IBM System Storage DS3500 and EXP3500 Rack Installation and Quick Start Guide

This *Rack Installation and Quick Start Guide* describes the basic procedure for installing the IBM® System Storage® DS3500 storage subsystem and the IBM System Storage EXP3500 storage enclosure. The information in this document pertains to the DS3512 and DS3524 storage subsystems, and the EXP3512 and EXP3524 storage enclosures.

For information about cabling and configuring the DS3500 storage subsystem and the EXP3500 storage enclosure, see the *IBM System Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide* that came with the hardware.

For educational information about the DS3500 and other IBM System Storage products, go to http://ibmdsseriestraining.com/.

For the latest information about IBM System Storage disk storage systems, including all of the DS3000 storage subsystems and storage enclosures, go to http://www.ibm.com/systems/support/storage/disk.

For safety information, see the multilingual *IBM Safety Information* document on the *Documentation* CD.

Rack installation guidelines

Review the documentation that came with your rack cabinet for safety and cabling information. Before you install the storage subsystem in a rack cabinet, review the following guidelines:

- Two or more people are required to install devices 18 kg (39.7 lb) or heavier in a rack cabinet.
- Make sure that the room air temperature is below 35°C (95°F).
- Do not block any air vents; usually 15 cm (6 in.) of space provides proper airflow.
- Do not leave open spaces above or below an installed storage subsystem in your rack cabinet. To help prevent damage to storage subsystem components, always install a blank filler panel to cover the open space and to help ensure proper air circulation.
- Install the storage subsystem or expansion enclosure only in a rack cabinet with perforated doors.
- Plan the device installation starting from the bottom of the rack cabinet.
- Install the heaviest device in the bottom of the rack cabinet.
- Do not extend more than one device out of the rack cabinet at the same time.
- Remove the rack doors and side panels to provide easier access during installation.
- Connect the storage subsystem or expansion enclosure to a properly grounded outlet.
- Do not overload the power outlet when you install multiple devices in the rack cabinet.
- The storage subsystem or expansion enclosure requires 2 U of vertical space in the rack cabinet.

Use safe practices when lifting.


≥18 kg (39.7 lb)


≥32 kg (70.5 lb)


≥55 kg (121.2 lb)

Power and cabling information for NEBS (Network Equipment-Building System) GR-1089-CORE

The following comments apply to IBM storage devices that have been designated as conforming to NEBS (Network Equipment-Building System) GR-1089-CORE.

The equipment is suitable for installation at:

- Network telecommunications facilities
- Locations where the NEC (NFPA 70 National Electrical Code) applies.

CAUTION:
Intra-building wiring (cabling) must be shielded and grounded at each end when used with the storage device.

Note:

- The intra-building ports of this equipment are suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of this equipment must not be metallically connected to the interfaces that connect to the OSP (outside plant) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, issue 5 or latest revision) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.
- The ac-powered system does not require the use of an external surge protection device (SPD).
- The dc-powered system employs an isolated DC return (DC-I) design. The DC battery return terminal shall not be connected to the chassis or frame ground.
- The storage device (dc power) is intended to be installed in a Common Bonding Network (or mesh network) as described in GR-1089-CORE, Issue 5 or latest revision.

Inventory list

The following inventory list describes the items that you need to install the DS3500 storage subsystem or EXP3500 storage enclosure in the rack cabinet. If any items are missing or damaged, contact your place of purchase.

Notes:

1. Depending on your DS3500 or EXP3500 order, your shipping box might contain additional materials not listed in the following checklist. Review the inventory checklist in the *IBM System Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide* that came with the hardware for any additional parts, and use that checklist in combination with the following information.
2. The host-interface cables, Ethernet cables, Fibre Channel signal cables, and iSCSI signal cables that are shipped vary with the hardware, and not included in the following list.

After you unpack the DS3500 or EXP3500, verify that you have the following items for each storage subsystem or storage expansion controller.

- Hard disk drives or blank trays (12 or 24) (Your storage subsystem or expansion enclosure might come with up to 24 drives.)
- RAID controllers (DS3500 only, up to 2)
- Environmental Service Modules (ESM) (EXP3500 only, 1)
- AC power models:
  - AC power supply and fan units (2)
  - Rack jumper line cords (2)
- DC power models:
  - DC power supply and fan units (2)
  - DC jumper cables (2)
- Rack-mounting hardware kit (1), including:
  - Support rails (2) (right and left assembly)
  - M5 black hex-head slotted screws (8)
  - M5 washers (6)
  - Small diameter spacers (8) (these come installed, four in each rail)
  - Large diameter spacers (8)
  - M4 pan-head screws (2)

Important: The DS3500 and EXP3500 ac power models do not ship with region-specific ac power cords. You must obtain the IBM-approved power cords for your region. The DS3500 and EXP3500 dc power models do not ship with a 30A rated disconnect device (circuit-breaker) that is required for the -48V DC power connection. See the *IBM System Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide* for more information.

