IBM System Storage

IBM

EXN3000 Storage Expansion Unit Installation and Setup Instructions

Contents

Before you begin

This document provides installation and setup instructions for the IBM® System Storage® EXN3000 storage expansion unit, sometimes referred to as a *shelf* in this and other documents.

Additional information about the EXN3000, including a comparison between the EXN3000 and other N series storage expansion units, can be found in the *IBM System Storage EXN3000 Storage Expansion Unit Hardware and Service Guide*.

Detailed SAS and Alternate Control Path (ACP) cabling information can be found in the *IBM System Storage N series Universal SAS and ACP Cabling Guide*.

For additional information about the EXN3000 and related topics, refer to the following resources.
* *IBM System Storage N series Introduction and Planning Guide*
* *IBM Environmental Notices and User Guide*
* IBM System Storage N series support website at www.ibm.com/storage/support/nseries/

Read the safety notices

Before continuing, make sure that you have reviewed the safety notices in the documentation that came with this system. Do not plug any cables into the system, adapters, or any electrical outlets until you have reviewed the safety information and followed the procedures in this document.

Need help?

If you encounter any difficulties while setting up your system, contact IBM service and support for assistance. More information can also be found on the IBM System Storage N series support website:

www.ibm.com/storage/support/nseries/

About the IBM N series support website

The IBM System Storage N series support website requires users to register in order to obtain access to N series support content on the web. To understand how the N series support web content is organized and navigated, and to access the N series support website, go to the following publicly accessible web page:

www.ibm.com/storage/support/nseries/

This web page also provides links to AutoSupport information as well as other important N series product resources.

Software requirements

Your storage system must meet the following software requirements:
* Data ONTAP 7.*x* releases: Data ONTAP 7.3.6 or a later version of the 7.*x* release family

  N3400 and N3600 storage systems can use Data ONTAP 7.3.4 or a later version of the 7.*x* release family.
* Data ONTAP 8.*x* releases: Data ONTAP 8.0.2P3 or a later version of the 8.*x* release family

  N3400 storage systems can use Data ONTAP 8.0.2 or a later version of the 8.*x* release family.

Customer-supplied items for installation

- #2 Phillips screwdriver
- Flat-bladed screwdriver
- Antistatic electrostatic discharge (ESD) wrist strap and grounding leash

Hot-adding EXN3000s

You can hot-add an EXN3000 in the following cases:

- Directly to a controller in any supported storage system with an existing SAS HBA or onboard SAS port.
- Depending on your configuration, you can mix different storage expansion unit models in the same stack.

   Note: Mixing IOM3 and IOM6 in the same storage expansion unit is not supported.

For more information about hot-adding EXN3000s, see the *IBM System Storage N series EXN3000 Hardware and Service Guide*.

Overview of the EXN3000 storage expansion unit

Refer to the following figures to familiarize yourself with the EXN3000 storage expansion unit.
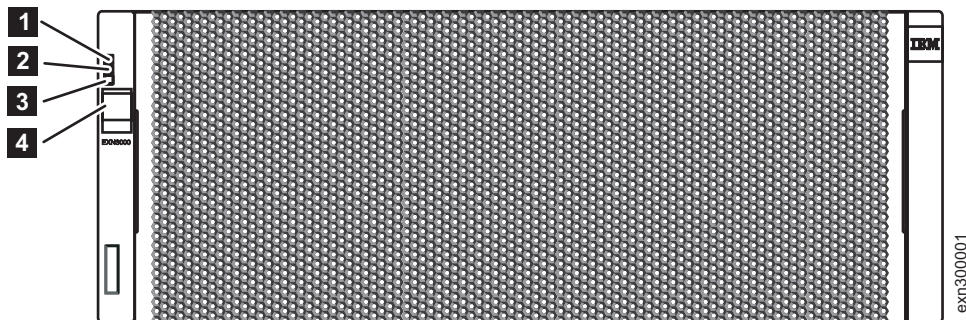
Figure 1. Front view with bezel

1	Shelf power LED	**3**	Shelf activity LED
2	Shelf fault LED	**4**	Two-digit shelf ID digital display
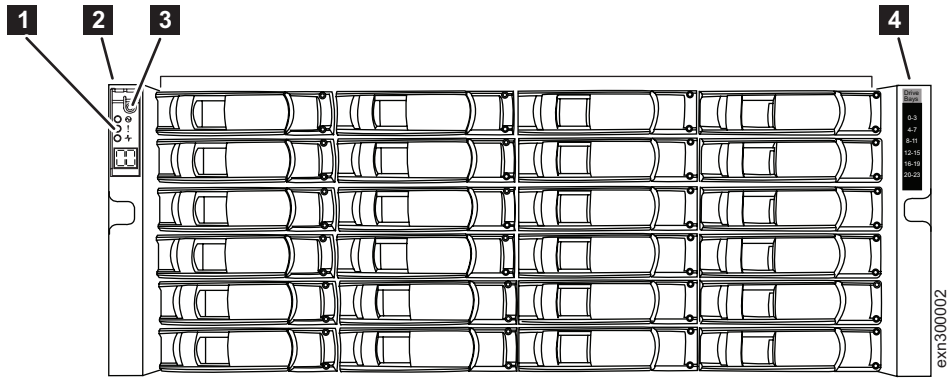
Figure 2. Front view without bezel

