Bull ESCALA

Expandable Storage Plus 2104 Model DS4
Installation Guide

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Bull ESCALA

Expandable Storage Plus 2104 Model DS4
Installation Guide

Hardware

November 2003

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Safety and environmental notices

This section contains the following information:

- Safety notices and their translations
- Safety inspection procedures for this product
- Environmental notices and statements

Safety notices and their translations

Safety notices are printed in English throughout this document.

A *Danger* notice warns you of conditions or procedures that can result in death or severe personal injury.

A *Caution* warns you of conditions or procedures that can cause personal injury that is neither lethal nor extremely hazardous.

An *Attention* notice warns you of conditions or procedures that can cause damage to machines, equipment, programs, or data.

For translations of the danger and caution notices, see *Expandable Storage Plus 2104 Model DS4 and Model TS4 Translated Safety Notices*, SC26-7558. The notices are listed in numeric order based on their IDs, which are displayed in parentheses, at the end of each notice. See the following examples of danger and caution notices for the location of the ID number.

DANGER

An electrical outlet that is not correctly wired could place a hazardous voltage on the metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (1)

CAUTION:
Do not insert hands or tools into the opening of the empty space that contained the fan assembly. (1)

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Electrostatic discharge (ESD)

Attention: When you handle field-replaceable units (FRUs) and other computer parts, take these precautions to avoid static damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always touch the computer parts carefully. Hold the cards by their edges or metal cover. Never touch any exposed circuits.
- Prevent people who are not correctly grounded from touching computer parts.
- Before you install a new part, touch the static-protective package that contains the part against an unpainted metal part of the 2104 Model DS4 or host system for at least 2 seconds. This reduces the static electricity in the package and in your body.
- Remove the part from its package and, if possible, install it directly into the 2104 Model DS4 without putting the part down. If you must put the part down, follow these steps:
  1. Place the static-protective package that contained the part onto a smooth, level surface.
  2. Place the part onto the static-protective package. Do not place the part directly onto any metal surface.

Safety inspection procedures

The safety inspection procedures describe how to inspect the 2104 Model DS4.

CAUTION:
The 2104 Model DS4 and Model TS4 are designed to be installed by the customer and are certified as customer setup. Make sure that the system or rack into which the 2104 Model DS4 and Model TS4 will be installed is also designed and certified for customer setup. If the 2104 Model DS4 and Model TS4 are not, then they must be installed by a CE. (22)

Inspecting the rack

Refer to your rack installation manual for information about performing a safety inspection on the rack.

Inspecting the 2104 Model DS4

Perform the following safety checks to identify unsafe conditions.

External machine checks

Perform the following external machine checks:

1. Check the chassis for damage (loose, broken, or sharp edges).
2. Check the power cables and ensure that the insulation is not worn or damaged.
3. Check for any obvious nonstandard changes. Use good judgment about the safety of any such changes.
4. Verify that all external covers are present and are not damaged.
5. Ensure that all latches and hinges are in correct operating condition.
6. Check the power cable for damage.
7. Check for worn, damaged, or pinched cables.
8. Inspect the fan-and-power-supply assemblies. Check that the fasteners in the cover of the power-supply unit (screws or rivets) have not been removed or disturbed.
9. Check the external signal cable for damage.
10. Check the cover for sharp edges, damage, or alterations that expose the internal parts of the device.
11. Correct any problems that you find.

Internal machine checks

Perform the following internal machine checks:

1. Check for any non-IBM changes that might have been made to the machine. If any are present, obtain the “Non-IBM Alteration Attachment Survey” form, number R009, from the IBM branch office. Complete the form, and return it to the branch office.
2. Check the condition of the inside of the machine for:
   - Metal or other contaminants
   - Indications of water or other fluid
   - Fire
   - Smoke damage
3. Check for any obvious mechanical problems, such as loose components.
4. Check any exposed cables and connectors for wear, cracks, or pinching.

