

IBM Storwize V7000 Expansion Enclosure Installation
Guide

*IBM Storwize V7000 Expansion
Enclosure Installation Guide*



Note

Before using this information and the product it supports, read the general information in “Notices” on page 21, the information in the “Safety and environmental notices” on page iii, as well as the information in the *IBM Environmental Notices and User Guide* , which is provided on a DVD.

This edition replaces GC27-4234-01 and applies to the IBM Storwize V7000 and IBM Flex System V7000 Storage Node systems.

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Safety and environmental notices

Review the safety notices, environmental notices, and electronic emission notices for IBM® Storwize® V7000 before you install and use the product.

Suitability for telecommunication environment: This product is not intended to connect directly or indirectly by any means whatsoever to interfaces of public telecommunications networks.

Here are examples of a caution and a danger notice:

CAUTION:

A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)

DANGER

| |
|---|
| <p>A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)</p> |
|---|

To find the translated text for a caution or danger notice:

1. Look for the identification number at the end of each caution notice or each danger notice. In the preceding examples, the numbers (C001) and (D002) are the identification numbers.
2. Locate *IBM Storwize V7000 Safety Notices* with the user publications that were provided with the Storwize V7000 hardware.
3. Find the matching identification number in the *IBM Storwize V7000 Safety Notices*. Then review the topics concerning the safety notices to ensure that you are in compliance.
4. Optionally, read the multilingual safety instructions on the Storwize V7000 website. Go to www.ibm.com/storage/support/storwize/v7000 and click the documentation link.

Safety notices and labels

Review the safety notices and safety information labels before using this product.

To view a PDF file, you need Adobe Acrobat Reader. You can download it at no charge from the Adobe website:

www.adobe.com/support/downloads/main.html

IBM Systems Safety Notices

This publication contains the safety notices for the IBM Systems products in English and other languages. Anyone who plans, installs, operates, or services the system must be familiar with and understand the safety notices. Read the related safety notices before you begin work.

Note: The IBM Systems Safety Notices document is organized into two sections. The danger and caution notices without labels are organized alphabetically by

language in the “Danger and caution notices by language” section. The danger and caution notices that are accompanied with a label are organized by label reference number in the “Labels” section.

The following notices and statements are used in IBM documents. They are listed in order of decreasing severity of potential hazards.

Danger notice definition

A special note that emphasize a situation that is potentially lethal or extremely hazardous to people.

Caution notice definition

A special note that emphasize a situation that is potentially hazardous to people because of some existing condition, or to a potentially dangerous situation that might develop because of some unsafe practice.

Note: In addition to these notices, labels might be attached to the product to warn of potential hazards.

Finding translated notices

Each safety notice contains an identification number. You can use this identification number to check the safety notice in each language.

To find the translated text for a caution or danger notice:

1. In the product documentation, look for the identification number at the end of each caution notice or each danger notice. In the following examples, the numbers (D002) and (C001) are the identification numbers.

DANGER

A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)

CAUTION:

A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)

2. Open the IBM Systems Safety Notices.
3. Under the language, find the matching identification number. Review the topics about the safety notices to ensure that you are in compliance.

Note: This product was designed, tested, and manufactured to comply with IEC 60950-1, and where required, to relevant national standards that are based on IEC 60950-1.

Caution notices for the Storwize V7000

Ensure that you understand the caution notices for Storwize V7000.

Use the reference numbers in parentheses at the end of each notice, such as (C003) for example, to find the matching translated notice in *IBM Storwize V7000 Safety Notices*.

CAUTION:

The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do not: Throw or immerse into water, heat to more than 100°C (212°F), repair or disassemble. (C003)

CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the machine covers, unless instructed otherwise in the installation and configuration procedures. (26)

CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- (For sliding drawers) Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.
- (For fixed drawers) This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.

(R001 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building.

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions.
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 230 mm (30 x 80 in.).
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
- Do not use a ramp inclined at more than 10 degrees.
- When the rack cabinet is in the new location, complete the following steps:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
- If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off the pallet and bolt the rack cabinet to the pallet.

(R002)

CAUTION:

- Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.
- It is intended that equipment installed within this rack will have its own enclosure. (R005).

CAUTION:

Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:

Use safe practices when lifting. (R007)

CAUTION:

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:

If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

Danger notices for Storwize V7000

Ensure that you are familiar with the danger notices for Storwize V7000.

Use the reference numbers in parentheses at the end of each notice, such as (C003) for example, to find the matching translated notice in *IBM Storwize V7000 Safety Notices*.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- If IBM supplied a power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To connect:

1. Turn off everything (unless instructed otherwise).
 2. Attach all cables to the devices.
 3. Attach the signal cables to the connectors.
 4. Attach the power cords to the outlets.
 5. Turn on the devices.
- Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

DANGER

Heavy equipment—personal injury or equipment damage might result if mishandled. (D006)

DANGER

Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.



- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

(R001 part 1 of 2)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

DANGER



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with \perp . (R010)

Special caution and safety notices

This information describes special safety notices that apply to the Storwize V7000. These notices are in addition to the standard safety notices supplied and address specific issues relevant to the equipment provided.

General safety

When you service the Storwize V7000, follow general safety guidelines.

