



Expansion Enclosure Guide

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Abstract:

This guide provides instructions and outlines system limitations for adding expansion enclosures to an Infortrend storage system without disrupting its existing storage operations.

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Introduction

Infortrend storage systems are built with high-quality, durable components and feature a highly scalable hardware design, offering extensive support for both scalability and upgradeability. You can expand your storage system's capacity using Infortrend's expansion enclosures, available in various form factors, to increase storage and deliver faster, more efficient services without downtime.

Overview of Maximum Drives

Infortrend offers various form factors for both storage systems and expansion enclosures. The maximum number of drives can be supported based on the specific model. Depending on the product line design, Infortrend employs SAS or JBOF (using NVMe technology) expansion technology to achieve high drive scalability. Most products include on-board expansion ports for connecting expansion enclosures, while some models support optional add-on expansion boards for connecting additional systems.

Refer to the table below for a detailed overview of Infortrend's products, their maximum drive capacities, and supported interfaces:

SAS HDD/SSD Model		Via On-board SAS Ports	Via Optional Expansion Board	Maximum Drives
EonStor DS Family		448 within 15 mixed SAS 12Gb/s expansion enclosures	N/A	448
EonStor GS 1000 Gen2 EonStor GS 1000B Gen2 EonStor GSe 1000 Gen2		448 within 15 mixed SAS 12Gb/s expansion enclosures	N/A	448
EonStor GS 1000 G3		448 within 15 mixed SAS 12Gb/s expansion enclosures	N/A	448
EonStor GS 2000		896 within 15 mixed SAS 12Gb/s expansion enclosures	N/A	896
EonStor GS 3000/4000 Gen2 EonStor GS 3000B/4000B Gen2 EonStor GSe 3000/4000 Gen2		896 within 15 mixed SAS 12Gb/s expansion enclosures	N/A	896
EonStor GS 3000/4000 G3 EonStor GSe 3000/4000 G3		896 within 15 mixed SAS 12Gb/s expansion enclosures	N/A	896
EonStor GS 5000		896 within 15 mixed SAS 24Gb/s expansion enclosures	N/A	896
SATA HDD Model		Via On-board SAS Ports	Via Optional Expansion Board	Maximum Drives
EonStor GSe Pro 100/200	5 bay	N/A	N/A	5
	8 bay	N/A	N/A	8
EonStor GSe Pro 1000	4 bay	N/A	N/A	4
	8 bay	N/A	N/A	8
EonStor GSe Pro 3000		N/A	448 within 15 mixed SAS 12Gb/s expansion enclosures	448
Storage Server		Via On-board SAS Ports	Via Optional Expansion Board	Maximum Drives
EonServ 5012 Gen 1/Gen2	12 bay	168 with 14 x JB 312 or 300 with 7 x JB 360(L)	N/A	432 (12 + 420)
EonServ 5016 Gen 1/Gen2	16 bay	224 with 14 x JB 316 or 300 with 7 x JB 360(L)	N/A	436 (16 + 420)

Table 1: Maximum Drives of Current SAS HDD Models

U.2 SSD Model		Via On-board JBOF Expansion Ports	Via Optional Expansion Board	Maximum Drives
EonStor DS 4000U		N/A	448 within 15 mixed SAS 12Gb/s expansion enclosures	448
EonStor GS 2000U/3000U		N/A	896 within 15 mixed SAS 12Gb/s expansion enclosures	896
EonStor GS 3000U/4000U	24 bay	96 with 3 x JBOF expansion enclosures	896 within 15 mixed SAS 12Gb/s expansion enclosures	U.2 NVMe JBOF: 96 or HDD/SSD JBOD: 896
	48 bay	N/A	896 within 15 mixed SAS 12Gb/s expansion enclosures	896
EonStor GS 5000U		N/A	96 with 3 x JBOF expansion enclosures or 896 within 15 mixed SAS 12Gb/s or SAS 24Gb/s expansion enclosures	U.2 NVMe JBOF: 96 or HDD/SSD JBOD: 896

Table 2: Maximum Drives of Current U.2 Models

Expansion Enclosure Number

Before adding an additional expansion enclosure to an existing configuration, you must set the rotary ID switch using a flat-blade screwdriver. Keep in mind that each expansion enclosure must have a unique ID within the expansion chain. The rotary ID switch on the expansion enclosure is currently numbered from 1 to 15, allowing for up to 15 expansion enclosures per chain.