Tools

Before you install the DS3500 or EXP3500, the installation area must have an Internet connection, and you must have the following tools:

- A cart to hold the storage subsystem and its components
- A 5 mm (3/16-in.) flat-blade screwdriver
- Anti-static protection

Note: A No. 2 Phillips screwdriver and an 8 mm wrench are optional.

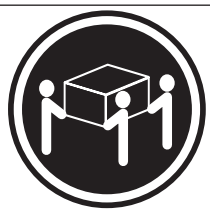
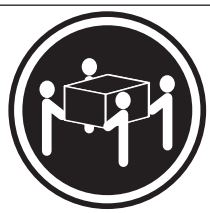
Installation overview

The installation of the DS3500 or EXP3500 involves the following procedures:

1. "Unpacking the storage subsystem"
2. "Installing the support rails" on page 5
3. "Removing the storage subsystem or expansion enclosure components" on page 6
4. "Installing the storage subsystem or storage enclosure in the rack cabinet" on page 10
5. "Turning on the power - AC models" on page 12
6. "Installing the software" on page 15
7. "Discovering and setting up the storage subsystem" on page 16
8. "Obtaining information from the IBM Support Web site" on page 17
9. "Updating the storage subsystem firmware" on page 17
10. "Configuring the storage subsystem" on page 17

Unpacking the storage subsystem

Statement 4:

		
≥ 18 kg (39.7 lb)	≥ 32 kg (70.5 lb)	≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

To unpack the storage subsystem or expansion enclosure, complete the following steps:

1. With the help of one other person, remove the storage subsystem or expansion enclosure from the shipping box and place it on a cart, table, or other raised surface.
2. Check the storage subsystem or expansion enclosure to make sure that you received all the necessary parts. See the "Inventory list" on page 3 section for the parts that are included with the storage subsystem or expansion enclosure.
3. Take the left and right support rails and the M5 screws and proceed to "Installing the support rails" on page 5.

Installing the support rails

Notes:

1. For proper weight distribution, install the support rails from the storage subsystem ship group in the lower portion of the rack cabinet.
2. If you are installing a storage subsystem, make sure that you allow for room above and below the storage subsystem for storage enclosures.
3. The support rails are marked “R” and “L” for right and left.

To install the left and right support rails in the rack cabinet, complete the following steps.

1. Starting with the left support rail, loosen the two rail adjustment screws. The adjustment screws are used to lock the support rails at a certain length.

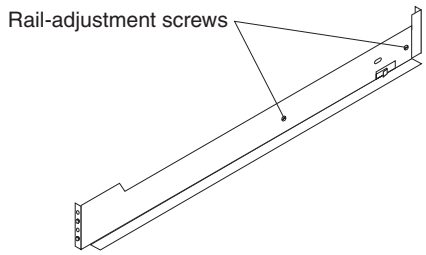


Figure 1. Rail-adjustment screws

2. Hold the front of the left support rail against the inside of the front rack cabinet support flange, and extend the rear of the support rail until it makes contact with the rear rack cabinet support flange. The alignment spacers at the rear of the support rail slide into the holes at the rear of the rack cabinet, as shown in Figure 2.

   Note: If the rack has square holes, replace the small spacers on the front and rear of the rails with the larger spacers that came with the rail kit.

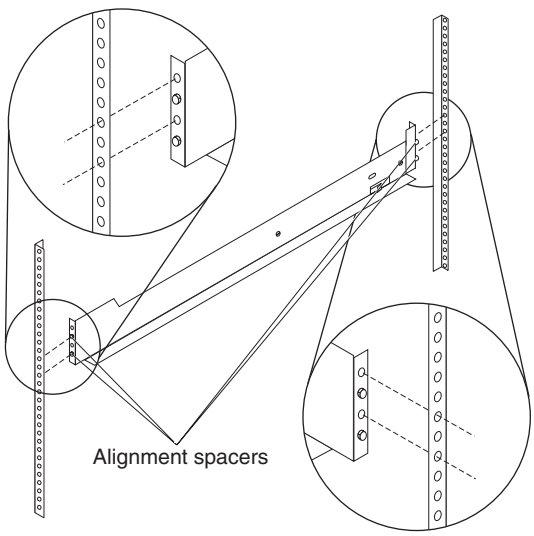


Figure 2. Positioning the support rails in the rack

3. From the front of the rack cabinet, with the support-rail flanges positioned inside the rack cabinet support rail assemblies, tighten one M5 screw in the second hole from the top of the rail bracket with a screwdriver, as shown in Figure 3 on page 6.

Note: Make sure that you use a washer when you install an M5 screw through a square hole on a rack-mounting flange.