1	Operation panel	3	Tab for changing the shelf ID
2	Left mounting tab	4	Right mounting tab

Note: Disk drive bays are numbered horizontally starting from 0 at the upper left position to 23 at the lower right position.
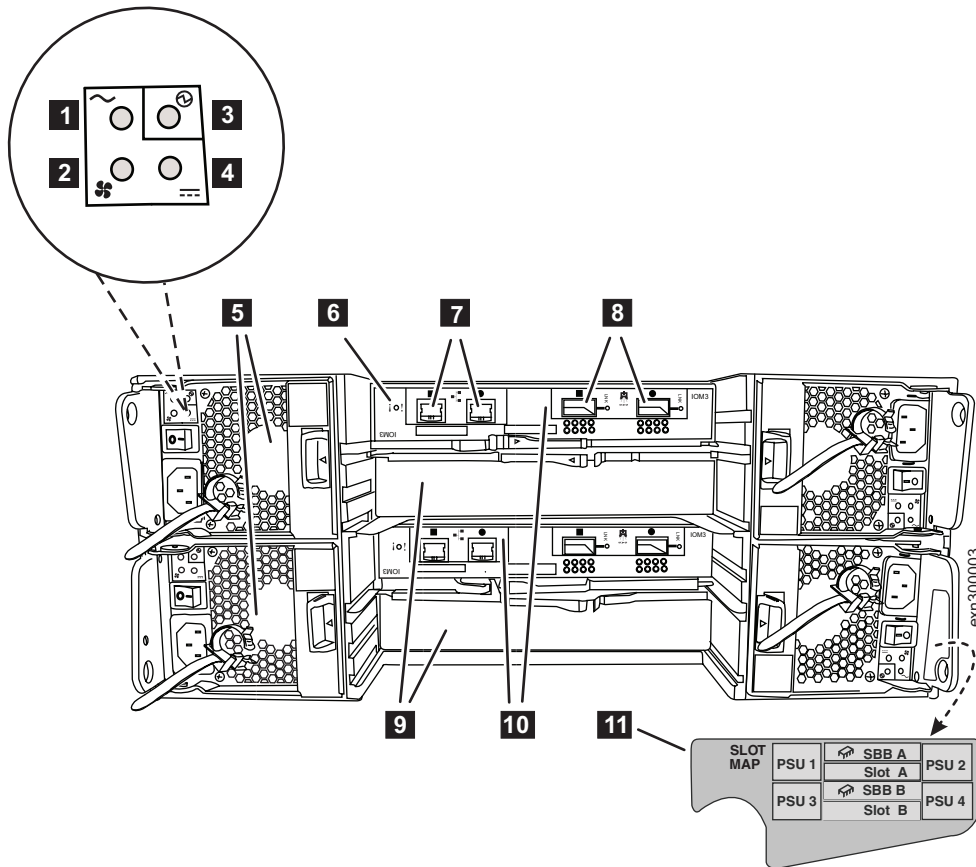
Figure 3. Rear view

1	AC fault LED	7	ACP ports

2	Fan fault LED	8	SAS ports
3	Power LED	9	I/O blanks
4	DC fault LED	10	I/O modules
5	Power supplies (each with two integrated fans)	11	Slot map label
6	IOM fault LED		

Notes:

- Disk shelves with two power supplies occupy the power supply unit (PSU1 and PSU4) locations as shown on the slot map label 11 in Figure 3 on page vii.
- The ACP and SAS ports on the Input/Output Modules are designated as circle and square ports (not In and Out ports).

Installation and setup instructions

Use these instructions to install and set up your EXN3000 storage expansion unit.

Unpacking the EXN3000

Use these instructions to unpack the EXN3000.

Important: If your system was shipped already assembled and cabled in a rack, go directly to the *Installation and Setup Instructions* for your N series storage system.

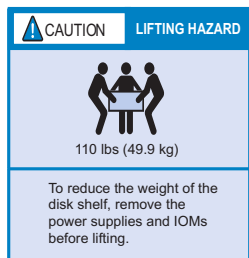**Note:** The contents of the box might differ based on the model you purchased.

1. Verify that the EXN3000 (2857-003) shipping packages include the following items:
   - 1 EXN3000 storage expansion unit
   - 1 IBM rail kit
   - 1 electrostatic discharge (ESD) wrist strap
   - 1 set of publications
   - 2 or 4 power cords (2 power cords ship with SATA HDD models; 4 power cords ship with SAS HDD models)
   - Miscellaneous data cables, as ordered

   CAUTION:
   Use safe practices when lifting.

   CAUTION | LIFTING HAZARD

   110 lbs (49.9 kg)

   To reduce the weight of the disk shelf, remove the power supplies and IOMs before lifting.

   CAUTION:
   A fully populated EXN3000 weighs 49.9 kg (110 lbs). Use three people to lift an EXN3000 into a rack. To make the unit lighter and easier to move, remove the power supplies and Input/Output Modules (IOMs), noting the location of each component for reinstallation. Do not remove the disk drives or drive blank covers to reduce the weight. After the unit is installed in the rack, reinsert the power supplies and IOMs.

2. Remove the EXN3000 from the carton using the integrated handles built into the sides of the unit. Place the unit on a table.

Installing the rails in an IBM 19-inch rack

Use these instructions to install the rails on which you will mount the EXN3000.

Note: Read this document in its entirety before proceeding.

