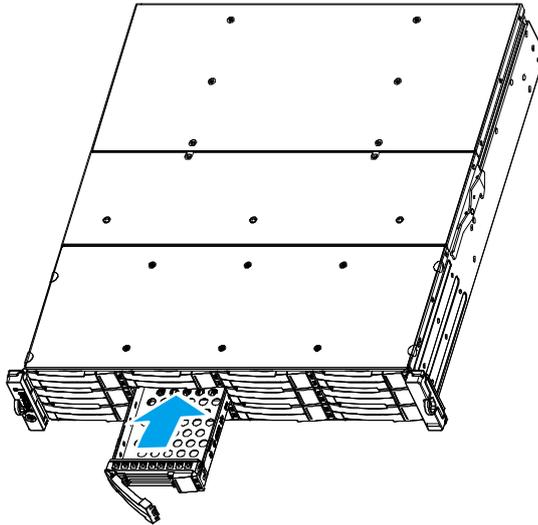
1. **Identify the drive tray.** Use EonOne Lite or the LED on the drive tray to identify faulty hard drive(s). The drive bays are numbered from left to right and from top to bottom.
2. **Open the drive tray.** Press the button. The spring handle will pop out.



3. **Remove the drive tray.** Pull the tray one inch away from the enclosure. Wait for at least 30 seconds for the disk drive to spin down, and then gently withdraw the drive tray from the chassis.
4. **Remove four retention screws** (two on each side). The screws secure the hard drive to the drive tray.



5. **Replace the drive.** After swapping the drive, fasten the retention screws back. Refer to screw locations in the previous step.
6. **Insert the drive tray back into the enclosure.** Install the drive tray with the front bezel open. When fully inserted, close the front bezel.



7. Check for drive error. Make sure that there is no more error reported.

# Chapter 8. Troubleshooting

## 8.1. OS Hard Drive Replacement

There're two 2.5'' 500G SATA hard drive on the controller that made into RAID1 to increase the security of OS drive.

## 8.2. OS Drive Status Checkup Methods

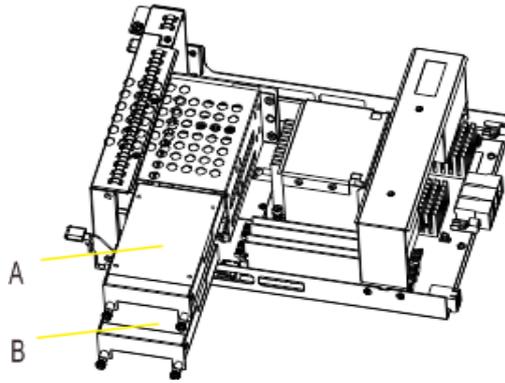
There are 2 methods to monitor the health status of OS drive, Surveon strongly recommend you to check the OS drive status periodically to ensure the security of the system.

### Method 1: Intel®RSTe AHCI&SCU Software RAID Driver

Through method 1, the tool of *Intel®RSTe AHCI&SCU Software RAID Driver* will detect which OS Hard Drive is damaged by the “Status” which is shown on the screen and provides the “location” information. The status will display as “Degraded” instead of “Normal”



If the location shows as **“Controller 0, Port 2”**, it stands for the hard disc of slot 2 (on the upper shelf)—(A area as the following pic shows) is damaged. On the contrary, If the location shows as **“Controller 0, Port 3”**, it stands for the hard disc of slot 3 (on the lower shelf) – (B area as the following pic shows) is damaged.



## **Method 2: Windows Event Log**

If there is disc error, the warning signal will appear in the Windows Event Log.