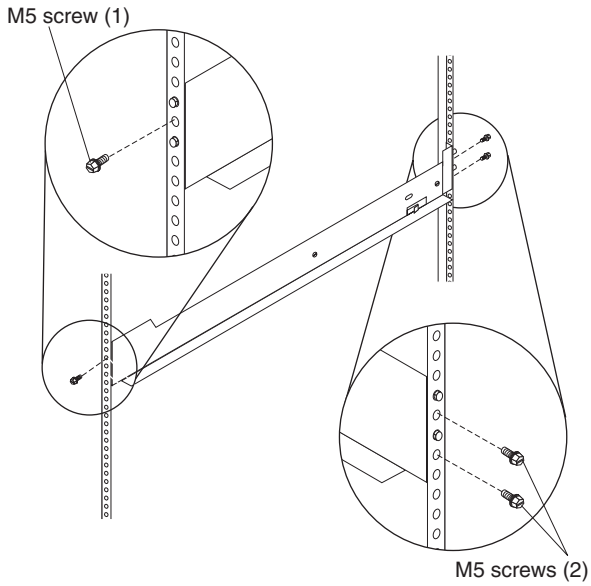


Figure 3. Securing the support rails in the rack

4. From the rear of the rack cabinet, tighten two M5 screws in the bottom hole and the hole second from the top of the rear rail bracket with a screwdriver.

   Note: Make sure that you use a washer when you install an M5 screw through a square hole on a rack-mounting flange.

5. Repeat steps 2 on page 5 through 4 for the right support rail.

Removing the storage subsystem or expansion enclosure components

Remove the controllers or ESMs, hot-swap drives, and the power supply and fan units before you lift the storage subsystem or expansion enclosure. This reduces the weight of the DS3500 or EXP3500 during installation. Each component in the back of the DS3500 and EXP3500 is held in place by a lever that has a locking latch.

To remove the components, complete the following steps.

Note: The DS3500 storage subsystem and the EXP3500 expansion enclosure use the same power supply, so the same removal procedure applies to both.

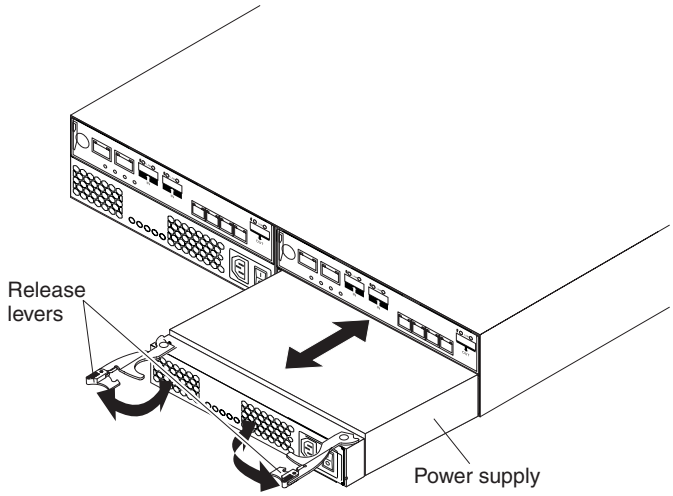


Figure 4. Removing a power supply from a DS3500 storage subsystem or an EXP3500 expansion enclosure

1. Remove the power supplies:
   a. Press the release tabs and open the release levers as shown in the illustration. The power supply moves out of the bay approximately 0.6 cm (0.25 inch).
   b. Slide the power supply out of the bay and set it aside.

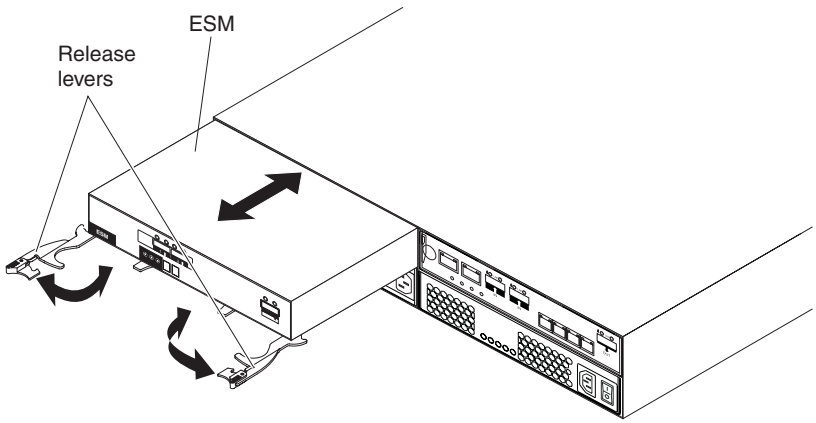


Figure 5. Removing an ESM from an EXP3512 or EXP3524

2. If you have an EXP3512 or EXP3524 expansion enclosure, remove the ESMs:
   a. Open the two release levers. The ESM moves out of the bay approximately 0.6 cm (0.25 inch).
   b. Slide the ESM out of the bay and set it aside.