Rear of rack

Front of rack

Left rail

Rail adjustment
screws

Right rail

Locating pins
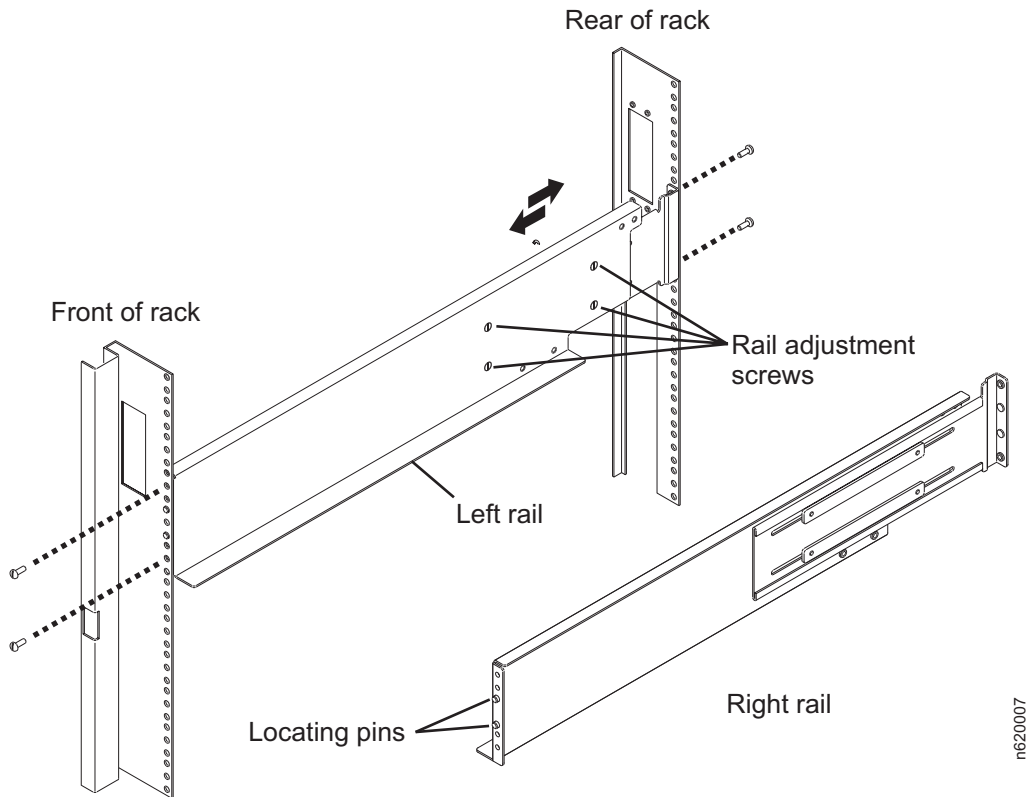
n620007

Figure 4. Installing the rails into the rack

1. Loosen (but do not remove) the four rail adjustment screws on each rail.
2. Use Figure 5 on page 3 for reference. At the front of the rack, position the right-hand rail into the rack at the appropriate EIA location (make sure that the two locating pins seat properly). The bottom of the rail should line up with the bottom EIA boundary.
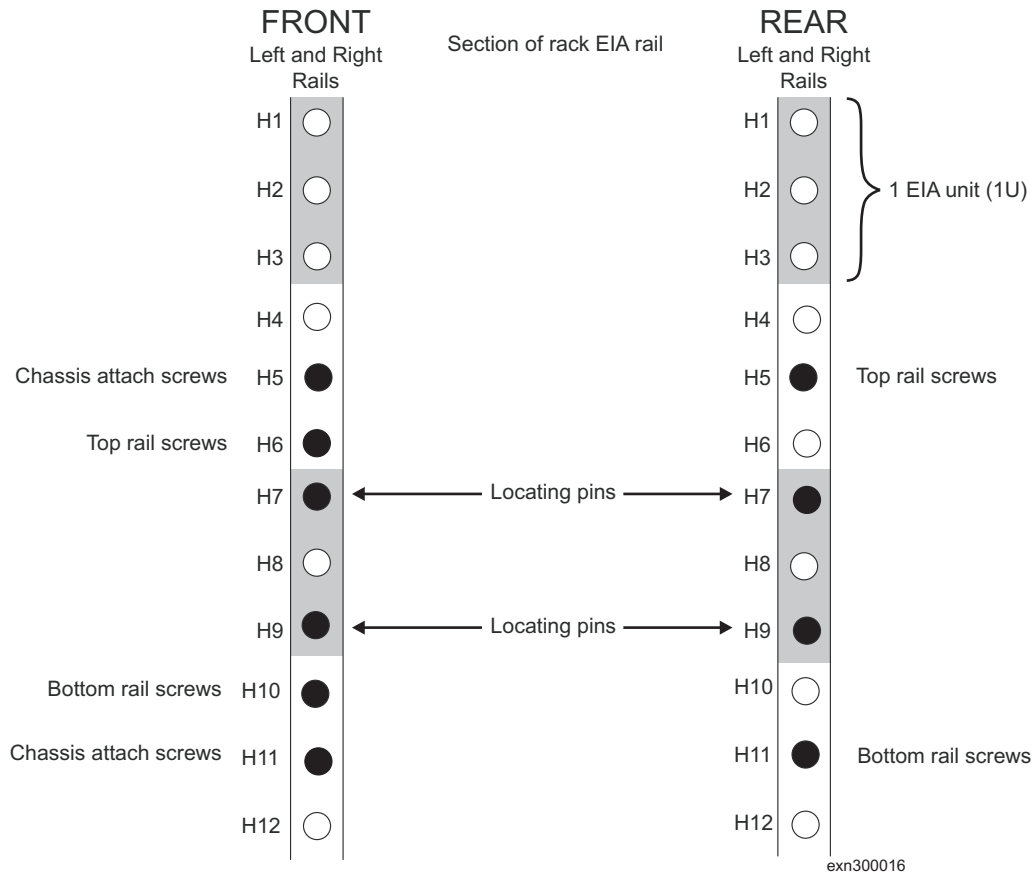
```
              FRONT                                    REAR
          Left and Right      Section of rack EIA rail    Left and Right
              Rails                                         Rails

          H1  ◯                                      H1  ◯   ⎫
                                                             ⎬  1 EIA unit (1U)
          H2  ◯                                      H2  ◯   ⎪
                                                             ⎭
          H3  ◯                                      H3  ◯

          H4  ◯                                      H4  ◯

Chassis attach screws  H5  ●                          H5  ●   Top rail screws

Top rail screws  H6  ●                                H6  ◯

          H7  ●  ◄────── Locating pins ──────►  H7  ●

          H8  ◯                                      H8  ◯

          H9  ●  ◄────── Locating pins ──────►  H9  ●

Bottom rail screws  H10  ●                            H10  ◯

Chassis attach screws  H11  ●                         H11  ●   Bottom rail screws

          H12  ◯                                     H12  ◯

                                                              exn300016
```