Use the following general rules to ensure safety to yourself and others:

- Observe good housekeeping in the area where the devices are kept during and after maintenance.
- Follow the guidelines when lifting any heavy object:
 1. Ensure that you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 18 kg (40 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes a hazard or that makes the equipment unsafe.
- Before you start the device, ensure that other personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the unit.
- Keep your tool case away from walk areas so that other people will not trip over it.

- Do not wear loose clothing that can be trapped in the moving parts of a device. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconducting clip, approximately 8 cm (3 in.) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.

- Wear safety glasses when you are: hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly after you have finished servicing the unit.

Handling static-sensitive devices

Ensure that you understand how to handle devices that are sensitive to static electricity.

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective bags until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its antistatic bag, touch it to an unpainted metal part of the system unit for at least two seconds. (This action removes static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your Storwize V7000, without putting it down. If it is necessary to put the device down, place it onto its static-protective bag. (If your device is an adapter, place it component-side up.) Do not place the device onto the cover of the Storwize V7000 or onto a metal table.
- Take additional care when you handle devices during cold weather because heating reduces indoor humidity and increases static electricity.

Sound pressure

Attention: Depending on local conditions, the sound pressure can exceed 85 dB(A) during service operations. In such cases, wear appropriate hearing protection.

Environmental notices

| The IBM Systems Environmental Notices and User Guide (ftp://public.dhe.ibm.com/systems/support/warranty/envnotices/environmental_notices_and_user_guide.pdf), Z125-5823 document contains all the required environmental notices for IBM Systems products in English and other languages.

| It includes statements on limitations, product information, product recycling and disposal, battery information, flat panel display, refrigeration, and water-cooling systems, external power supplies, and safety data sheets.

| To view a PDF file, you need Adobe Reader. You can download it at no charge from the Adobe web site (get.adobe.com/reader/).

About this guide

This guide provides instructions for unpacking your shipping order and installing the IBM Storwize V7000 2076 expansion enclosure.

The IBM Storwize V7000 2076 expansion enclosure works with your existing system.

Who should use this guide

This guide is intended for users who are adding the IBM Storwize V7000 2076 expansion enclosures to their existing system.

Storwize V7000 library and related publications

Product manuals, other publications, and websites contain information that relates to Storwize V7000.

Storwize V7000 Information Center

The IBM Storwize V7000 Information Center contains all of the information that is required to install, configure, and manage the Storwize V7000. The information center is updated between Storwize V7000 product releases to provide the most current documentation. The information center is available at the following website:

publib.boulder.ibm.com/infocenter/storwize/ic/index.jsp

Storwize V7000 library

Unless otherwise noted, the publications in the Storwize V7000 library are available in Adobe portable document format (PDF) from the following website:

www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss

In addition to being available on websites, the *IBM Systems Safety Notices* and *IBM Systems Environmental Notices and User Guide* are shipped on CD with the product.

Table 1 lists websites where you can find help, services, and more information.

Table 1. IBM websites for help, services, and information

| Website | Address |
|---|--|
| Directory of worldwide contacts | http://www.ibm.com/planetwide |
| Support for Storwize V7000 (2076) | www.ibm.com/storage/support/storwize/v7000 |
| Support for IBM System Storage® and IBM TotalStorage products | www.ibm.com/storage/support/ |

Each of the PDF publications in the Table 2 on page xiv is also available in the information center by clicking the number in the “Order number” column:

Table 2. Storwize V7000 library

| Title | Description | Order number |
|--|---|----------------------|
| <i>IBM Storwize V7000 Quick Installation Guide</i> | This guide provides detailed instructions for unpacking your shipping order and installing your system. The first of three chapters describes verifying your order, becoming familiar with the hardware components, and meeting environmental requirements. The second chapter describes installing the hardware and attaching data cables and power cords. The last chapter describes accessing the management GUI to initially configure your system. | GC27-2290 |
| <i>IBM Storwize V7000 Expansion Enclosure Installation Guide, Machine type 2076</i> | This guide provides instructions for unpacking your shipping order and installing the 2076 expansion enclosure for the Storwize V7000 system. | GC27-4234 |
| <i>IBM Storwize V7000 Troubleshooting, Recovery, and Maintenance Guide</i> | This guide describes how to service, maintain, and troubleshoot the Storwize V7000 system. | GC27-2291 |
| <i>IBM Systems Safety Notices</i> | This guide contains translated caution and danger statements. Each caution and danger statement in the Storwize V7000 documentation has a number that you can use to locate the corresponding statement in your language in the <i>IBM Systems Safety Notices</i> document. | G229-9054 |
| <i>IBM Storwize V7000 Read First Flyer</i> | This document introduces the major components of the Storwize V7000 system and describes how to get started with the <i>IBM Storwize V7000 Quick Installation Guide</i> . | GC27-2293 |
| <i>IBM System Storage SAN Volume Controller and IBM Storwize V7000 Command-Line Interface User's Guide</i> | This guide describes the commands that you can use from the Storwize V7000 command-line interface (CLI). | GC27-2287 |
| <i>IBM Statement of Limited Warranty (2145 and 2076)</i> | This multilingual document provides information about the IBM warranty for machine types 2145 and 2076. | Part number: 4377322 |

Table 2. Storwize V7000 library (continued)

| Title | Description | Order number |
|---|---|--------------------------------|
| <i>IBM License Agreement for Machine Code</i> | This multilingual guide contains the License Agreement for Machine Code for the Storwize V7000 product. | SC28-6872 (contains Z125-5468) |

IBM documentation and related websites

Table 3 lists websites that provide publications and other information about the Storwize V7000 or related products or technologies.