IMPORTANT!

- To avoid ID conflicts, ensure that each expansion enclosure is assigned a unique ID when connecting in a multi-array environment.
- This step is required for the JB 3000 and 4000 series. For the JB 4000U series, this step is not required.



Figure 1: Expansion Enclosures ID switch

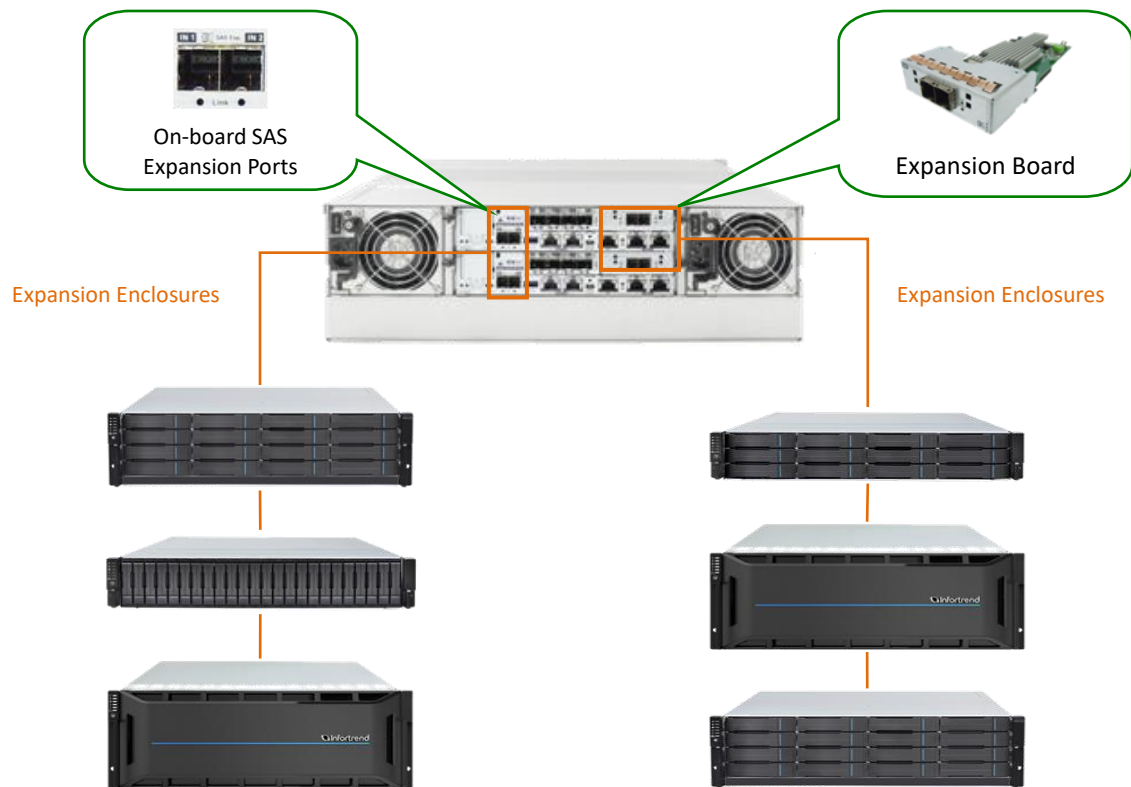


Figure 2: Expansion Enclosures

Expansion Enclosure Connections

The sections in this chapter cover the connections between expansion enclosures and storage systems via SAS or JBOF expansion ports.

As the SAS drive-side protocol has been upgraded from SAS 6 Gb/s to newer technologies (SAS 12/24 Gb/s or NVMe), the operational storage system can utilize the appropriate protocol for expansion.

For SAS 12 Gb/s, 24 Gb/s, and JBOF Storage Systems

For Infortrend storage systems with SAS 12 Gb/s drive-side, the onboard SAS expansion ports are labeled as 'IN.'