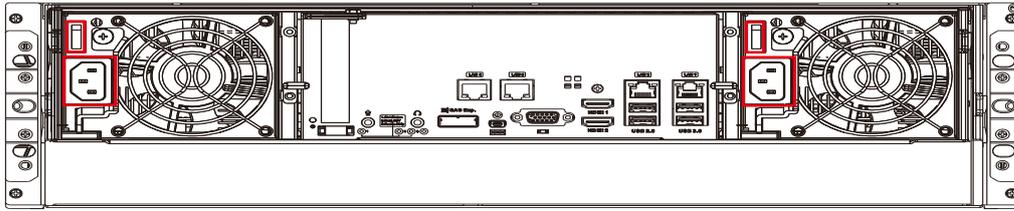
Level	Date and Time	Source	Event ID	Task Category	
Warning	2/18/2016 3:34:32 PM	elrepress	27	None	Intel(R) I210 Gigabit Network Connection#6  Network link is disconnected.
Warning	2/18/2016 3:34:32PM	elrepress	27	None	Intel(R) I210 Gigabit Network Connection#5  Network link is disconnected.
Warning	2/18/2016 3:34:32PM	elrepress	27	None	Intel(R) I210 Gigabit Network Connection#4  Network link is disconnected.

***The damage warning notice and replacement procedures are as followed:***

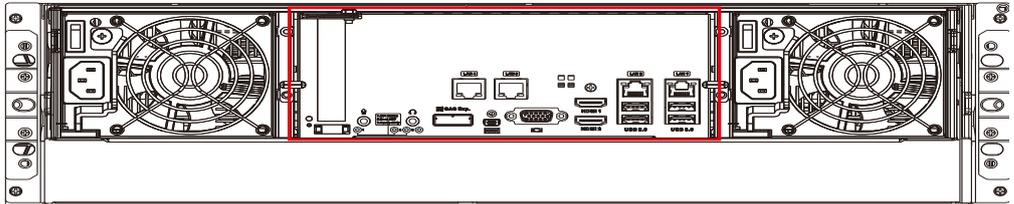
***Tools Required: Philips Screwdriver***



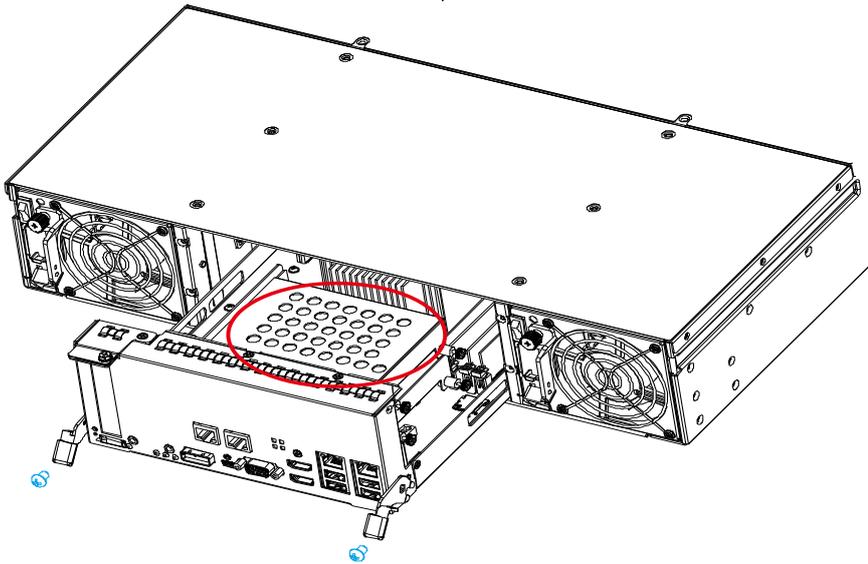
1. Confirm which OS drive is damaged by ***Intel®RSTe AHCI&SCU Software RAID Driver***
2. Turn off the NVR7800 subsystem.



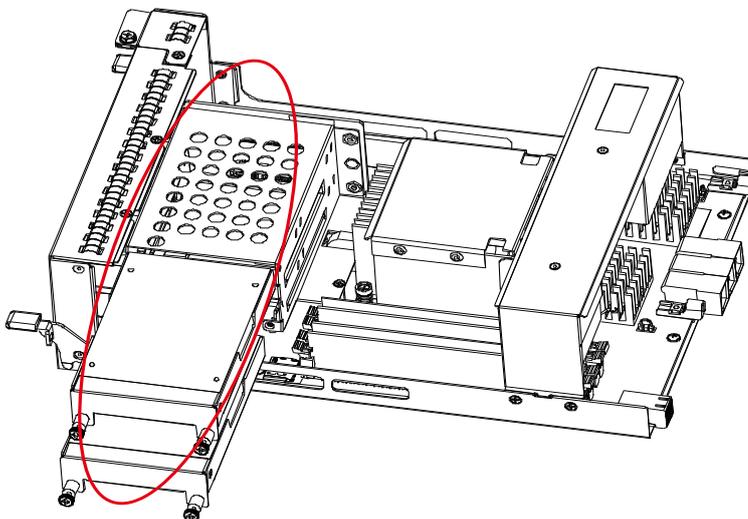
3. Loosen the screws on the lever, and push the levers down to remove the controller out of the enclosure.