Figure 5. Rail positioning guide

> **Note:** When installed, each EXN3000 unit will occupy a 4U space.
>
> Using two silver pan head M5 screws, attach the rail to the front of the rack using holes H6 and H10. Tighten these screws with a screwdriver.

3. At the rear of the rack, position the rail at the same EIA location used in step 2 (make sure that the locating pins seat properly). Using two silver pan head M5 screws, attach the rail to the rack using holes H5 and H11. Tighten these screws with a screwdriver.

4. Tighten the four rail adjustment screws on the installed rail.

5. Using a Phillips screwdriver, install a rear tie-down plate on the rail using two M5 Phillips flat-head screws **1** , as shown in Figure 6 on page 4.
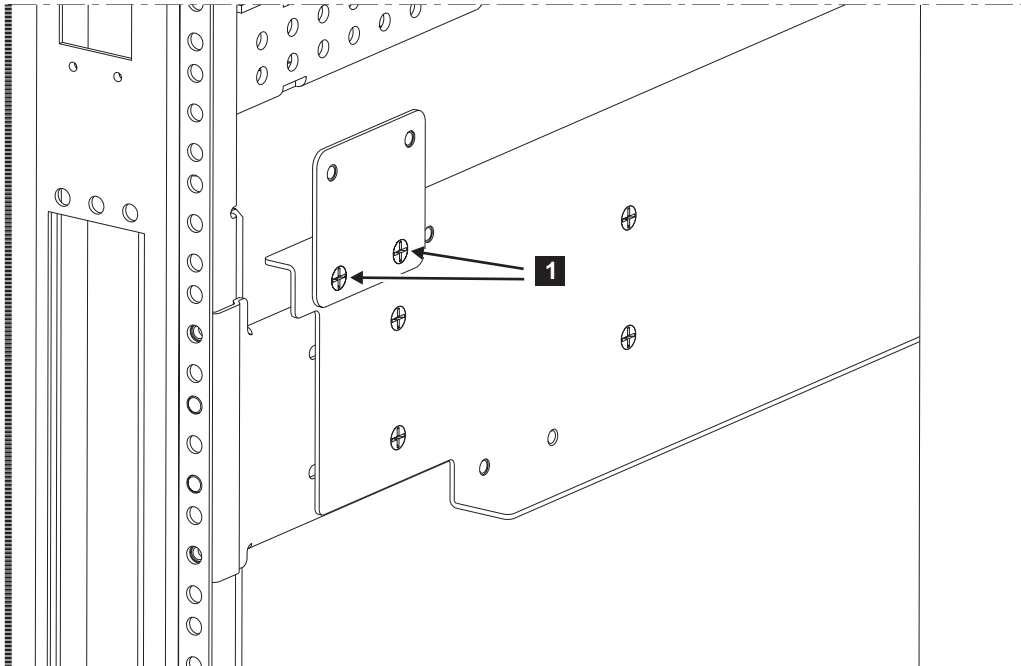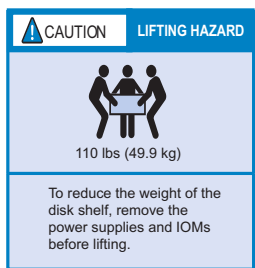
Figure 6. Installing the tie-down plate

6. Repeat steps 2 through 5 for the left-hand rail.
7. Repeat steps 1 through 6 for each additional EXN3000 that you are installing in the rack, making sure to allow 4U of space for each EXN3000.

Installing the EXN3000 in the rack

Use these instructions to install the EXN3000 in the rack.

CAUTION:
A fully populated EXN3000 weighs 49.9 kg (110 lbs). Use three people to lift an EXN3000 into a rack. To make the unit lighter and easier to move, remove the power supplies and IOMs, noting the location of each component for reinstallation. Do not remove the disk drives or drive blank covers to reduce the weight. After the unit is installed in the rack, reinsert the power supplies and IOMs.