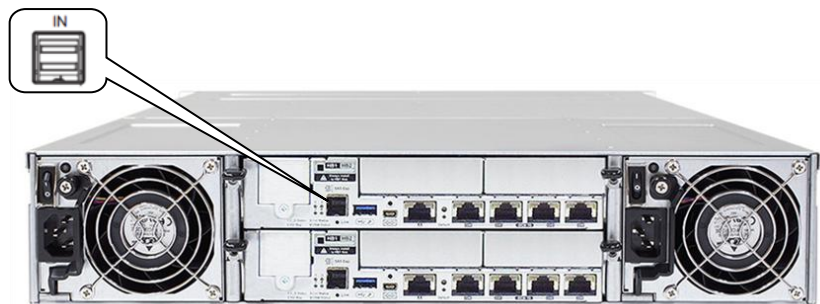


Figure 3: SAS 12 Gb/s Storage System Onboard Expansion Port

For any type of expansion enclosure, connect a blue SAS cable from the primary controller's SAS expansion port on the

storage system to the primary controller's OUT SAS port on the first expansion enclosure.

To configure redundant paths in a two-daisy-chain topology, connect an orange SAS cable from the second controller's SAS expansion port on the storage system to the second controller's OUT SAS port on the last expansion enclosure. The basic connection rule for this configuration is to connect IN to OUT, starting from the last expansion enclosure back to the first.

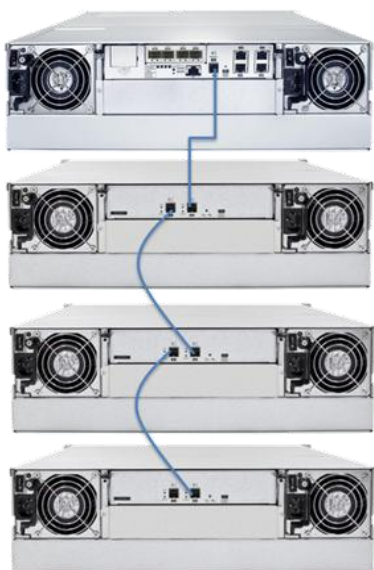


Figure 4: Connecting single-controller expansions via the onboard SAS 12 Gb/s expansion ports .

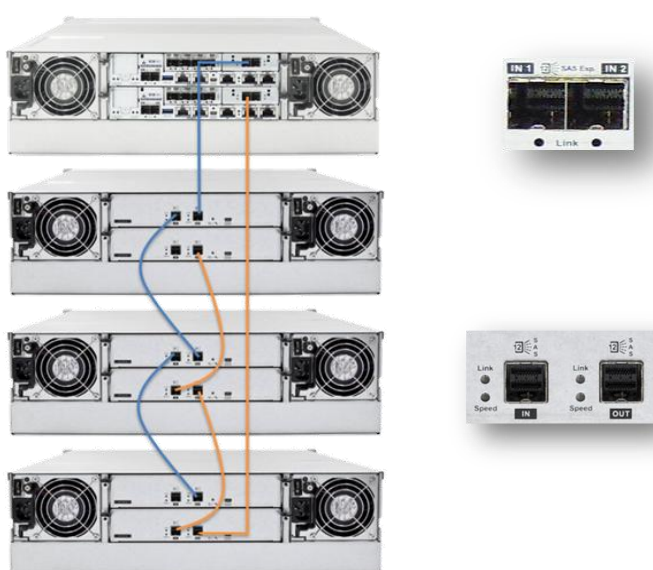


Figure 5: Connecting dual-controller expansions via host board SAS 12Gb/s, 24Gb/s or JBOF expansion ports.