Table 3. IBM documentation and related websites

| Website | Address |
|--|--|
| <i>IBM Storage Management Pack for Microsoft System Center Operations Manager (SCOM)</i> | The IBM Storage Host Software Solutions Information Center describes how to install, configure, and use the IBM Storage Management Pack for Microsoft System Center Operations Manager. |
| <i>IBM Storage Management Console for VMware vCenter</i> | The IBM Storage Host Software Solutions Information Center describes how to install, configure, and use the IBM Storage Management Console for VMware vCenter, which enables Storwize V7000 and other IBM storage systems to be integrated in VMware vCenter environments. |
| <i>IBM Storage Device Driver for VMware VAAI</i> | IBM Storage Host Software Solutions Information Center describes how to install, configure, and use the IBM Storage Device Driver for VMware VAAI. |
| <i>IBM Storwize V7000 Adapter for VMware vCenter Site Recovery Manager</i> | The VMware website describes how to install, configure, and use the IBM Storwize V7000 Adapter for VMware vCenter Site Recovery Manager. |
| IBM Publications Center | www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss |
| IBM Redbooks® publications | www.redbooks.ibm.com/ |

Related accessibility information

To view a PDF file, you need Adobe Reader, which can be downloaded from the Adobe website:

www.adobe.com/support/downloads/main.html

How to order IBM publications

The IBM Publications Center is a worldwide central repository for IBM product publications and marketing material.

The IBM Publications Center offers customized search functions to help you find the publications that you need. Some publications are available for you to view or download at no charge. You can also order publications. The publications center displays prices in your local currency. You can access the IBM Publications Center through the following website:

Related websites

The following websites provide information about Storwize V7000 or related products or technologies:

| Type of information | Website |
|--|--|
| Storwize V7000 support | www.ibm.com/storage/support/storwize/v7000 |
| Technical support for IBM storage products | www.ibm.com/storage/support/ |
| IBM Electronic Support registration | www.ibm.com/support/electronicssupport |

Sending your comments

Your feedback is important in helping to provide the most accurate and highest quality information.

To submit any comments about this book or any other Storwize V7000 documentation:

- Go to the feedback form on the website for the Storwize V7000 Information Center at publib.boulder.ibm.com/infocenter/storwize/ic/index.jsp?topic=/com.ibm.storwize.v7000.doc/feedback.htm. You can use the form to enter and submit comments. You can browse to the topic in question and use the feedback link at the very bottom of the page to automatically identify the topic for which you have a comment.
- Send your comments by email to starpubs@us.ibm.com. Include the following information in your email:
 - Publication title
 - Publication form number
 - Page, table, or illustration numbers that you are commenting on
 - A detailed description of any information that should be changed

How to get information, help, and technical assistance

If you need help, service, technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

Information

IBM maintains pages on the web where you can get information about IBM products and fee services, product implementation and usage assistance, break and fix service support, and the latest technical information. For more information, refer to Table 4.

Table 4. IBM websites for help, services, and information

| Website | Address |
|-----------------------------------|--|
| Directory of worldwide contacts | http://www.ibm.com/planetwide |
| Support for Storwize V7000 (2076) | www.ibm.com/storage/support/storwize/v7000 |

Table 4. IBM websites for help, services, and information (continued)

| Website | Address |
|--|--|
| Support for IBM System Storage and IBM TotalStorage products | www.ibm.com/storage/support/ |

Note: Available services, telephone numbers, and web links are subject to change without notice.

Help and service

Before calling for support, be sure to have your IBM Customer Number available. If you are in the US or Canada, you can call 1 (800) IBM SERV for help and service. From other parts of the world, see <http://www.ibm.com/planetwide> for the number that you can call.

When calling from the US or Canada, choose the **storage** option. The agent decides where to route your call, to either storage software or storage hardware, depending on the nature of your problem.

If you call from somewhere other than the US or Canada, you must choose the **software** or **hardware** option when calling for assistance. Choose the **software** option if you are uncertain if the problem involves the Storwize V7000 software or hardware. Choose the **hardware** option only if you are certain the problem solely involves the Storwize V7000 hardware. When calling IBM for service regarding the product, follow these guidelines for the **software** and **hardware** options:

Software option

Identify the Storwize V7000 product as your product and supply your customer number as proof of purchase. The customer number is a 7-digit number (0000000 to 9999999) assigned by IBM when the product is purchased. Your customer number should be located on the customer information worksheet or on the invoice from your storage purchase. If asked for an operating system, use **Storage**.

Hardware option

Provide the serial number and appropriate 4-digit machine type. For Storwize V7000, the machine type is 2076.

In the US and Canada, hardware service and support can be extended to 24x7 on the same day. The base warranty is 9x5 on the next business day.

Getting help online

You can find information about products, solutions, partners, and support on the IBM website.

To find up-to-date information about products, services, and partners, visit the IBM website at www.ibm.com/storage/support/storwize/v7000.

Before you call

Make sure that you have taken steps to try to solve the problem yourself before you call.

Some suggestions for resolving the problem before calling IBM Support include:

- Check all cables to make sure that they are connected.
- Check all power switches to make sure that the system and optional devices are turned on.
- Use the troubleshooting information in your system documentation. The troubleshooting section of the information center contains procedures to help you diagnose problems.
- Go to the IBM Support website at www.ibm.com/storage/support/storwize/v7000 to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Using the documentation

Information about your IBM storage system is available in the documentation that comes with the product.