1. Remove the EXN3000 front bezel.
2. From the front of the rack, place the EXN3000 onto the rails and slide it in until the front mounting bracket of the unit is flush with the frame rails of the rack.
3. At the front of the rack, using four silver pan head M5 screws in the H5 and H11 holes, secure the EXN3000 to the rack by threading the screws through the system unit bracket and the rack frame rail into the threaded rail nuts. Tighten the screws using a flat-bladed screwdriver.
4. From the rear of the rack, use a silver pan head M5 screw **1** to attach the rear of the chassis to the tie-down plate on each rail, as shown in Figure 7 on page 5.
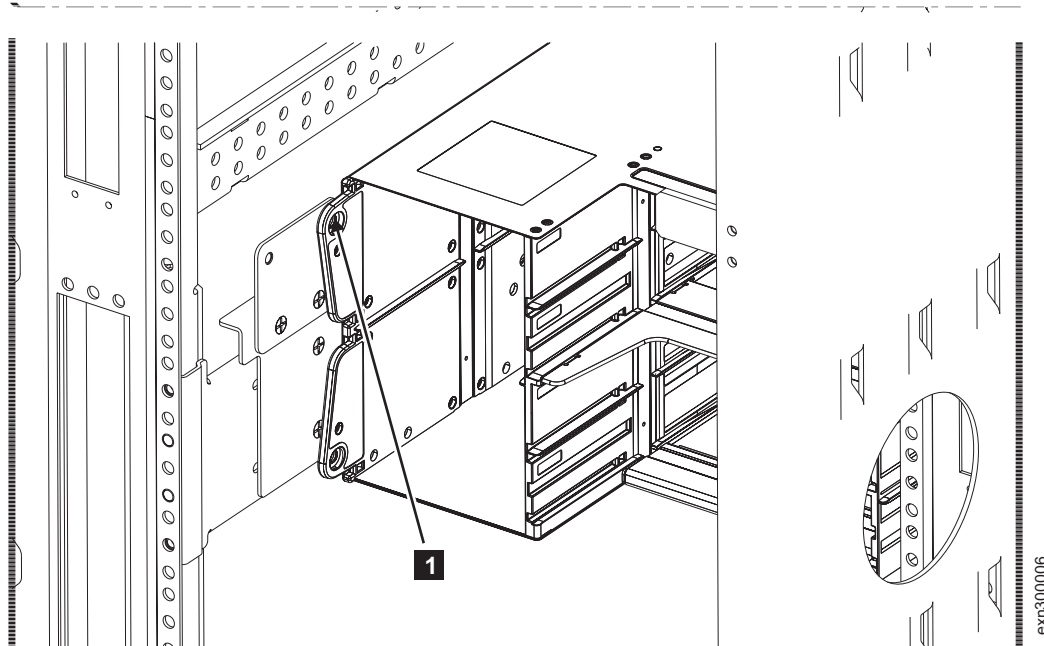
Figure 7. Attaching the chassis to the tie-down plate

Connecting power to the EXN3000

Use these instructions to connect power to the EXN3000.

1. Make sure all power supply switches of the storage expansion unit (or units) are in the Off position.
2. Connect the power cords to each EXN3000 and secure the power cords in place with the power cord retainer. Make sure that the power supplies on the left side of the system are connected to a separate AC source than the power supplies on the right side of the system. This ensures redundant power.

   Notes:
   - Depending on the disk drive type, your EXN3000 might have two or four power supplies.
     - EXN3000s with 15k SAS disk drives require the use of four power outlets.
     - EXN3000s with 7.2k SATA disk drives require the use of two power outlets.
   - EXN3000 storage expansion units do not need additional grounding.
3. Turn on power to the storage expansion units and wait for the disk drives to spin up.

FC/SAS bridge for stretch or fabric-attached MetroCluster systems

See *IBM System Storage N series Introduction and Planning Guide* and *ATTO FibreBridge 6500N Installation and Operations Manual* for information about FC/SAS bridge hardware. This document, as well as all N series documentation, is available on the IBM N series support website, which is accessed and navigated as described in "About the IBM N series support website" on page v.

Setting the storage expansion unit shelf IDs

A unique shelf ID is required for each SAS storage expansion unit within the entire storage system.

A valid EXN3000 storage expansion unit shelf ID is 00 - 98.

Note: N3400 and N3600 systems have an internal shelf ID preset to 00, so for N3400 and N3600 configurations, valid EXN3000 shelf IDs are 01 - 98.

If your storage system has SAS and Fibre Channel (FC) storage expansion units, the storage expansion unit shelf IDs do not need to be unique between the SAS and FC expansion units. (FC expansion unit shelf IDs continue to be unique within each FC loop. SAS expansion unit shelf IDs continue to be unique to all other SAS expansion units in the storage system, including the N3400 or N3600 system's internal shelf ID.)

Visually verify that the shelf ID for each storage expansion unit is unique. If not, set the shelf ID as follows. For additional details, see the *IBM System Storage EXN3000 Storage Expansion Unit Hardware and Service Guide*.

1. Remove the front bezel if you have not already removed it.
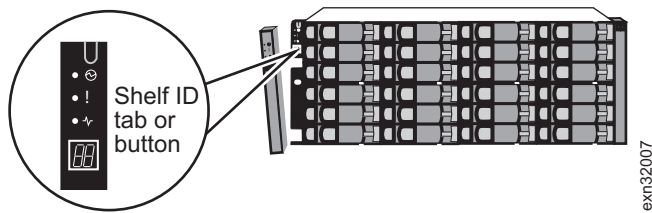2. Press and hold the U-shaped tab **1** above the LEDs until the first digit flashes.

Figure 8. Expansion unit shelf ID tab

3. Press the tab until the correct number is displayed.
4. Repeat steps 2 and 3 for the second digit.
5. Press and hold the tab until the second number stops flashing.

   Both numbers start flashing and the Fault LED on the operations panel illuminates after about five seconds.
6. Power-cycle the storage expansion unit to make the new expansion unit shelf ID take effect.
7. Replace the front bezel.

Cabling the EXN3000

Use these instructions to cable the EXN3000.