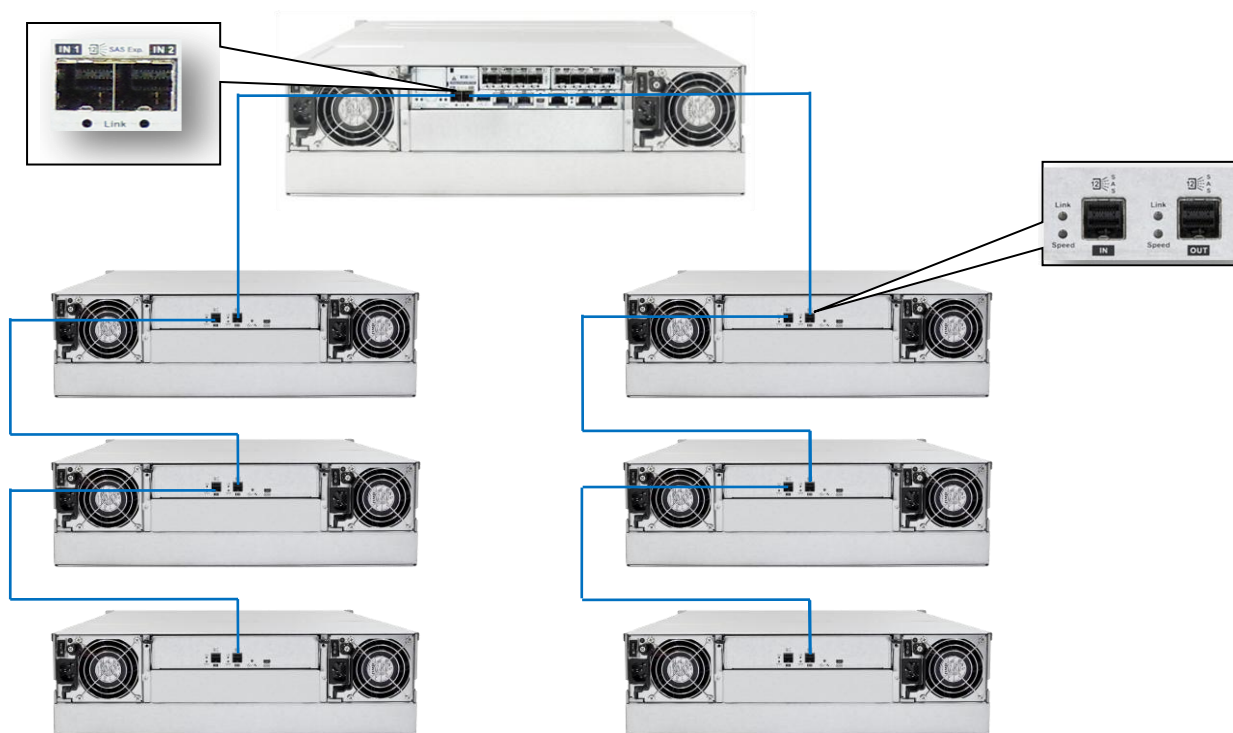


Figure 6: Connecting single-controller expansions via the onboard SAS 12Gb/s or 24Gb/s expansion ports