That documentation includes printed documents, online documents, readme files, and help files in addition to the information center. See the troubleshooting information for diagnostic instructions. The troubleshooting procedure might require you to download updated device drivers or software. IBM maintains pages on the web where you can get the latest technical information and download device drivers and updates. To access these pages, go to www.ibm.com/storage/support/storwize/v7000 and follow the instructions. Also, some documents are available through the IBM Publications Center.

Sign up for the Support Line Offering

If you have questions about how to use and configure the machine, sign up for the IBM Support Line offering to get a professional answer.

The maintenance supplied with the system provides support when there is a problem with a hardware component or a fault in the system machine code. At times, you might need expert advice about using a function provided by the system or about how to configure the system. Purchasing the IBM Support Line offering gives you access to this professional advice while deploying your system, and in the future.

Contact your local IBM sales representative or the IBM Support Center for availability and purchase information.

What's new

New and updated information was included in this version of the book as a result of usability testing and other feedback. Read all of the steps no matter how familiar you are with the installation.

Chapter 1. Product overview

This topic provides an overview of the machine type models 2076-212 and 2076-224 expansion enclosures.

Machine type models 2076-212 and 2076-224 expansion enclosures overview

The IBM Storwize V7000 expansion enclosure is a high-capacity 24-drive bay (2.5-inch drives) or 12-drive bay (3.5-inch drives) unit packaged in a 2U rack-mountable enclosure.

Expansion enclosures add additional storage capacity to your system. They are high-capacity units, packaged in a 2U rack-mountable enclosure.

Expansion enclosures connect either to control enclosures or to other expansion enclosures through the SAS ports. These are the expansion enclosure models:

- Machine type and model 2076-212, which can hold up to 12 3.5-inch drives.
- Machine type and model 2076-224, which can hold up to 24 2.5-inch drives.

The machine type and model (MTM) are shown on labels that are located on the front and the rear of each enclosure.

- The labels also show the enclosure serial number. You must know the serial number when you contact IBM® support.

Chapter 2. Physical configuration planning of a system

Before you install the expansion enclosure, plan the physical configuration and the initial settings for your system (refer to your system's Information Center). After configuration planning, you can plan the physical installation required for your specific system.

Location and cabling guidelines

Certain specifications for the physical site must be met before you can set up your environment. This activity includes verifying that adequate space is available and that requirements for power and environmental conditions are met.

Locating expansion enclosures

Before installing one or more expansion enclosures you must develop a hardware location chart. The system in which you are adding the expansion enclosures provides detailed guidelines for locating expansion units. Keep in mind that each enclosure requires two standard rack units of space in a rack.

Identify the appropriate location for each enclosure by following the hardware location chart.

SAS cabling

SAS cables are required. Make sure you have the proper number and lengths before you begin installation. Again, make sure that you follow the location hardware location chart based on your system's guidelines.

Planning for power

Plan to attach each of the two power supplies in an enclosure to separate main power supply lines.

Each expansion enclosure consists of two canisters (upper and lower). The lower is a reverse of the upper canister.

Attention: The power cord is the main power disconnect. Ensure that the socket outlets are located near the equipment and are easily accessible.

Figure 1 on page 4 (**3** and **4**) shows the rear view of an expansion enclosure's two canisters, and identifies the location of the power supply units (**1** and **2**). The ports and their use are described later in this section.

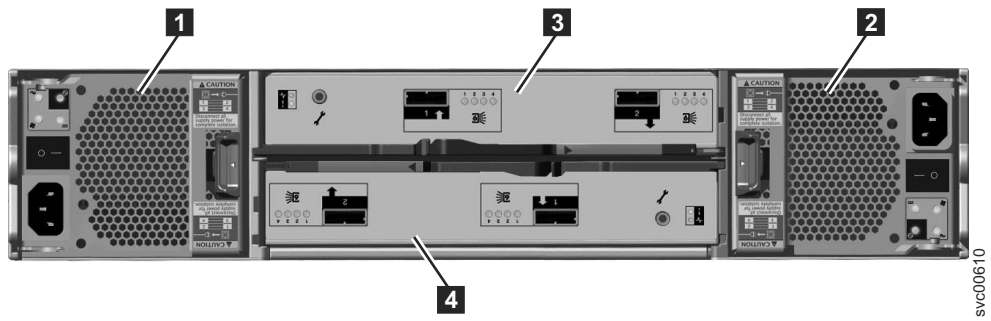


Figure 1. Rear view of a model 2076-212 or a model 2076-224 expansion enclosure

Chapter 3. Before you begin the installation

This topic contains a set of instructions to help you unpack your shipping order and install your system. The first steps involve verifying your order, becoming familiar with the hardware component terminology, and ensuring that you have met the environmental requirements.

