IBM BladeCenter S
Types 7779 and 8886

12-Disk Storage Module

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Note

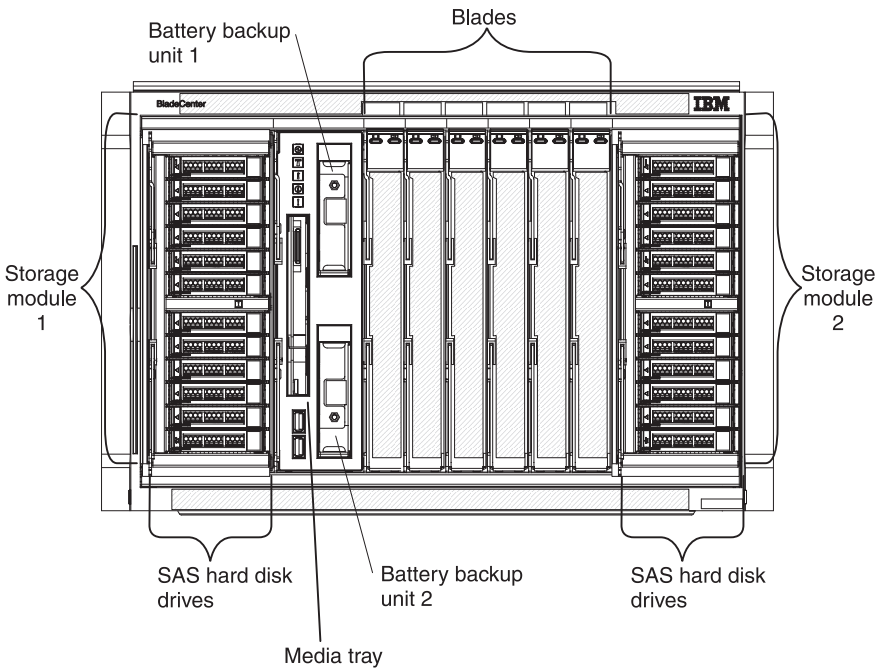
Note: Before using this information and the product it supports, read the general information in Notices; and read the *IBM Safety Information* and the *IBM Systems Environmental Notices and User Guide* on the IBM *Documentation CD*.

First Edition (July 2013)

Contents

Chapter 1. BladeCenter S Types 7779 and 8886 disk storage module

Disk storage modules can be installed in storage module bay 1 and storage module bay 2 of the BladeCenter S chassis.



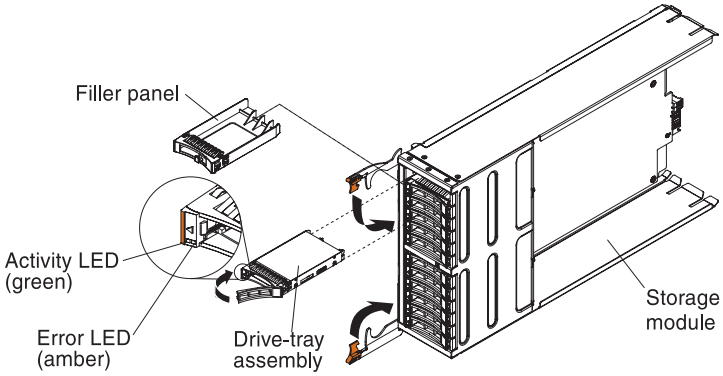
Disk storage modules

You can install a maximum of two disk storage modules in the BladeCenter S chassis and each disk storage module contains hot-swap hard disk drives. A disk storage module and the hard disk drives installed in that disk storage module are commonly referred to as *integrated shared storage* because this storage is integrated in the BladeCenter S chassis and shared among the blade servers in the BladeCenter S system.

Each disk storage module can support up to twelve hot-swap, 2.5-inch hard disk drives. Please note that only SAS hard disk drives are supported. Thus, only SAS RAID controller modules can be used.

Within each disk storage module, the hard disk drives are numbered 1 through 12 from top to bottom for the 2.5-inch hard disk drive configuration.

Note: Each hard disk drive bay must contain either a hard disk drive or a drive-bay filler.



Note: Four power modules are required in the BladeCenter S chassis if both disk storage modules are installed.

To access the hard disk drives in the disk storage module, SAS RAID controller modules must be installed.

Note:

1. SAS RAID controller modules must be installed, one in I/O module bay 3 and the other in I/O module bay 4. Each SAS RAID controller module will have access to both disk storage modules (for high availability).
2. Mixing one 2.5-inch disk storage module and one 3.5-inch disk storage module in a BladeCenter S chassis is currently not supported.

There is one LED on each disk storage module:

Fault Solid (amber) when there is a disk storage module failure.