The ACP and SAS ports on the EXN3000 Input/Output modules are designated as circle and square ports (not In and Out ports). See the *IBM System Storage EXN3000 Storage Expansion Unit Hardware and Service Guide* for a comparison between SAS and Fibre Channel storage expansion units and for more information about the EXN3000.

Attention:
- If you are using HBAs, they must be installed in the storage system before you cable the system.
- Always cable SAS connections first, and then cable ACP connections.
1. Cable the N series controllers.

Refer to the *Installation and Setup Instructions* for the N series storage system to which you are connecting the EXN3000.

2. Cable the storage expansion units.

   The illustrations in "Cabling a single-controller NAS or iSCSI configuration" and "Cabling a high availability NAS or iSCSI configuration" on page 10 show the steps for cabling two common configurations.

   Note: In the descriptions of these configurations, references to the *first* and *last* disk shelves in a stack are to the first, or closest, shelf in a SAS stack, which makes the first connections to the N series controller, and to the last, or ending, shelf in a stack.

   For SAS and ACP cabling rules, and for more cabling configurations, see the *IBM System Storage N series Universal SAS and ACP Cabling Guide*.

Alternate Control Path (ACP) capability

For maximum storage availability and stability, storage systems with EXN3000 storage expansion units have the option to use the ACP capability. ACP is a protocol that enables Data ONTAP to manage and control the EXN3000 storage subsystem. It uses a separate network from the data path so it can independently perform recovery whenever certain interruptions are detected in the data path.

To use the ACP capability, you must cable the ACP ports on the EXN3000s and connect the EXN3000s to the dedicated network interface on each N series storage system controller. At system setup, you enable the ACP functionality by configuring ACP parameters. If your storage system does not have a dedicated onboard network interface for ACP, you dedicate one at system setup.

Standard ACP cabling rules apply to all N series storage systems and can be found in the *IBM System Storage N series Universal SAS and ACP Cabling Guide*.

Attention: ACP cabling requires CAT6 Ethernet LAN cables.

ACP functionality, configuration, and enabling information can be found in the *Data ONTAP Storage Management Guide for 7-Mode*.

Note: If at initial storage system setup you choose not to use the ACP capability, you can use it later by cabling the ACP connections and enabling ACP by running setup again.

Cabling a single-controller NAS or iSCSI configuration

This task illustrates how to cable a single-controller NAS or iSCSI configuration with two quad-port SAS HBAs supporting two stacks of expansion units with dual-path connectivity.

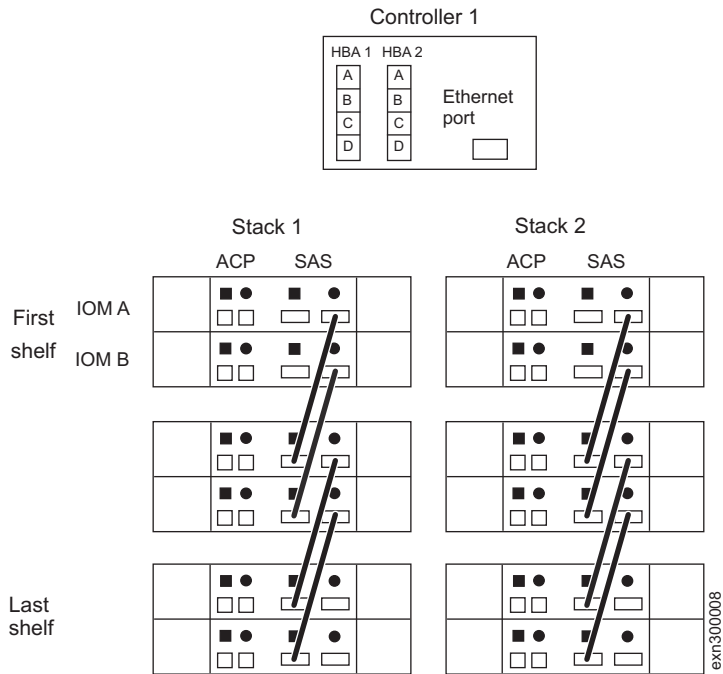1. Daisy-chain the SAS ports, as shown in Figure 9 on page 8.