Before you begin installation make sure that:

1. You have read the planning information regarding your physical environment.
2. The cables are ready for installation.

CAUTION:

The weight of this part or unit is between 18 and 32 kg (39.7 and 70.5 lb). It takes two persons to safely lift this part or unit. (C009)

Be familiar with the following information

- Where it is applicable, a CAUTION notice indicates situations that can be potentially hazardous to you. Before doing a step that contains a caution notice, read and understand the statement that accompanies it.
- **Sliding drawers:** Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.
- **Fixed drawers:** Any fixed drawer (like the Storwize V7000) must not be removed for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.
- Use safe practices when lifting. The fully populated enclosure weighs about 57.2 lbs (26 kg). At least two people are required to lift and install the enclosure into the rack or to remove an enclosure from the rack.
- Do not use rack-mounted devices as a shelf or workspace. Do not place any object on top of rack-mounted devices.

Tools needed

A Phillips screwdriver is the only tool needed for the system installation.

Reviewing your packing slip

After you open your box or boxes, locate your packing slip. Ensure that the items that are listed in your packing slip match what is in the box. Ensure that any optional items that you ordered are included in the list. Your shipment might contain additional items depending on the order.

Standard ship group contents:

- ___ • Expansion enclosure (models 2076-212 or 2076-224). The last two digits of the model number identify the number of drive slots, either 12 or 24.
- ___ • Rack-mounting hardware kit, including:
 - ___ – Two rails (right and left assembly)

- __ – Two M5 x 15 Hex Phillips screws per rail (two rails)
- __ – Two M5 x 15 Hex Phillips screws per chassis

Note: Two parts of the rail kit are attached to each side of the enclosure.

- __ • Two power cords
- __ • Drive assemblies or blank carriers (installed in the enclosure).
Verify the number of drives and the size of the drives.

Other shipped items:

- __ • Environmental Notices flyer
- __ • Limited Warranty information
- __ • Software CD that contains the environmental notices, the publication PDFs, and the information center content. One CD is shipped per enclosure.
- __ • License Function authorization document

Additional components for expansion enclosure:

- __ • One set of SAS cables for each expansion enclosure

Identifying the hardware components

Expansion enclosure components

Figure 2 shows the rear view of an expansion enclosure and identifies the location of the power supply units and the canisters. The ports and their use are described later in this section.

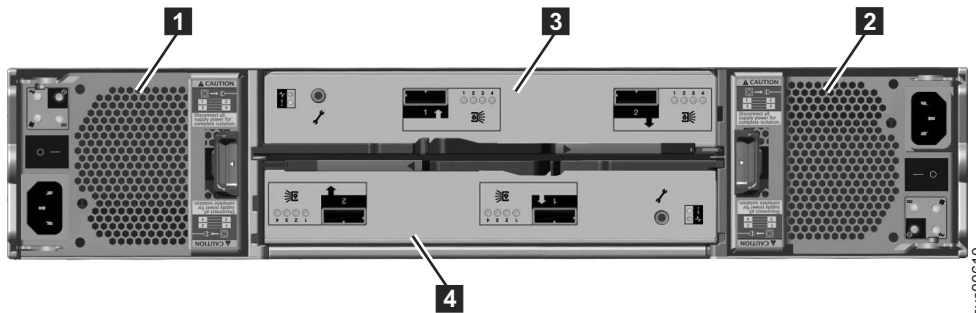


Figure 2. Rear view of a model 2076-212 or a model 2076-224 expansion enclosure

- Power supply units are on the left and right of the canisters. Power supply **1** is located on the left. Power supply **2** is located on the right. Power supply 1 is inserted top side up, and power supply 2 is inverted, or top side down.
- Two canisters are housed in the middle of the enclosure. Each canister is known as an expansion canister. The upper canister, as shown in Figure 2, is canister **3**, and the lower canister is canister **4**. Canister 3 is top side up, and canister 4 is inverted, or top side down.

Figure 3 on page 7 shows the rear view of an expansion enclosure and identifies the SAS port locations.