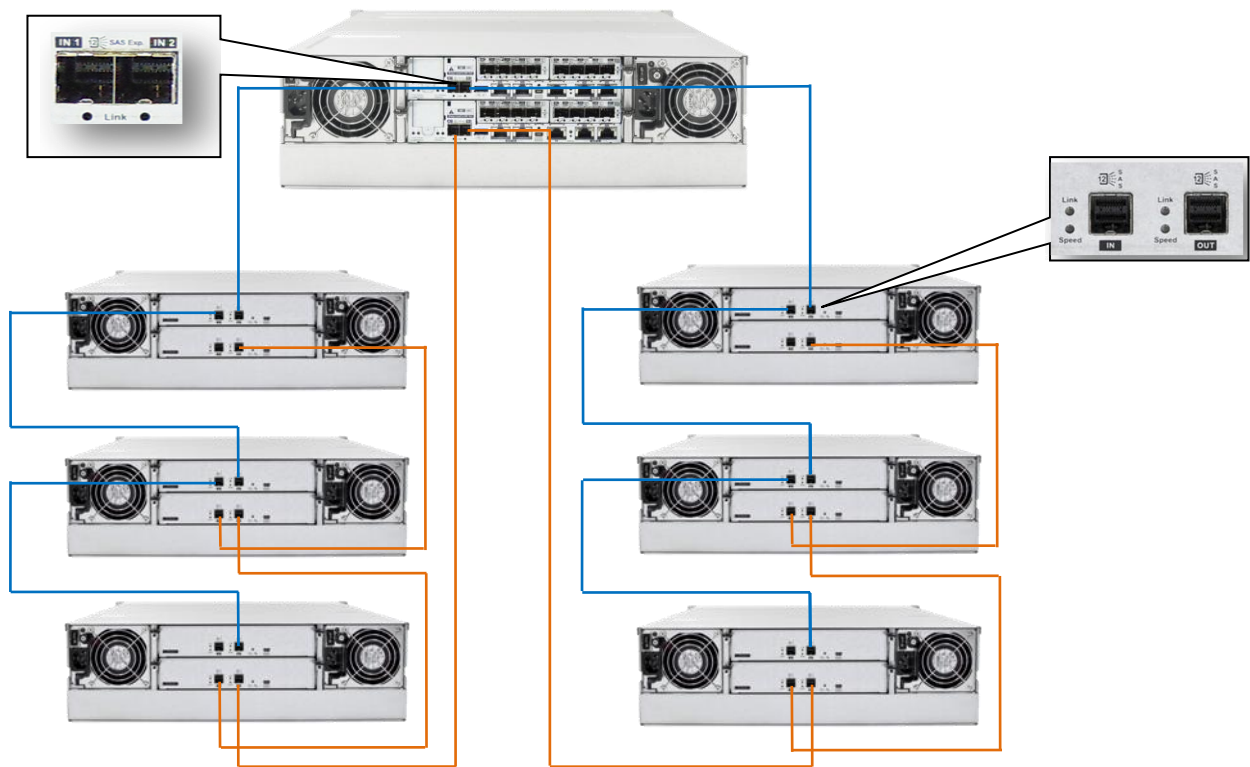


Figure 7: Connecting dual-controller expansions via the onboard SAS 12Gb/s or JBOF expansion ports

For SAS 6 Gb/s Storage System

For SAS 6 Gb/s drive-side storage system, the SAS expansion ports are marked as **OUT**.

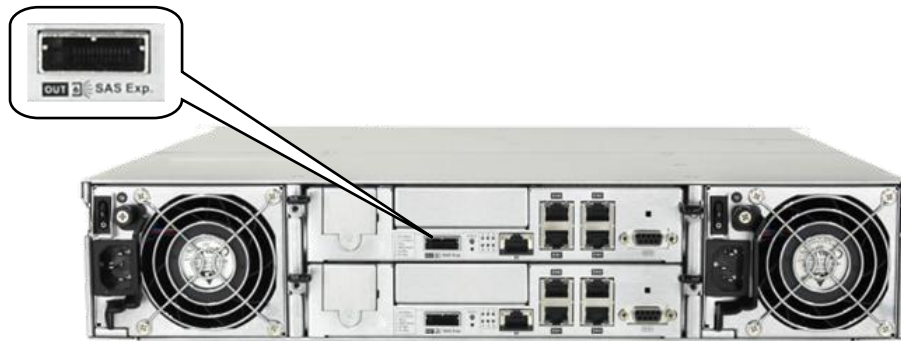


Figure 8: SAS 6 Gb/s Storage System Onboard Expansion Port

For any type of expansion enclosure, connect a blue SAS cable from the primary controller's OUT SAS port on the storage system to the primary controller's IN SAS port on the expansion enclosure.

To ensure redundancy in a two-daisy-chain topology, connect an orange SAS cable from the second controller's SAS expansion port on the storage system to the second controller's IN SAS port on the last expansion enclosure. The basic connection rule for this configuration is to connect OUT to IN, starting from the last expansion enclosure back to the first.