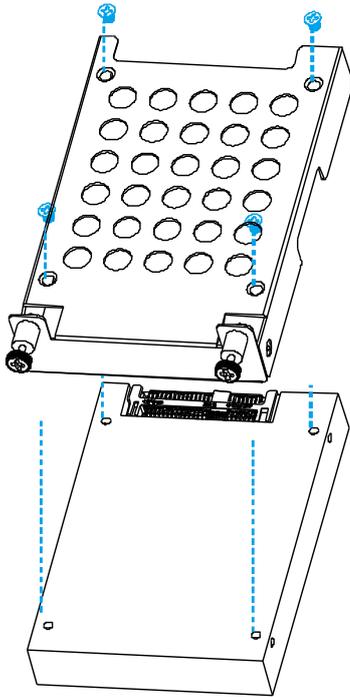
Pull the Controller out and replace new 2.5" OS HDDs.



4. Depart the damaged HDD based on the information that you are informed.  
Loosen the thumb screws on the tray and gently pull out the tray from the cage.



5. Install the new hard drive into the tray, insert it back into the cage, tighten the thumb screws.



Also, Match the labels to install 2.5”HDDs.

For example:

- Ctrl 0, Port 2: Place this HDD on the top tray.
- Ctrl 0, Port 3: Place this HDD on the lower tray.





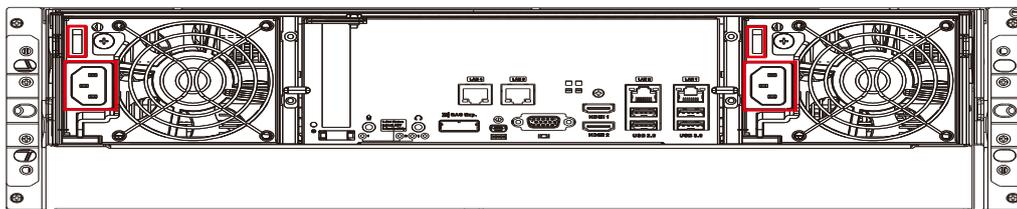
6. Insert the controller back to the controller tray on the rear panel.
7. Finally, reboot the computer to enable RAID1 mirror the functions of the hard disc.

**Note:** (1) If you encounter pretty rare circumstances that 2 OS drives are damaged simultaneously, please contact with FAE. (2)The *Intel®RSTe AHCI&SCU Software RAID Driver* is placed in product's CD.

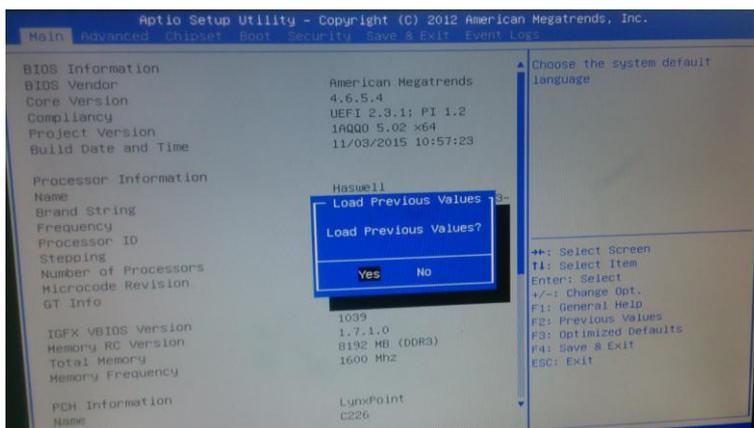
### 8.3. Power on the System, and Format RAID

After replacing OS drives, reset the system to the default.