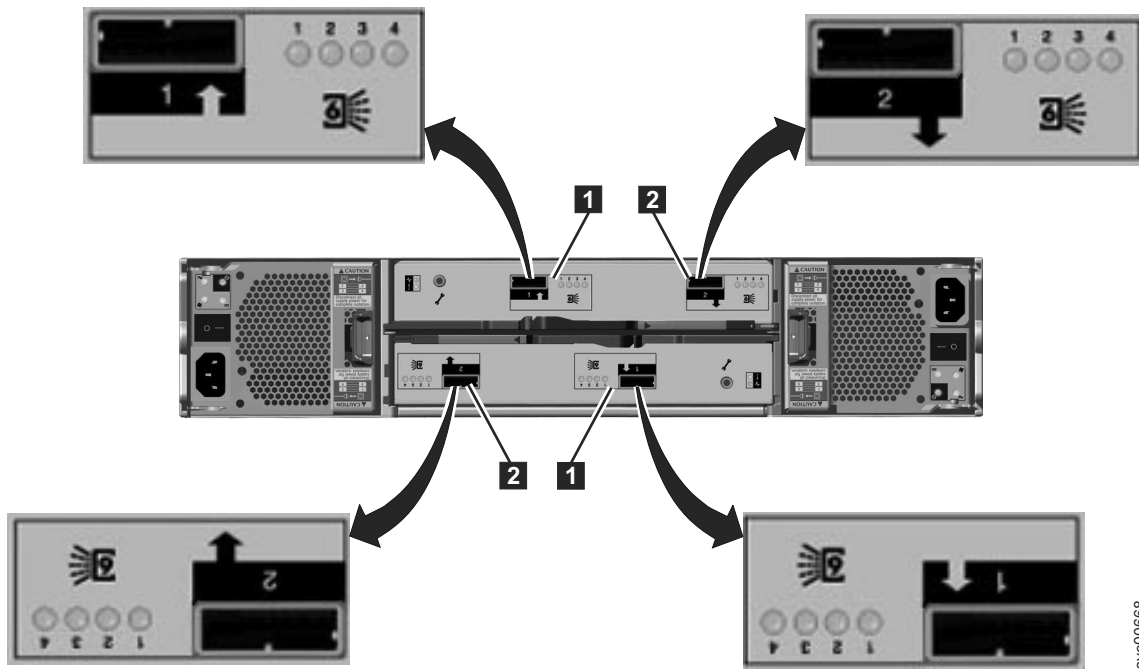


Figure 3. SAS ports and LEDs in rear of expansion enclosure

Each canister has two SAS ports that are numbered 1 on the left **1** and 2 on the right **2**.

Port 1 is the input port, as indicated by the arrow at **1**. Port 1 must always be connected.

Port 2 is the output port, as indicated by the arrow at **2**. Port 2 is only connected if this expansion unit is not the last one in the chain.

Note: The reference to the left and right locations applies to canister 1, which is the upper canister. The port locations are inverted for canister 2, which is the lower canister.

Chapter 4. Installing the hardware

You have completed the initial steps of verifying the shipping contents and becoming familiar with the hardware components. You have verified that the power requirements are met and have planned the location of the enclosures. You are now ready to begin installing the hardware components and connecting the data cables and power cords.

Installing the support rails

Follow this procedure to install support rails for the enclosure in the rack cabinet.

About this task

To install the support rails, do the following steps:

1. Locate the rack mounting rails and screws.

The rail assembly is made up of two sets of rails. One set of rails is already installed, or preinstalled, on the sides of the enclosures. The other set of rails must be installed in the rack cabinet. The rails on the sides of the enclosures slide into the rails that are installed in the rack cabinet.

2. Working at the front of the rack cabinet, identify the two standard rack units of space in the rack into which you want to install the support rails.

Figure 4 shows two rack units with the front mounting holes identified.

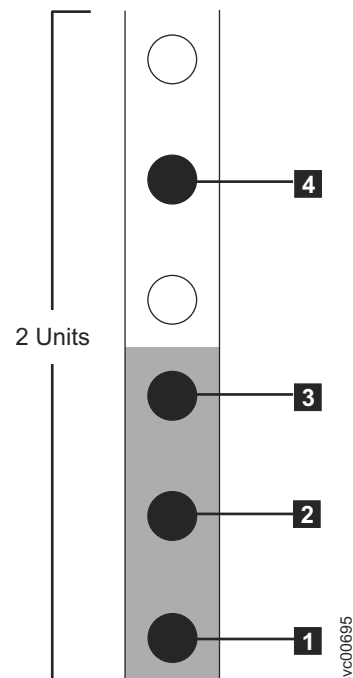


Figure 4. Hole locations in the front of the rack

- **1** Bottom rail location pin hole
- **2** Enclosure mounting screw hole. Do not insert the screw until the enclosure is installed.
- **3** Rack mounting screw hole

- **4** Top rail location pin hole
3. Align the bottom of the rail with the bottom of the two rack units. Insert the rail location pins **1** and **4** through the holes in the rack cabinet.
 4. Insert a clamping screw into the rack mounting hole **3** between the rail location pins.
 5. Tighten the screw to secure the rail to the rack.
 6. Working from the rear of the rack cabinet, extend the rail that you secured to the front to align the bottom of the rail with the bottom of the two rack units.

Note: Ensure that the rail is level between the front and the back.

Figure 5 shows two rack units with the back mounting holes identified.

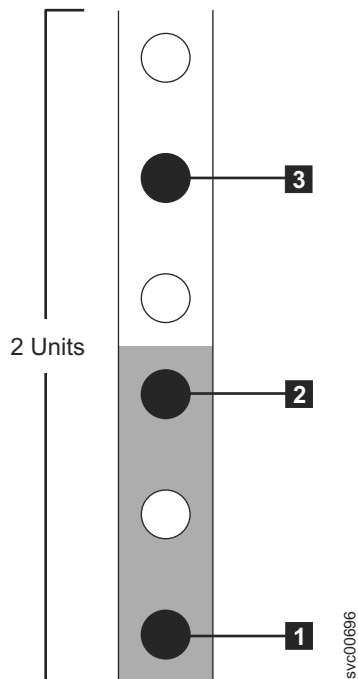


Figure 5. Hole locations in the back of the rack

- **1** Bottom rail location pin hole
 - **2** Rack mounting screw hole
 - **3** Top rail location pin hole
7. Insert the rail location pins through the holes **1** and **3** in the rack cabinet.
 8. Insert a clamping screw into the rack mounting hole **2** between the rail location pins.
 9. Tighten the screw to secure the rail to the rack from the back side.
 10. Repeat the steps to secure the opposite rail to the rack cabinet.
 11. Repeat the procedure for each additional enclosure.

Installing the enclosures

Follow this procedure to install an enclosure into a rack.

About this task

DANGER

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- (For sliding drawers) Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.
- (For fixed drawers) This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.

(R001 part 2 of 2)

Following your enclosure location plan, install the enclosure, starting from the bottom.

1. On either side of the drive assemblies, remove the enclosure end caps by squeezing the middle of the cap and pulling it away from the front of the enclosure, as show in Figure 6.