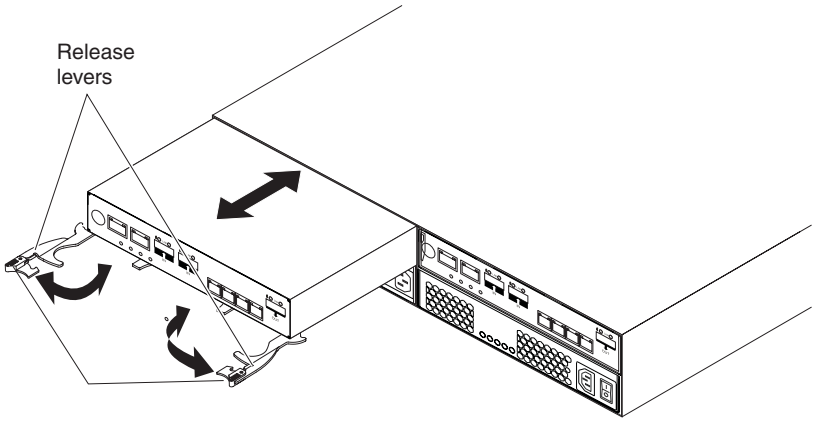


Figure 6. Removing a controller from a DS3512 or DS3524

3. If you have a DS3512 or DS3524 storage subsystem, remove the controller or controllers:
   a. Open the two release levers as shown in the illustration. The controller moves out of the bay approximately 0.6 cm (0.25 inch).
   b. Slide the controller out of the bay and set it aside.

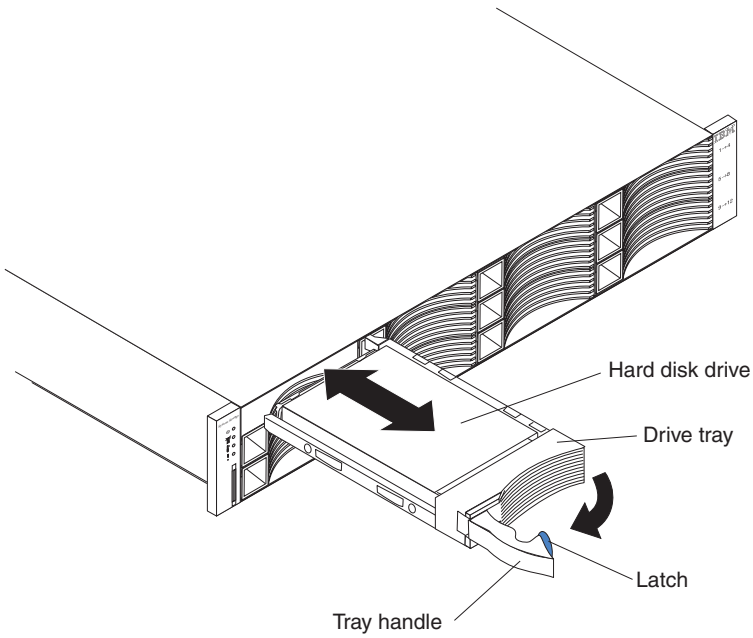


Figure 7. Removing a hard disk drive from a DS3512 or an EXP3512

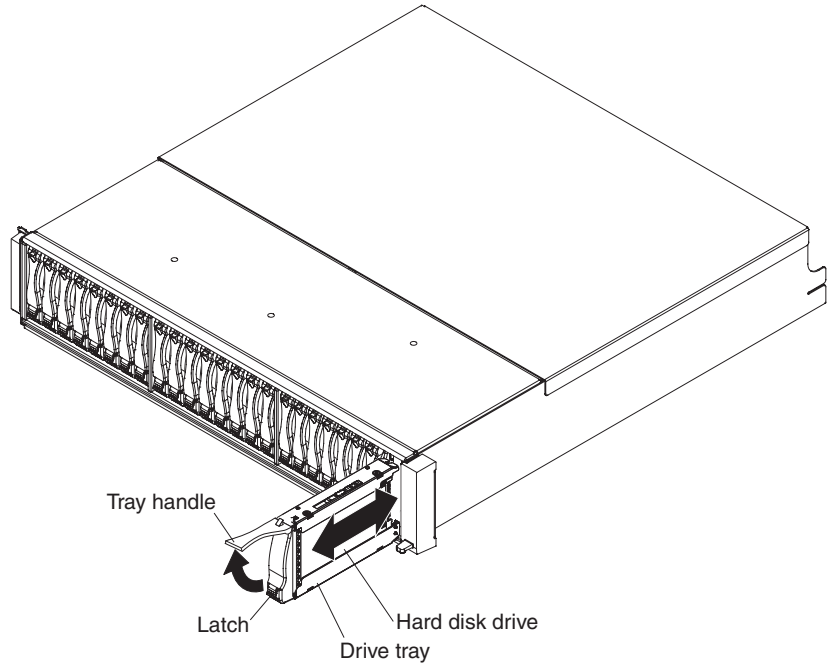


Figure 8. Removing a hard disk drive from a DS3524 or EXP3524

4. Remove the drives:
   a. Label the drives so that you can replace them in their original order.
   b. Release the latch on the drive by pressing on the inside of the bottom of the tray handle.
   c. Lift the closed latch to its open position. When the latch is open, it is at a 90° angle to the front of the drive.
   d. Pull the drive out of its bay.
   e. Repeat steps 4b through 4d for each drive.
5. See the *IBM Systems Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide* that came with the enclosures for more information about removing the components.