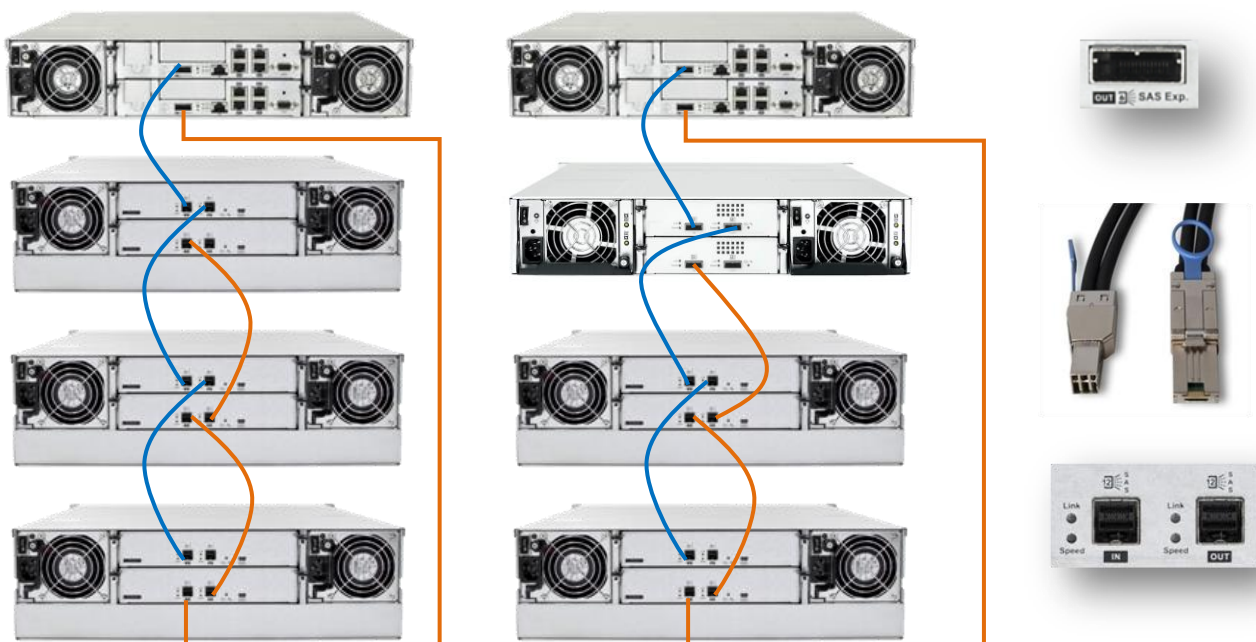


Figure 9: SAS 6 Gb/s Storage System Expansion Connection

Expansion Enclosure On-line Expanding

This chapter outlines the steps for adding expansion enclosures to an existing storage system setup.

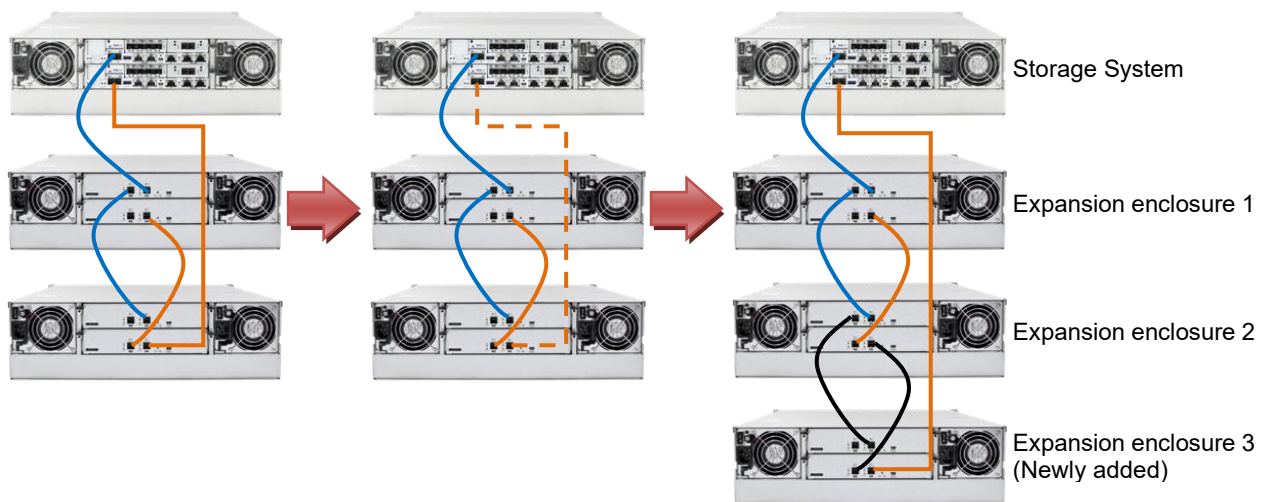


Figure 10: Adding an expansion enclosure

1. Setting the expansion enclosure ID

The expansion enclosure ID is located on the front panel of the expansion enclosure. When setting the expansion IDs, always assign them in order: set the first expansion to 1, the second to 2, and so on. Newly added expansion enclosures must be connected after the last expansion enclosure in the current setup. Please ensure that each enclosure ID is unique.



Figure 11: Expansion enclosure ID

IMPORTANT!