Safety label checks

Perform the following safety label checks:

1. Verify that the label is installed on the 2104 Model DS4. See Figure 1.

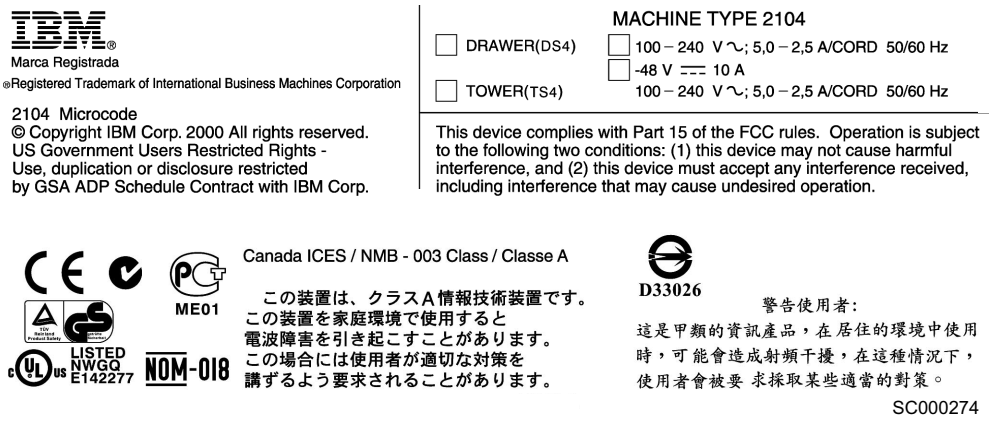


Figure 1. 2104 Model DS4 label

2. Verify that the linecord caution label is installed on the 2104 Model DS4 power supply. See Figure 2.

   CAUTION:
   This unit might have two linecords. To remove all power, disconnect both linecords. (1)

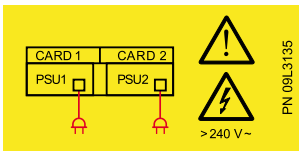


Figure 2. Linecord caution label

3. Verify that the power supply cover caution label is installed on the 2104 Model DS4 power supply. See Figure 3.

   CAUTION:
   Do not remove cover, do not service, no serviceable parts. (2)

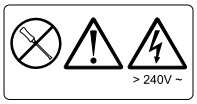


Figure 3. Power supply cover caution label

4. Verify that the fusing caution label is installed on the 2104 Model DS4 power supply. See Figure 4.

   CAUTION:
   Double Pole/Neutral Fusing. (3)

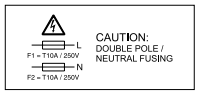


Figure 4. Fusing caution label

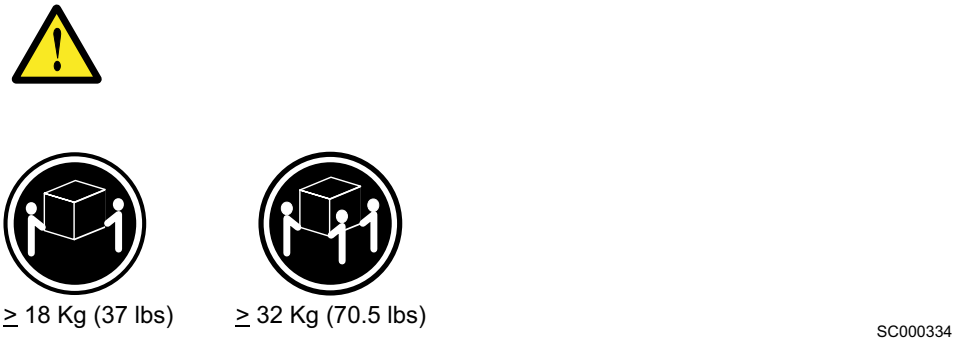
5. Verify that the weight label is installed on the 2104 Model DS4. See Figure 5.

   CAUTION:
   This unit weighs over 32 Kg (70.5 lbs). Refer to manuals. (4)

Figure 5. 2104 Model DS4 weight label

CAUTION:
If a 2104 Model DS4 is fully loaded with 14 drives and two power supplies, its total weight exceeds 32 Kg (70.5 lbs). You must remove at least six drives from the 2104 Model DS4 before you lift it or install it into a rack or 2104 Model TS4. This reduces the total weight to less than 32 Kg (70.5 lbs) and the 2104 Model DS4 can then be safely handled by two people. Failure to do so can result in injury.