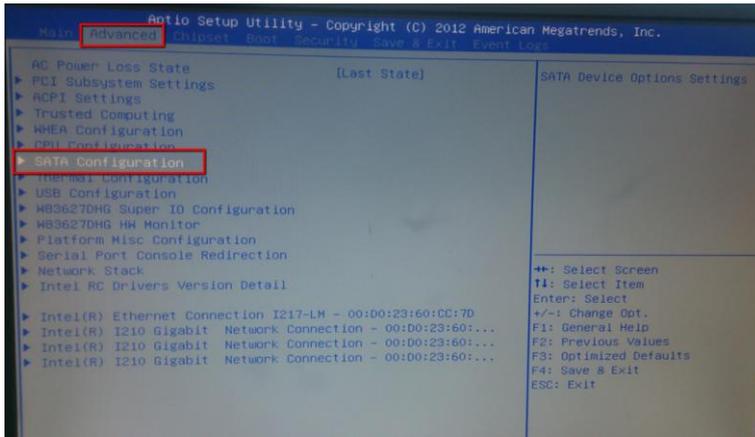
1. Power on the NVR7800.



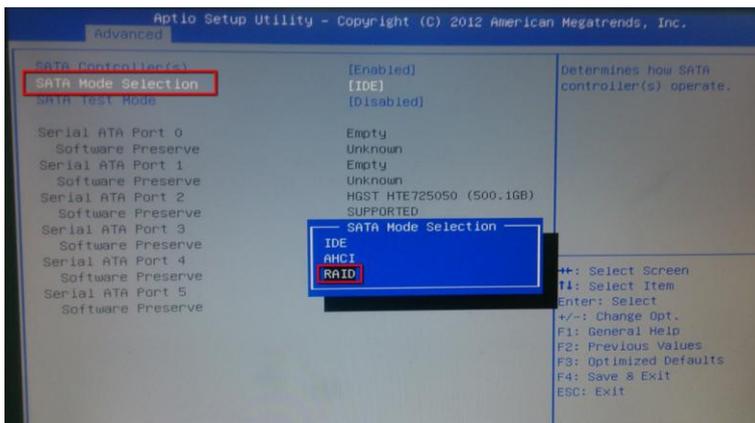
2. Press "F2" to access the BIOS setup.



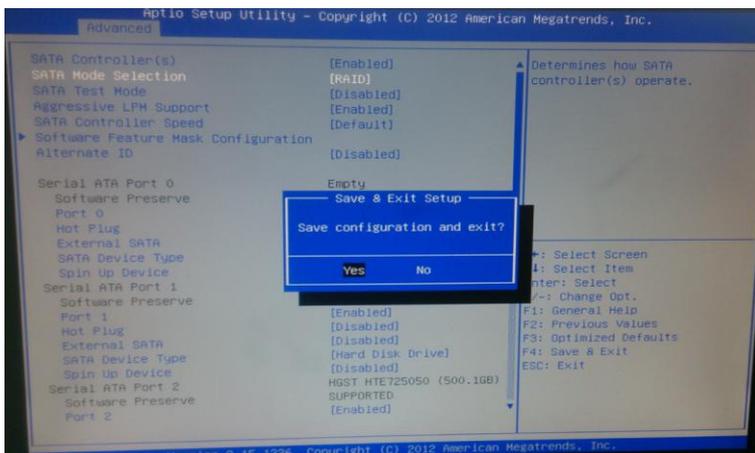
3. Select “Advanced” >> “SATA Configurations”.



4. In the “SATA Mode Selection”, select “RAID”.

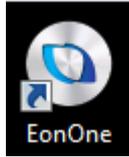


5. Press “F4” to save configurations and exit the BIOS setup.



6. The NVR7800 will restart.

7. After restarting the system, press “EonOne” icon on the desktop to launch EonOne.



8. Log in EonOne. The default username and password are: admin / admin.

User Name:

Password:

Remember Password  SSL Login

9. The related information will be displayed on the EonOne overview screen such as "Volume", "Total Space", "System Status", and etc.