There are two LEDs on each hard disk drive:

Green Flashing when an operation, such as a read or a write, is being performed.

Flashing when the hard disk drive is being rebuilt (fast blink) or identified (slow blink).

Note: When power is restored to the BladeCenter S chassis after a complete loss of power and you have implemented the hard disk drives as a redundant array (RAID 1, RAID 10, RAID 5), the green light will blink as the hard disk drive is being resynchronized.

The redundant array is accessible during resynchronization although performance may be slightly slower.

Amber

Solid when there is a drive failure.

Chapter 2. Installation guidelines

Before you remove or replace a component, read the following information.

- Read Safety and "Handling static-sensitive devices" on page 4. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- You do not have to disconnect the BladeCenter S system from power to install or replace any of the hot-swap modules. You must shut down the operating system and turn off a hot-swap blade server before you remove it, but you do not have to remove power from the BladeCenter S system itself.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the BladeCenter S system.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- Orange on a component or an orange label on or near a component indicates that the component may be hot-swapped, which means that you can remove or install the component while the BladeCenter S system is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the BladeCenter S chassis, open or close a latch, and so on.

System reliability guidelines

To help ensure proper system cooling and system reliability, make sure the following requirements are met.

- Each of the module bays on the front and rear of the BladeCenter S chassis has either a module or a module bay filler installed in it.
- Each of the blade bays on the front of the BladeCenter S chassis has either a blade server or a blade bay filler installed in it.
- Each of the disk storage module bays has a disk storage module or disk storage module filler installed in it. If a disk storage module is installed, each of the drive bays has a hard disk drive or a hard disk drive bay filler installed in it.
- Each of the drive bays in a blade server storage expansion option has either a hot-swap drive or a filler panel installed.
- You have followed the cabling instructions that come with optional adapters.

- Cables for the optional modules are routed correctly.
- A failed fan module is replaced as soon as possible.

Handling static-sensitive devices

Make sure that you read these guidelines before handing static-sensitive devices.

Attention: Static electricity can damage the BladeCenter S chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

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

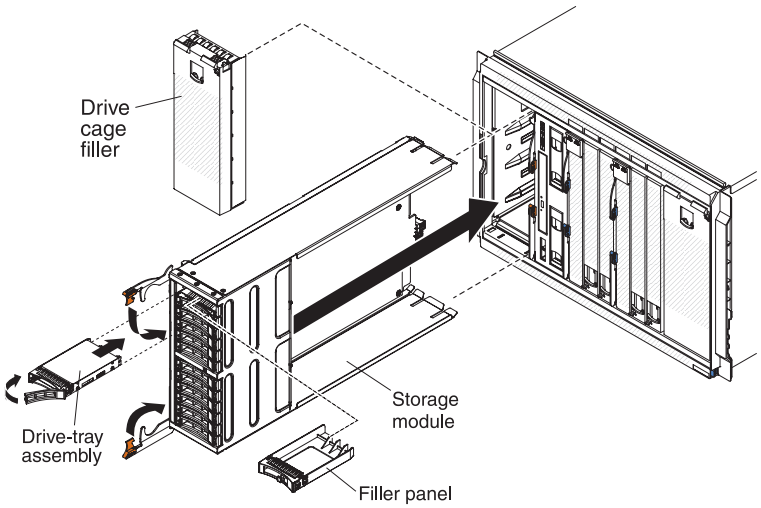
- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the BladeCenter S chassis or rack for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it immediately without setting down the device. If it is necessary to set down the device, put it back into its static-protective package.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Chapter 3. Installing a disk storage module

You can install a disk storage module while the BladeCenter S system is powered on. To install it, open the release handles on the disk storage module and slide the disk storage module into the disk storage module bay. Then, you can install hard disk drives into the disk storage module.

Note: Four power modules are required in the BladeCenter S chassis if two disk storage modules are installed. If you are installing a disk storage module in disk storage module bay 1, you must have power modules installed in power module bays 1 and 2. If you are installing a disk storage module in disk storage module bay 2, you must have power modules installed in power module bays 3 and 4.

Important: You can only install 12-disk storage modules in a BladeCenter S chassis with SAS RAID controller modules installed. Please refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.



1. Open the release handles on the disk storage module (rotate the top handle up and the bottom handle down).
2. Slide the disk storage module into the disk storage module bay until it stops.
3. Close the release handles (rotate the top handle down and the bottom handle up).
4. Install hard disk drives:
   a. Open the release handle on the hard disk drive (rotate the handle up).
   b. Slide the hard disk drive into the disk storage module until it stops.