Installing the storage subsystem or storage enclosure in the rack cabinet

To install the storage subsystem, complete the following steps:

1. Read the safety information that comes with the storage subsystem or storage enclosure.
2. Slide the rear of the storage subsystem or expansion enclosure onto the support rails as shown for the DS3512 and EXP3512 in Figure 9, and for the DS3524 and EXP3524 in Figure 10.

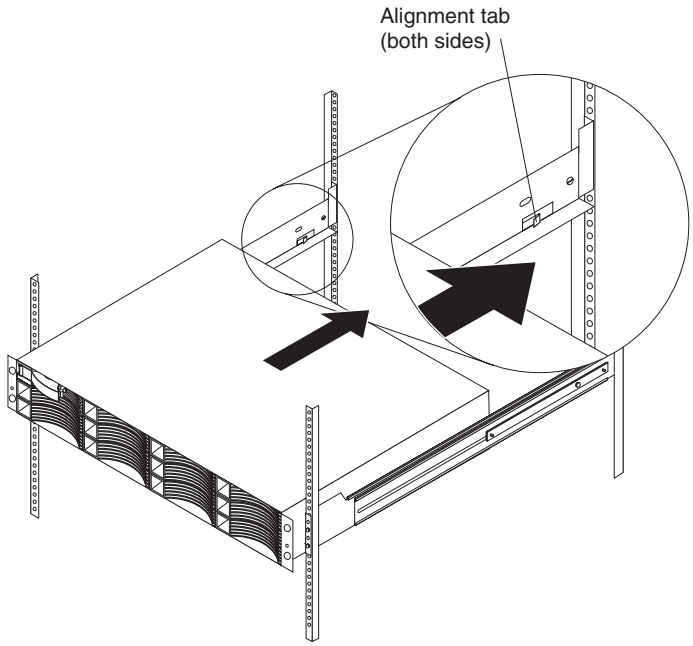


Figure 9. Positioning a DS3512 or EXP3512 in a rack

Note: The DS3524 and EXP3524 do not use the support rail alignment tabs.

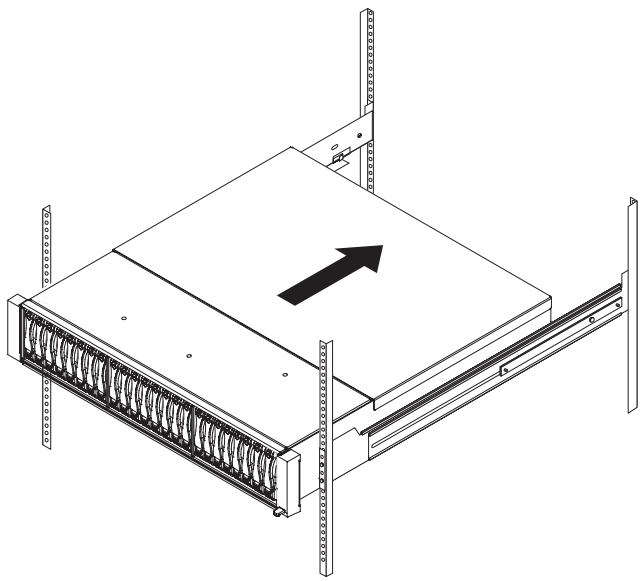


Figure 10. Positioning a DS3524 or EXP3524 in a rack

3. Align the front mounting holes on each side of the storage subsystem or expansion enclosure with the mounting holes on the front of the support rails.
4. Install and tighten one M5 screw in the support hole on each side of the front of the storage subsystem or expansion enclosure (no washer is required), as shown for the DS3512 or EXP3512 in Figure 11, and for the DS3524 or EXP3524 in Figure 12.