The screenshot shows the EonOne Overview page. It includes sections for Device Information (Model: EV 5016G, Version: 5.11A.31, Volume: Vol-1 1.81TB), System Status (Healthy, Uptime 0 days 01:29:39), Performance (CPU and MEMORY usage at 0%, I/O graph), and Hardware (RAID status: No errors were detected).

10. Select "Action" and press the Delete icon.

The screenshot shows the Storage management interface. It has a table with columns for Volume Name, Status, and Capacity. A red box highlights the delete icon in the Action column for the 'Vol-1' volume.

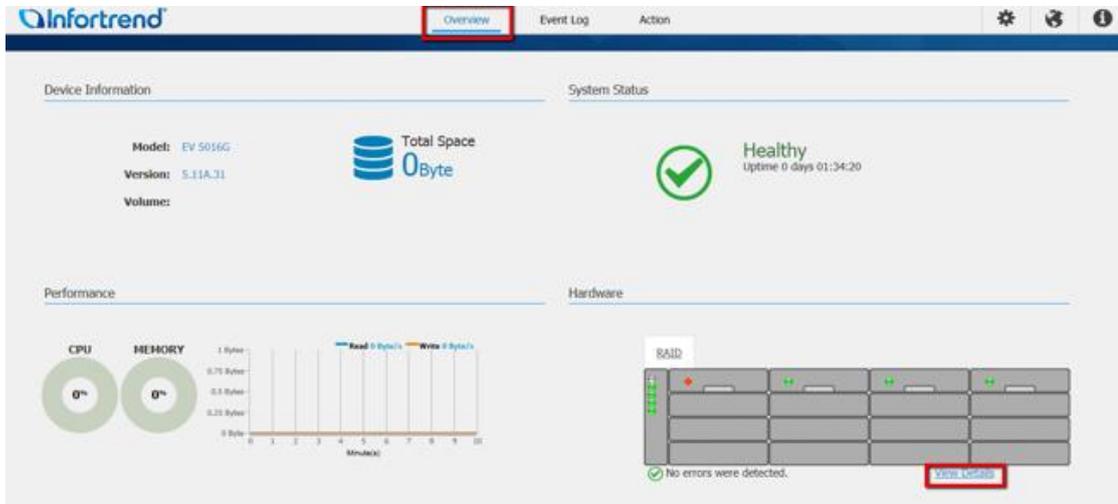
Volume Name	Status	Capacity	Action
Vol-1	✔ The volume has been mounted.	1.81 TB	

11. Press "OK" to delete RAID.

12. After finishing, the message will show in screen and the volume has been deleted from the list.



13. Select “Overview” and press “View Details”.



# Appendix

## A. Technical Specifications

Users need to prepare the following devices to set up the surveillance system.

### Connection Interface

System Hard Drive Support	
Drive Interface / channel	Supports 12 / 16 channels of 3/6Gbps SAS, SATA-II/SATA-III, Near-line SAS series
JBOD models	
SAS Interface	Eight SMP PHYs interfaced through two 12Gb SAS ports
Drive Interface / channel	Supports up to 12 / 16 channels of 3/6Gbps SAS, SATA-II/SATA-III, Near-line series

### CPU & Operating System Hard Drive

CPU
Intel® Xeon® Processor E3-1225 V3 (8M Cache, 3.20 GHz)
Intel® Xeon® Processor E3-1275 v3 (8M Cache, 3.50 GHz)
Operating System Hard Drive
2.5 inch 500GB SATA II drive x 2 ( Please check Surveon web for qualified list )

### RAID Configurations

RAID Levels	0, 1(0 + 1), 3, 5, 6, 10, 30, 50, 60, and non-RAID disk spanning
Cache Mode	All drive channels are pre-configured and cannot be changed
Cache Memory	Write-through, write-back, and adaptive write policy
Number of LUNs	Pre-installed DRAM module with ECC, registered; in two DIMM sockets
Multiple Target IDs/Host Channel	Up to 32 per host ID, for a total of 1024 on all host channels
Aliases for Target IDs	Yes
Firmware on Flash Memory	Yes
DIMM Slot	Two DRAM module slot(s)
Hardware XOR	Yes
Real-time Clock	For event messages with time record and task scheduling