Figure 9. Daisy-chain the SAS ports

2. Cable the first shelf connections as shown in Figure 10.
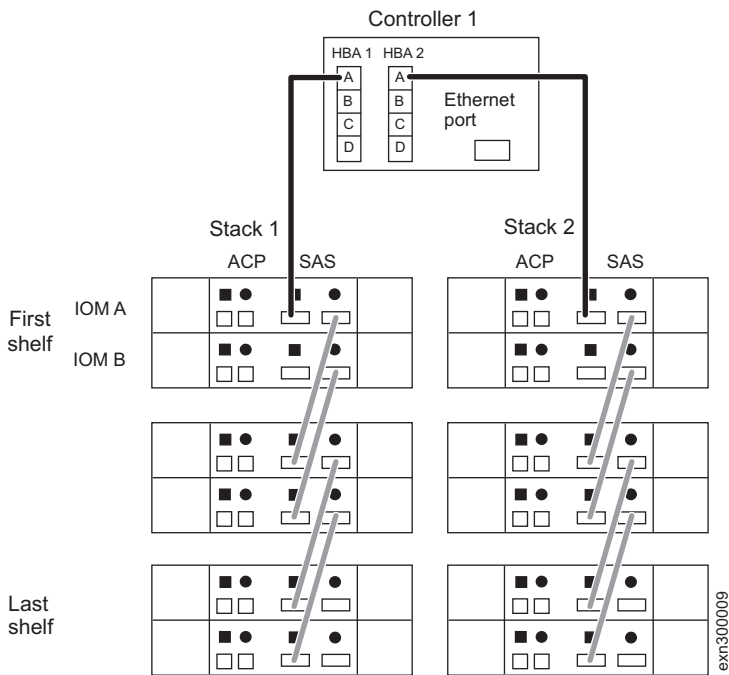

Figure 10. Cable the first shelf connections

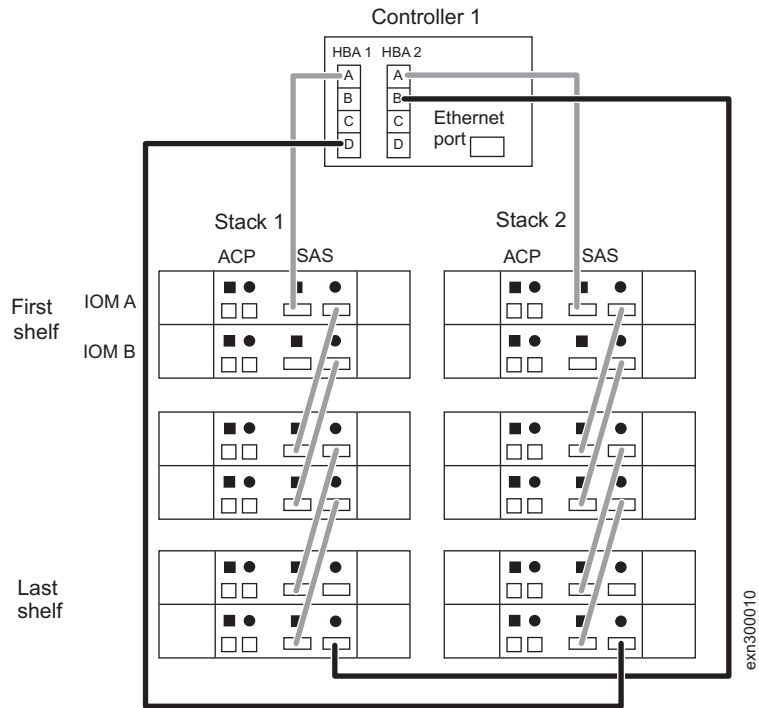3. Cable the last shelf connections as shown in Figure 11 on page 9.

Figure 11. Cable the last shelf connections

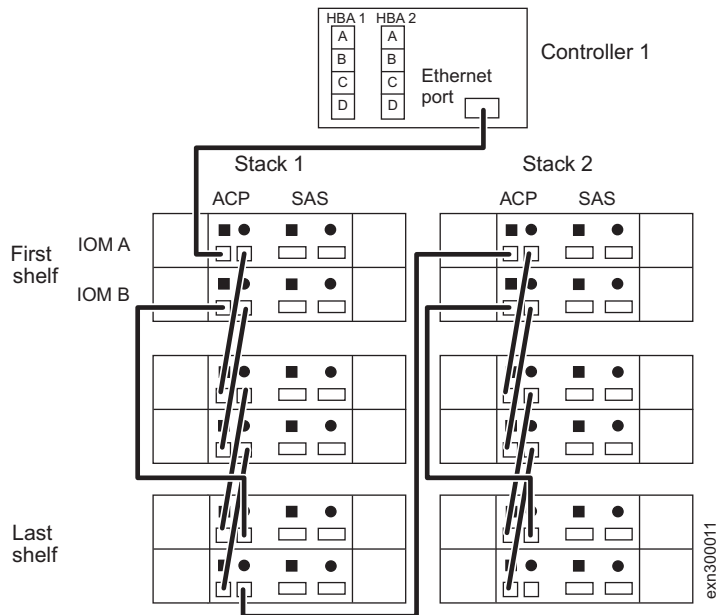4. Cable the ACP connections as shown in Figure 12.

Figure 12. Cable the ACP connections

Cabling a high availability NAS or iSCSI configuration

This task illustrates how to cable an active/active (or high availability) NAS or iSCSI configuration with two quad-port SAS HBAs supporting two stacks of expansion units with multipath connectivity.

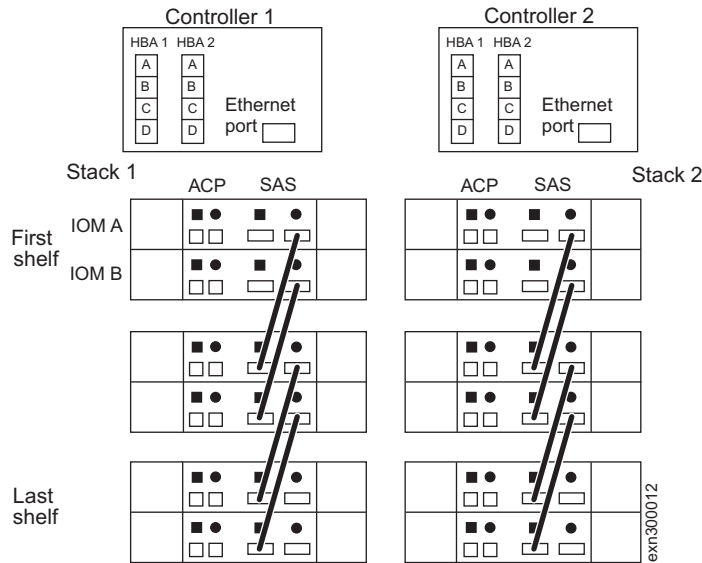1. Daisy-chain the SAS ports, as shown in Figure 13.