Figure 6. Removing the enclosure end cap

2. Align the enclosure with the front of the rack cabinet.

- Carefully slide the enclosure into the rack along the rails until the enclosure is fully inserted.

Notes:

- The preinstalled rails on the sides of the enclosure must fit into the rack-mounted rails that you previously installed.
 - The rails are not designed to hold an enclosure that is partially inserted. The enclosure must always be in a fully inserted position.
 - Do not have more than one enclosure extended out of the rack at the same time to avoid the danger of the rack toppling over.
- Insert a screw into the hole behind each enclosure end cap and tighten the screw, as shown in Figure 7.



Figure 7. Securing an enclosure to a rack cabinet

- After matching each end cap's serial number to the serial number found on the rear of each enclosure, push the end caps back into position.
- Repeat this procedure for each additional enclosure that you install.

Connecting the SAS cables

This topic describes the general cabling guidelines for attaching SAS cables when installing one or more expansion enclosures.

About this task

This task applies if you are installing one or more expansion enclosures.

Note: The enclosure terminology that is used in this topic is described fully in "Identifying the hardware components" on page 6.

Be aware of these guidelines when you begin to attach the cables to the SAS ports:

- Attach cables serially between enclosures; do not skip an enclosure.
- Ensure that cables are installed in an orderly way to reduce the risk of cable damage when replaceable units are removed or inserted.
- Arrange your cables to provide access to:

- The enclosures themselves. Access is required to the hardware for servicing and for safely removing and replacing components using two or more people.
- Ensure that each SAS cable is fully inserted. A click is heard when the cable is successfully inserted.
- Ensure the SAS cable has the correct end connector for both this enclosure and the enclosure to which you are connecting.

Note: If you make a mistake during cabling and must unplug a SAS cable, pull the blue tag to release the cable.

Connecting the power cords

You can use this procedure when attaching the power cords to the power supply units.

About this task

Two power supply units are located in each enclosure. Ensure that the power switches for each power supply unit are off.

Note: Each power supply unit comes with an attached cable retention bracket that fastens around the power cord to prevent the cord from being removed accidentally.

Do the following steps when you attach the power cord to each power supply unit:

1. Straighten the cable tie on the cable retention bracket. The cable retention bracket is attached to the power supply unit.
2. Open the cable retention bracket, as shown in Figure 8 on page 14.



Figure 8. Unlocking the cable retention bracket

3. Slide the cable retention bracket away from the power supply unit until there is enough room to attach the cable retention bracket to the cable. When sliding the bracket away from the cable plug-in, pull the lever on the bracket that controls the cable tie slightly towards the center of the canister. You do not need to pull the lever to slide the bracket towards the cable plug-in.
4. Attach a power cord to each of the two power supply units in each enclosure. Ensure that cables are installed in an orderly way to reduce the risk of cable damage when replaceable units are removed or inserted.
5. Place the cable retention bracket around the end of the cable that plugs into the power supply unit.
6. Slide the cable retention bracket along the cord until it fits snugly against the plug end of the cable, as shown in Figure 9 on page 15.

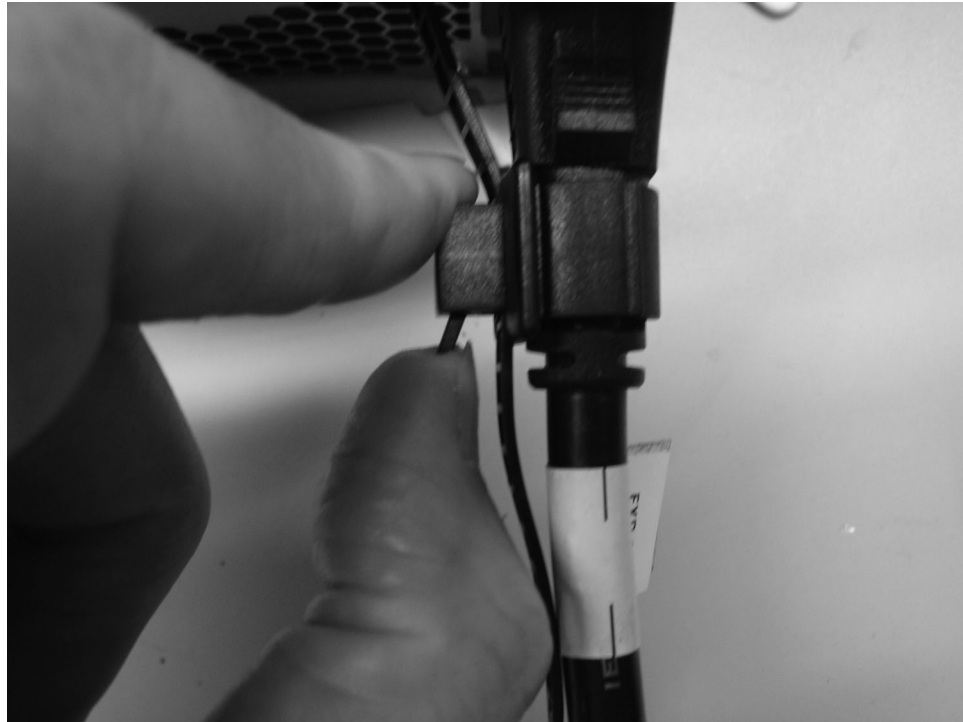


Figure 9. Sliding the cable retention bracket directly behind the power cord

7. Tighten the fastener around the plug.
8. Repeat the steps for each additional power cord.
9. Plug the power cords into a properly grounded electrical outlet. To provide power failure redundancy, plug the power cords for the individual power supply units for each enclosure into separate power distribution units, if possible.