Configuration	Text-based firmware-embedded utility over RS-232C through the serial cable Telnet via an established network connection The SANWatch Manager program using in-band or Ethernet connection
Performance Monitoring	Yes
Remote Control and Monitoring	Yes
Event Broadcast/Alert	Yes, via Java-based SANWatch Manager
Event Notification	Yes, via the SANWatch manager
Hardware Connection	In-band over Fibre, SAS, or other host link types, out-of-band via Ethernet or RS-232C
Configuration on Disk	Configuration data stored on disks so that logical drive assemblies exist after controller replacement.
Failure Indicator	Faults are indicated via alarm, module LED indicators, LCD panel, SANWatch Manager, or terminal emulation.

## Fault Tolerance for RAID models

Drive S.M.A.R.T Support	Yes, with user-configurable detect-only, clone and replace, and perpetual clone functions.
ISEMS (Infotrend Simple Enclosure Management Service) via I <sup>2</sup> C interface	Yes
Automatic Drive Failure Detection	Yes
Automatic Rebuild on Spare Drives	Yes
Regenerate Logical Drive Parity	Yes
Bad Block Reassignment	Yes
Manual and Automatic Rebuild upon Failed Drive Replacement	Yes
Manual Clone of Suspected Failed Drive	Yes
Concurrent Rebuild on Multiple Drives in a RAID (0 + 1) Logical Drive	Yes
Salvage the 2 <sup>nd</sup> Temporary Failed Drive in a RAID 1, 3, 5 or 6 Logical Drive	Yes
Salvage the 1 <sup>st</sup> Temporary Failed Drive in a RAID 0 Logical Drive	Yes

## Power Supply

Input Voltage	Single controller model: 100VAC @ 10A 240VAC @ 5A with PFC (auto-switching)
Frequency	50 to 60Hz
Power Rating	460W
DC Output	12.0V: 38A (Max.) 5.0VSB: 2A (Max.)
Input Frequency	50 to 60Hz
AC Input	100VAC @ 10A or 240VAC @ 5A with PFC
Power Factor Correction	Yes
Hold-up Time	At least 12ms at 115/230VAC full load after a loss of AC input
Over-temperature Protection	Auto shutdown when lost cooling or exceeded ambient temperature; over-voltage protection is also available.

## Dimensions

### ➤ 2U series

Dimensions	With chassis ears & protrusions
Height	88.00mm
Width	447.40mm
Length	524.41mm

### ➤ 3U series

Dimensions	With chassis ears & protrusions
Height	130.00mm
Width	447.40mm
Length	524.20mm

## Environment

Humidity	5 to 95% (non-condensing - operating and non-operating)
Temperature	Operating: 0° to 40°C Non-operating: -40° to 60°C
Altitude	Operating: Sea level to 12,000ft Packaged: Sea level to 40,000ft
Shock (Half-sine)	Operating: 5G, half-sine, 11ms pulse width Non-operating: 15G, half-sine, 11ms pulse width
Vibration	(Random) Operating: 5 to 500Hz, 0.25Grms, X/Y/Z, 30min Non-operating: 5 to 500Hz, 1.0Grms, X/Y/Z, 30min (Sine) Operating: 5 to 500Hz, 0.2Grms, X/Y/Z Sine, 1hr/sweep Non-operating: 5 to 500Hz, 1.0Grms, X/Y/Z Sine, 1hr/sweep
Acoustic Noise	65dBA boundary, 60dBA normal

## B. Certification

### Summary

Safety	UL 60950-1, 2nd Edition BSMI CNS 14336-1: 99 年版 CB IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 EAC TP TC 004/2011, TP TC 020/2011
EMC	CE EN 55022:2010 +AC:2011 / EN61000-3-2:2006/A1:2009/A2:2009 / EN 61000-3-3: 2013 / EN 55024: 2014 BSMI (CNS 13438) FCC (FCC Part 15,subpart B )
Environment	IEC 60068-2 MIL-STD-810E/883E ISTA ASTM-D3332 IPC-TM-650
Others	ISO7779/3744 RoHS Microsoft WHQL-Windows Embedded Ultimate 7 Milestone XProtect Corporate

警告使用者：

這是甲類資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策