      Important:

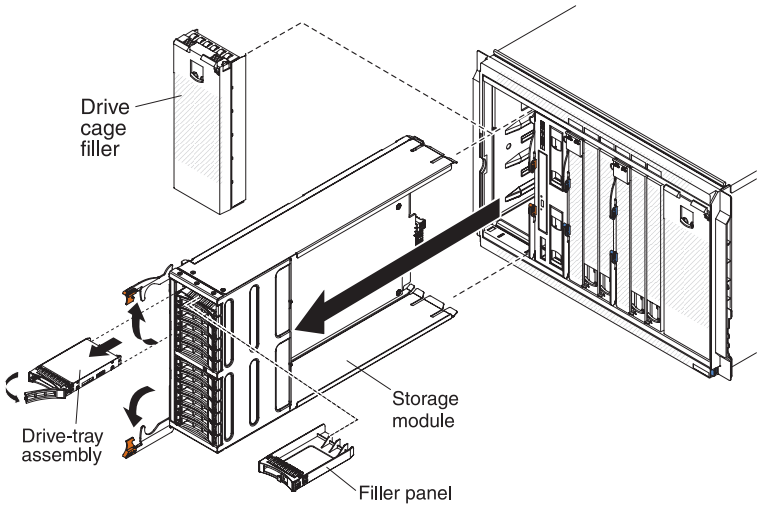
      SAS RAID controller modules are installed in the BladeCenter S chassis. Please make sure that you install SAS hard disk drives. SATA hard disk drives are not supported.
   c. Close the release handle (rotate the handle down).

Chapter 4. Removing a disk storage module

You can remove a disk storage module while the BladeCenter S system is powered on. To remove it, open the release handles on the disk storage module, and slide the module out of the BladeCenter S chassis.

Note: Make sure that all hard disk drive activity is stopped (the green LEDs on any of the hard disk drives installed in the disk storage module are not blinking).

Important: If you are removing disk storage modules or hard disk drives from a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.



1. Remove hard disk drives:
   a. Open the release handle on the hard disk drive (rotate the handle up) to disengage the hard disk drive from the disk storage module.
   b. Slide the hard disk drive out of the disk storage module.
2. Open the release handles on the disk storage module (rotate the top handle up and the bottom handle down) to disengage the disk storage module from the BladeCenter S chassis.
3. Slide the disk storage module out of the BladeCenter S chassis.

Chapter 5. Replacing 6-Disk Storage Module with 12-Disk Storage Module

The 6-Disk Storage Module is the enclosure that holds up to six 3.5" disk drives, while the 12-Disk Storage Module holds up to twelve 2.5" disk drives. The 12-Disk Storage Module is supported in the BladeCenter S chassis with a minimum SAS RAID Controller (RSSM) Firmware code level of 1.3.x.xxx. Before installing the 12-Disk Storage Module, the firmware of both controllers are required to be updated to the latest version. For the firmware update procedure, please refer to *Chapter 6: Updating firmware* of the *IBM SAS RAID Controller Module Installation and User's Guide* for details. Perform the following steps when replacing the previously installed 6-Disk Storage Module with the new 12-Disk Storage Module.

Note:

1. Users should backup all the data stored on the disk drives in the 6-disk storage module before performing this task.
2. Users will need to re-create RAID storage configuration after performing this task.
3. Users need to stop all I/O to perform this replacement action.

1. Log in to the BladeCenter Advanced Management Module (AMM).
2. Select **Firmware VPD** under the **Monitors** category, then click **I/O Module Firmware Vital Product Data**. For **Main Application 3** of both **SAS RAID Ctrl Mod** modules, make sure that the **Revision** is higher than or equal to *3002*.
3. Select **Admin/Power/Restart** under the **I/O Module Tasks** category. Afterwards, choose **Power off** to power off both controllers. Wait until the **Pwr** state changes to *off* before proceeding to the next step.
4. Remove the 6-Disk Storage Module from the chassis. Please refer to *Chapter 4: Removing a storage module* of the *6-Disk Storage Module* user guide for details.
5. Insert the replacement 12-Disk Storage Module into the chassis (see Chapter 3, "Installing a disk storage module," on page 5).
6. Choose **Power on** to power on both controllers. Wait until the **POST status** state changes to "*POST results available: Module completed POST successfully.*" before proceeding to the next step.
7. Select **System Status** under the **Monitors** category, then click the **Storage Modules** section. Please make sure that there are no storage related errors in the current status.

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CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

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Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as “total bytes written” (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. IBM is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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Table 1. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

1. ASHRAE 52.2-2008 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
2. The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.
3. ANSI/ISA-71.04-1985. Environmental conditions for process measurement and control systems: Airborne contaminants. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

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