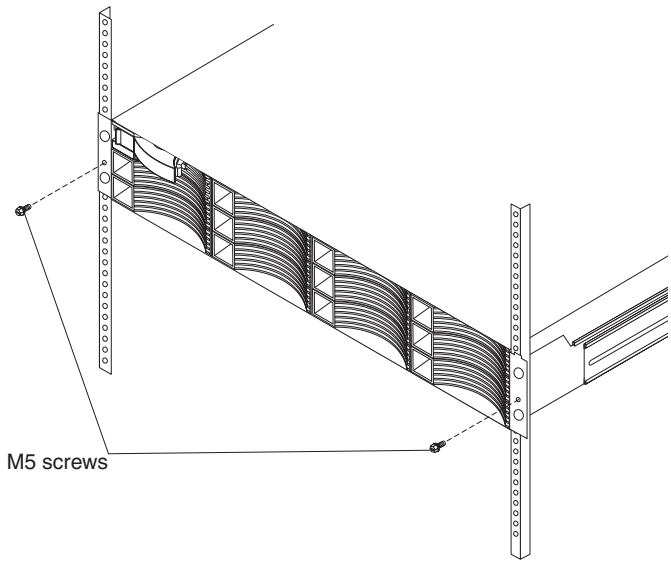


Figure 11. Securing a DS3512 or EXP3512 to a rack

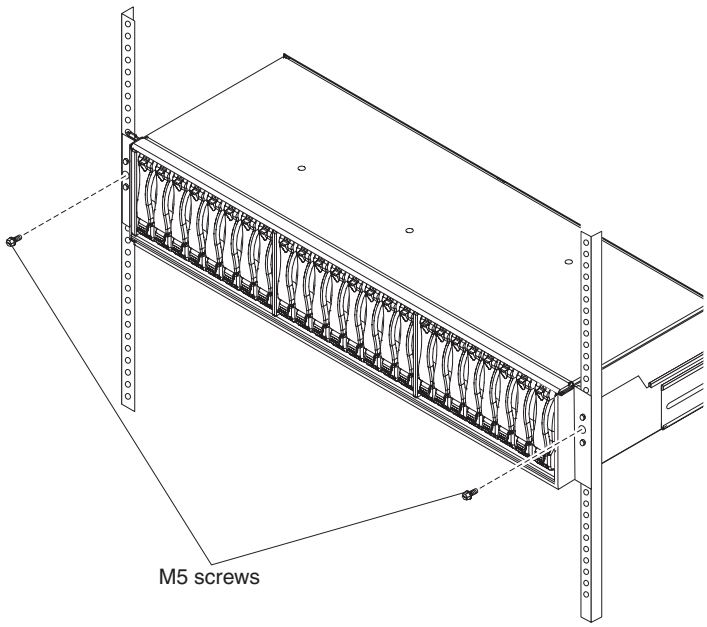


Figure 12. Securing an DS3524 or EXP3524 to a rack

5. Install and tighten the two M4 screws through rear of the support rails into the slotted holes on the outside of the storage subsystem or expansion enclosure.

6. Install the left and right bezels on the storage subsystem or expansion enclosure as shown in Figure 13. Fit the slot on the top of the bezel over the tab on the chassis flange and rotate the bezel down until it snaps into place. Make sure that the inside surface of the bezel is flush with the chassis.

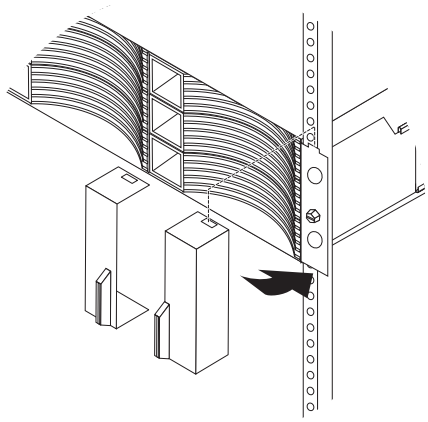


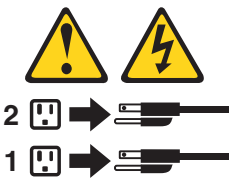
Figure 13. Installing the bezels

7. Install the storage subsystem or expansion enclosure components you removed in "Removing the storage subsystem or expansion enclosure components" on page 6.

Turning on the power - AC models

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Important: You must follow the power sequence in the order shown in the following procedure. To establish power redundancy for enclosures with two power supplies, use at least two power distribution units (PDUs) in the rack cabinet. Split the power connections from each enclosure into the separate PDUs. Then, connect the PDUs to external power receptacles that are on different circuits.

To turn on the storage subsystem ac power, complete the following steps:

1. Connect a power cord to each power supply in the storage subsystem.
2. Connect the other end of each power cord to the power receptacle.
3. Turn on the power to the switches, if applicable.

4. Turn on both power switches on all of the attached storage enclosures, and wait 60 seconds.
5. Turn on both power switches on the storage subsystem.

Note: When you turn off the power to the storage subsystem, complete the preceding steps in reverse order. Turn off the power to the storage subsystem first; then, turn off the power to the storage enclosures.

Turning on the power - DC models

Statement 29:

CAUTION:
This equipment is designed to permit the connection of the earthed conductor of the dc supply circuit to the earthing conductor at the equipment. If this connection is made, all of the following conditions must be met:

- **This equipment shall be connected directly to the dc supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the dc supply system earthing electrode conductor is connected.**
- **This equipment shall be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same dc supply circuit and the earthing conductor, and also the point of earthing of the dc system. The dc system shall not be earthed elsewhere.**
- **The dc supply source shall be located within the same premises as this equipment.**
- **Switching or disconnecting devices shall not be in the earthed circuit conductor between the dc source and the point of connection of the earthing electrode conductor.**

Statement 34:

CAUTION:
To reduce the risk of electric shock or energy hazards:

- **This equipment must be installed by trained service personnel in a restricted-access location, as defined by the NEC and IEC 60950-1, First Edition, The Standard for Safety of Information Technology Equipment.**
- **Connect the equipment to a reliably grounded safety extra low voltage (SELV) source. An SELV source is a secondary circuit that is designed so that normal and single fault conditions do not cause the voltages to exceed a safe level (60 V direct current).**
- **Incorporate a readily available approved and rated disconnect device in the field wiring.**
- **See the specifications in the product documentation for the required circuit-breaker rating for branch circuit overcurrent protection.**
- **Use copper wire conductors only. See the specifications in the product documentation for the required wire size.**
- **See the specifications in the product documentation for the required torque values for the wiring-terminal nuts.**

To turn on the storage subsystem dc power, complete the following steps:

1. Make sure that the power on-off switches of *both* dc power supplies in the storage subsystem and *all* attached storage enclosures are in the off position.
2. Connect a dc jumper cable to *each* dc power supply in the storage subsystem and to *all* attached storage enclosures:
   a. Using the supplied strap, tie the dc power supply cable to the rail to provide strain relief for the power cable.
   b. Connect the dc power cable to the power supply. See Figure 14 and Table 1 for the dc power supply connector PIN positions.

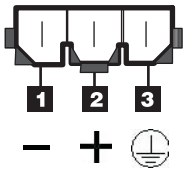


Figure 14. DC power connector - pin positions

Table 1. DC power supply connector - pin descriptions

Number	Function	DC power cable wire color
1	Pin 1: - 48 V dc	Brown
2	Pin 2: POS RTN	Blue
3	Pin 3: GND	Green/yellow

   c. Connect the - 48V wire (brown) of the dc power cable to an approved disconnect device (circuit breaker) rated at 30 A. The disconnect device must be easily accessible from the back of the DS3500 unit.

      Attention:

      - The disconnect device (circuit breaker) must be rated at 30 A.
      - Make sure that only 10 AWG copper conductor wires are used for all of the wiring between the DS3500 or EXP3500 dc power connectors and the dc power source.

   d. Complete the wiring from the disconnect device to the terminal marked -48V of the Reliably grounded safety extra low voltage (SELV) dc power source. Connect the POS RTN wire (blue) and the ground wire (green/yellow) of the dc power cable to the terminals marked POS RTN and GND on the dc power source, as shown in Figure 15.

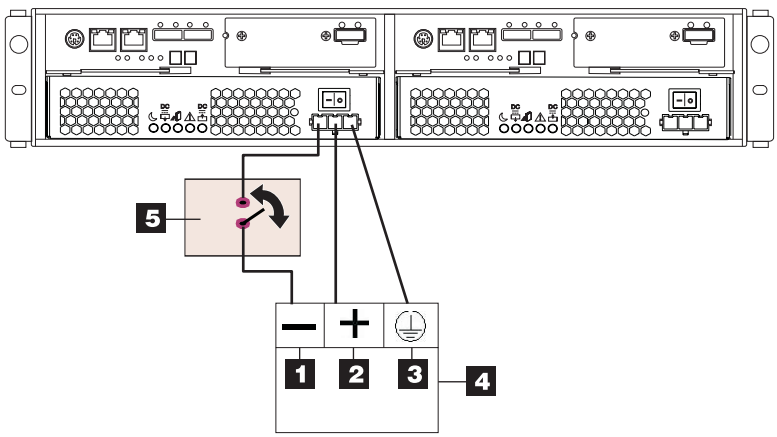


Figure 15. DC wiring from DS3500 to disconnect device and dc power source

Table 2. DC power source wiring descriptions

Number	Function
1	Pin 1: - 48 V dc
2	Pin 2: POS RTN
3	Pin 3: GND
4	DC power source
5	Disconnect device (circuit breaker)

3. After connecting all of the dc jumper cables, turn on the power to the -48 V dc SELV power source.
4. Turn on both power switches on all of the attached storage enclosures, and wait 60 seconds.
5. Turn on both power switches on the storage subsystem.

Note: When you turn off the power to the storage subsystem, complete the preceding steps in reverse order. Turn off the power to the storage subsystem first; then, turn off the power to the storage enclosures. Lastly, turn off the disconnect devices installed on the -48V SELV power source.

Installing the software

There are two types of computers that are associated with the storage subsystem. *Hosts* send input/output (I/O) to the storage subsystem LUNs. *Management stations* manage the storage subsystem. A computer can function as a host, a management station, or both. Use this section to install the IBM System Storage DS Storage Manager software on a management station or a host.

Note: The latest version of the Storage Manager software for your operating system is on the IBM Support Web site. See "Obtaining information from the IBM Support Web site" on page 17 for more information. The version of the software on the *DS Storage Manager* DVD that came with your storage subsystem might not be the latest version.