This step is required for the JB 3000 and 4000 series. For the JB 4000U series, this step is not required.

2. Installing the newly-added expansion enclosure

Due to the heavy weight of the expansion enclosure, we recommend installing the hard drives only after the enclosure has been mounted on the rack. Once the ID assignment and installation of the expansion enclosures to the rack are complete, you can connect the newly added expansion enclosures to the existing system via SAS cables.

When connecting the new enclosures, ensure the SAS cables are long enough to reach between the SAS ports. The longest cable should be used to connect the storage system to the last expansion enclosure. In some cases, the expansion enclosures may not be directly stacked above or below the storage system, so cabling routes may vary. In most cases, at least one long SAS cable will be required.

3. Reconnecting the redundant SAS path (for redundant models only)

Unplug the SAS cable from the current last expansion controller, and then connect it to the SAS port of the second controller on the newly added last expansion enclosure. A longer SAS cable may be required.

This step involves disconnecting one of the SAS cables, so critical events, such as notifications of drive-side redundant path failure, may occur. You will receive alert notifications via the management GUI, LCD panel, LEDs, and other means of notification.

Host				
Channel ID ▲	Data Rate ▲	Max Speed ▲	Current Spe... ▲	Status ▲
Channel 0	Auto	1.0 Gbps	The link has been negoti...	Link Up
Channel 1	Auto	1.0 Gbps	--	Link Down

Expansion		
Channel ID	Speed	Status
Channel 5	12.0 Gbps	Link Up

Path: RAID → JBOD 1 → JBOD 2

Path: RAID → JBOD 2 → JBOD 1

Figure 12: Redundant path failure of expansion enclosures in SANWatch

4. Connecting new SAS cable

Connect new SAS cables (see **black** connection) from the current last expansion to the newly-added expansion enclosure. Ensure to follow the SAS connection's **IN to OUT** rule described in [Expansion Enclosure Connections](#).

5. Turning on the newly-added expansion enclosure

Press the power button to turn on the expansion enclosure, and then wait for the storage management GUI to detect the additional expansion enclosure. Once the added subsystem is successfully integrated into the system assembly, the storage system's status on the management GUI, LCD panel, LED panel, and other status indicators will return to normal.

Please note that adding a new expansion enclosure activates the Hot-Add feature, which may cause a delay or pause of about 10-20 seconds on the host I/O. The delay/pause duration may vary depending on the operating system, drivers, and other factors.

6. Installing the newly added drives

We recommend installing the drives into the newly added expansion enclosure only after the enclosure has been successfully recognized by the storage system. Once the drives are installed in the enclosure, check their status in the storage management GUI. When the drives appear on the GUI, they can be used for storage provisioning. For more details, please refer to the software manual.

IMPORTANT!

If SANWatch or Embedded RAIDWatch is used as the management tool for the DS family, you must reload the tool after connecting the new expansion enclosure. If the management tool does not display the newly added enclosures, click 'Data Reload' in the upper-right corner of the GUI to refresh the screen.

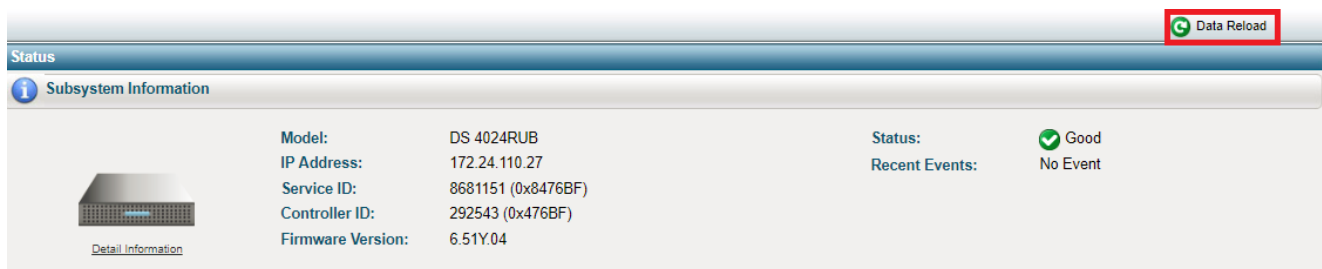


Figure 13: Data Reload button on Embedded RAIDWatch