Powering on the system

You can use this procedure to power on an expansion enclosure and determine the status of the system.

About this task

Attention: Do not operate the system when the drive assemblies are missing. Drive assemblies that are missing disrupt the airflow; the drives do not receive sufficient cooling. You must insert blank carriers into unused drive bays.

Powering on an expansion enclosure:

1. Power on the newly installed enclosures. Use the power switch on each of the two power supply units in the back of the expansion enclosure.
2. Use the information in Table 5 on page 16 to verify the state of the light emitting diodes (LEDs) on the system. Verify that no faults are detected. Refer to your system Information Center's Troubleshooting section.

Figure 10 on page 16 shows the location of the LEDs on the power supply units in the rear of the expansion enclosure.

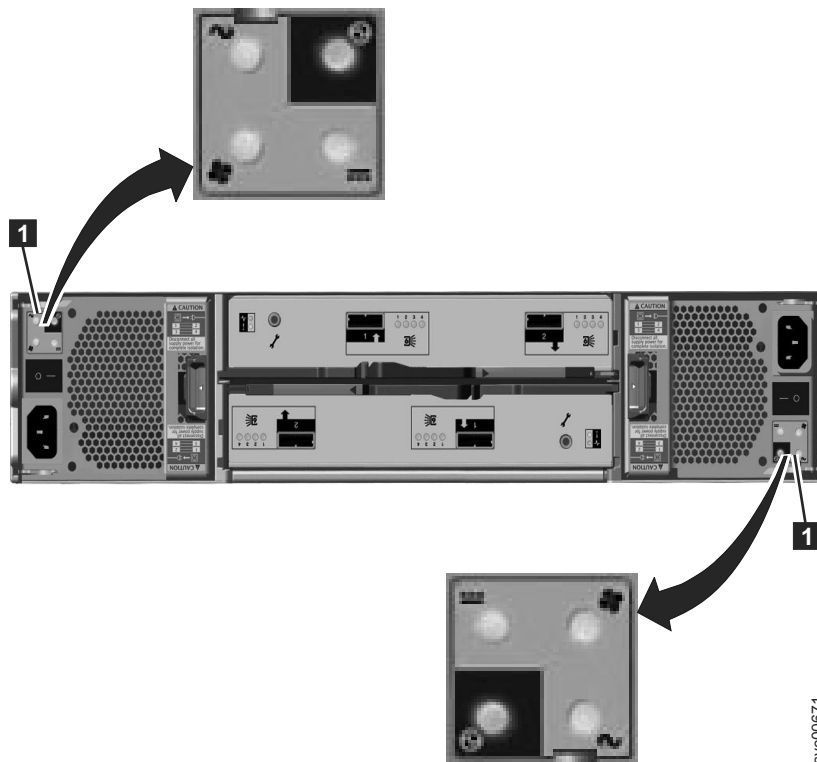











Figure 10. LEDs on the power supply units of the expansion enclosure

Table 5. LED status when expansion enclosures are powered on

| Hardware component | LED name and symbol | If power on and no fault is detected |
|--|---|--------------------------------------|
| Left enclosure end cap, front of enclosure | Power, top  | LED is on. |
| | Fault, middle  | LED is off. |
| | Identify, bottom  | LED is off. |
| Expansion canister, rear. The reference to the top and bottom locations applies to canister 1, which is the upper canister. The LED locations are inverted for canister 2, which is the lower canister. | Canister status, top  | LED is on. |
| | Fault status, bottom  | LED is off. |
| Power supply unit, expansion enclosure. The reference to the left and right locations applies to power supply unit 1, which is the left power supply. The LED locations are inverted for power supply unit 2, which is the right power supply. | Power supply, upper right  | LED is on. |
| | Fan failure  | LED is off. |
| | dc power failure  | LED is off. |
| | ac power failure  | LED is off. |

Appendix A. Accessibility features for IBM Storwize V7000

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

These are the major accessibility features for the Storwize V7000:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen. PDF documents have been tested using Adobe Reader version 7.0. HTML documents have been tested using JAWS version 9.0.
- This product uses standard Windows navigation keys.
- Interfaces are commonly used by screen readers.
- Keys are discernible by touch, but do not activate just by touching them.
- Industry-standard devices, ports, and connectors.
- You can attach alternative input and output devices.

The Storwize V7000 Information Center and its related publications are accessibility-enabled. The accessibility features of the Information Center are described in [Viewing information in the information center](#).

Keyboard navigation

You can use keys or key combinations to perform operations and initiate menu actions that can also be done through mouse actions. You can navigate the Storwize V7000 Information Center from the keyboard by using the shortcut keys for your browser or screen-reader software. See your browser or screen-reader software Help for a list of shortcut keys that it supports.

IBM and accessibility

See the IBM Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility.

Appendix B. Where to find the Statement of Limited Warranty

The Statement of Limited Warranty is available in both hardcopy format and in the Information Center.

The Statement of Limited Warranty is shipped hardcopy with your product. It is also available at: "Storwize V7000 library and related publications" on page xiii.

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