Installing the Storage Manager on a management station

To install the Storage Manager software on a management workstation, complete the following steps:

1. If you have access to the Internet, download the latest version of the Storage Manager software from the IBM Support Web site (see "Obtaining information from the IBM Support Web site" on page 17 for more information). If you do not have Internet access, insert the *DS Storage Manager* DVD on the management workstation and locate the applicable directory for your operating system.

   Note: The type of operating system that the management station runs is the directory that you must locate on the *DS Storage Manager* DVD. For more information, see the operating-system and device-river readme files on the *DS Storage Manager* DVD.
2. Double-click the Storage Manager executable file. Follow the instructions in the setup wizard, and make sure that you select one of the following options when you are prompted:
   - Click **Management Station** if the computer will be used only as a management station.
   - Click **Typical (full installation)** if the computer will be used as a management station and a host.
3. If this computer is the only computer designated as a monitor, select **Automatically Start Monitor** when you are prompted.

   Note: If additional computers will manage the storage subsystem, do not click **Automatically Start Monitor** when you set up those additional computers. Instead, click **Do Not Automatically Start the Monitor** when you are prompted. Otherwise, multiple alert notifications will be sent when there are problems with the storage subsystems.

Installing software on a host

To install the software on a host, complete the following steps:

1. Check the host bus adapter (HBA) BIOS and device-driver versions for your current HBAs. If necessary, update them to the current level shown on the IBM Support Web site before you install the software (see "Obtaining information from the IBM Support Web site" on page 17 for more information).

   Note: The BIOS and device drivers for your HBAs should be obtained directly from the IBM Support Web site. See "Obtaining information from the IBM Support Web site" on page 17 for more information.

2. Install the multipath driver to manage the paths from the host HBAs to the storage subsystem controllers. For more information, see the *IBM System Storage DS® Storage Manager Version 10 Installation and Host Support Guide*.

Discovering and setting up the storage subsystem

To discover and set up the storage subsystem, complete the following steps:

1. Start the Storage Manager software from your management station. The Enterprise Management and Confirm Initial Automatic Discovery windows open.
2. Select **Automatic Discovery** from the Enterprise Management Window to discover the storage subsystem. After the initial automatic discovery is complete, the Enterprise Management window displays all hosts and storage subsystems that are attached to the local subnetwork.

   Note: To discover storage subsystems that are outside of the local subnetwork, click **Edit > Add Storage Subsystem** and manually enter the IP address of the storage subsystem controller management ports or the IP address of a remote host.

3. Click **Rename the Storage Subsystem**. Use the serial number of the DS3500 as the first part of the subsystem name. The host name has a maximum of 30 characters.
4. Click **Locate the Storage Subsystem**. A blue LED flashes on the front of the selected storage subsystem. Label the storage subsystem with its associated name.
5. Highlight the storage subsystem and click **Tools > Manage Storage Subsystem** to open the Subsystem Management window and the Task Assistant.
6. If the storage subsystem is not in Optimal state, click the **Recover from Failure** icon in the Task Assistant. Follow the steps in the Recovery Guru. When the subsystem is Optimal, close the Task Assistant.
7. In the Subsystem Management window, click **Storage Subsystem > View > Profile**. Click the **Controller Firmware**, **NVSRAM**, **ESM Firmware**, **Drive Product ID**, and **Firmware Versions** tabs, and write each number in the following table for future use.

Controller firmware:
NVSRAM:
ESM firmware:
Drive product ID:
Firmware versions:

8. Save the profile for future use and close the profile window.

   Note: Save a copy of the storage subsystem profile and the Collect All Support Data bundle when you make configuration changes to the storage subsystems.

Obtaining information from the IBM Support Web site

The IBM System Storage documentation that is described in this *Quick Start Guide* and other IBM System Storage information is on the IBM support Web site. To access the latest documentation, downloads, and other technical updates on the IBM support Web site, complete the following steps.

Note: Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/systems/storage/support/.
2. Under **Select your product**, in the **Product Family** field, click **Disk systems**.
3. In the **Product** field, click the applicable product name, and then click **Go**.
4. Under **Support & downloads**, click the applicable support category.

Note: For detailed information about device-driver and firmware versions, make sure that you read the readme files that are posted with each package.

Updating the storage subsystem firmware

Note: The Storage Manager host code and HBA BIOS and device driver are current, if you completed all the steps in "Installing the software" on page 15.

In the Subsystem Management Window, click **Advanced > Maintenance > Download**. Select the following options in the order listed:

1. Controller firmware
2. Controller NVSRAM
3. ESM firmware
4. Drive firmware

Configuring the storage subsystem

In the Subsystem Management Window, click **View > Task Assistant**. If the storage subsystem is Optimal, complete the following tasks in the order listed:

1. Configure alert notification for problems in the storage subsystem
2. Define hosts
3. Create new storage partitions
4. Save configuration
5. Set or change password

This edition applies to the IBM System Storage DS3500 and EXP3500 Storage Subsystem with controller firmware version 7.70, and to all subsequent releases and modifications until otherwise indicated in new editions.

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