Figure 13. Daisy-chain the SAS ports

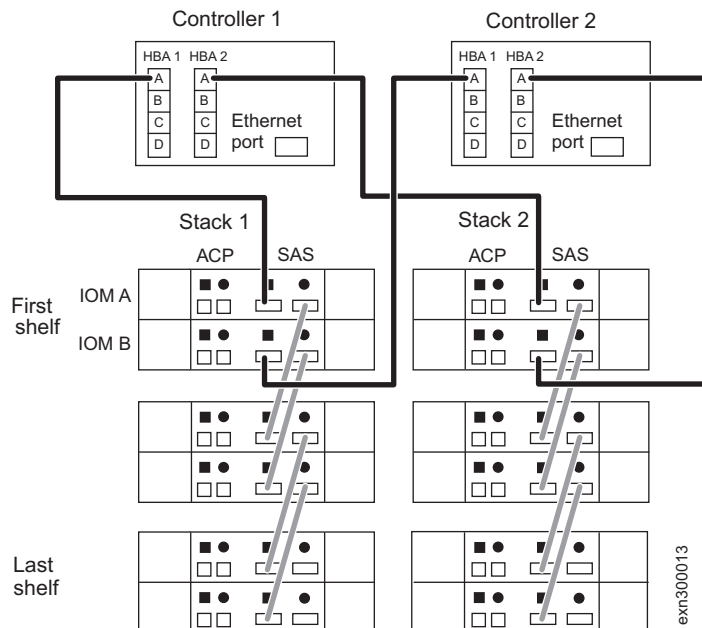2. Cable the first shelf connections, as shown in Figure 14.

Figure 14. Cable the first shelf connections

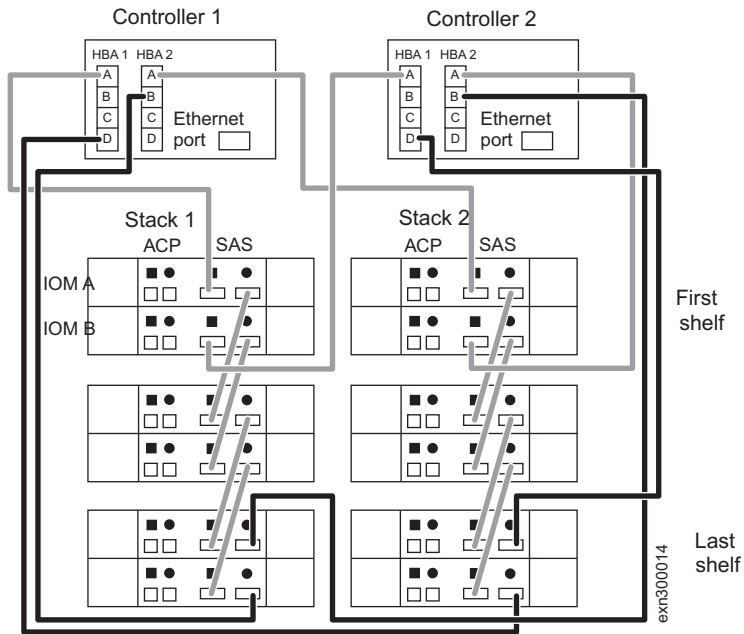3. Cable the last shelf connections, as shown in Figure 15 on page 11.

Figure 15. Cable the last shelf connections

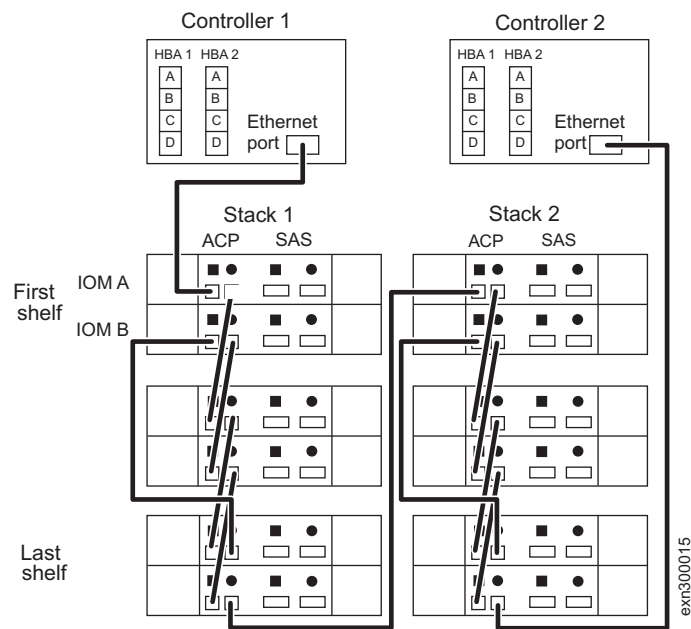4. Cable the ACP connections, as shown in Figure 16.

Figure 16. Cable the ACP connections

Cabling a fabric-attached MetroCluster configuration

See *Configuring a MetroCluster with SAS disk shelves and FibreBridge 6500N* and *ATTO FibreBridge 6500N Installation and Operations Manual* for information on installing, hot-adding, converting HA pairs to fabric-attached MetroClusters, and replacing FC/SAS bridge. This document, as well as all N series documentation, is available on the IBM N series support website, which is accessed and navigated as described in "About the IBM N series support website" on page v.

Booting the system

See the *Installation and Setup Instructions* that came with your N series storage system for instructions on booting your storage system for the first time.

If you are using the ACP capability, at setup you will enable the ACP capability. See the *Data ONTAP Software Setup Guide for 7-Mode* for the setup worksheet and other setup information.

IBM ®

Part Number: 35P2631

Printed in USA

(1P) P/N: 35P2631