Attention:
If you have data stored on the drives, label the drives before you remove them. When you replace the drives, install each one in the same drive bay from which you removed it. Failure to do so could result in a loss of data.



6. Verify that the standby condition label is installed on the 2104 Model DS4. See Figure 6.

   CAUTION:
   A standby condition is indicated by the symbol to the right of the DC directly above the switch, SW1. When SW1 is toggled to the right position directly under the standby symbol, the unit's ac-power is not shut off. (7)

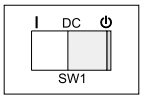


Figure 6. Standby condition label

Checking the grounding of the 2104 Model DS4

Perform the following steps to check the grounding of the 2104 Model DS4:

1. Ensure that all power is removed from the rack. See the installation document for the rack or host system.
2. Ensure that the power cables **2** are plugged into each fan-and-power-supply assembly. See Figure 7. Also ensure that the other ends of the power cables are unplugged from the power distribution unit or battery-backup unit in the rack. See the installation document for the rack or host system.

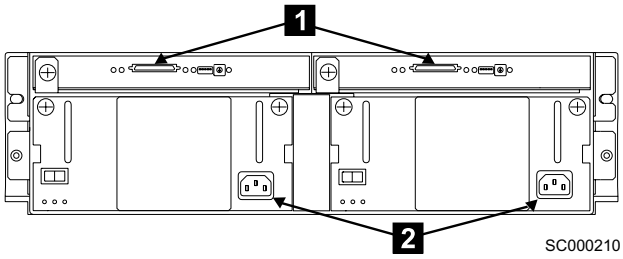


Figure 7. Power cables and SCSI connectors on the 2104 Model DS4

3. **Attention:** Some electrical circuits could be damaged if the external SCSI cables are connected to the 2104 Model DS4 while the grounding check is being done.

   Ensure that no external SCSI cables are plugged at the connectors **1** .
4. Check the grounding of the 2104 Model DS4:
   a. At the connector ends of the power plugs that you unplugged from the power distribution unit or battery-backup unit in step 2, do a visual inspection and ensure that the third wire ground pin is in good condition.
   b. Use an ohm meter to connect one lead to the 2104 Model DS4 chassis and the other lead to the third wire ground pin at the face of the power connectors that you unplugged in step 2. You should read 0.1 ohm or less between the ground pin on the power connector and the 2104 Model DS4 chassis.

If the grounding is correct, the grounding check is complete.

If the grounding is not correct, unplug the power cables from the fan-and-power-supply assemblies in the 2104 Model DS4.

If you are servicing a 220-volt 2104 Model DS4, go to step 5.

If you are servicing a -48 volt 2104 Model DS4, go to step 7.

5. Check for continuity between the chassis of the 2104 Model DS4 and the ground pin **1** of the power connector on each fan-and-power-supply assembly. See Figure 8.

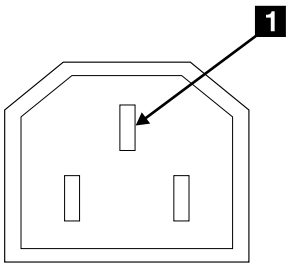


Figure 8. Ground pin (220 V 2104 Model DS4)

6. Go to step 9.
7. Check for continuity between the chassis of the 2104 Model DS4 and the ground pins 1 and 7 of each mainline-power connector. See Figure 9.

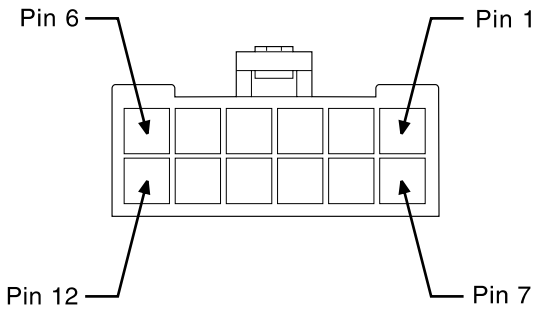


Figure 9. Ground pins (-48 V 2104 Model DS4)

8. Go to step 9.
9. If any fan-and-power-supply assembly has no continuity, exchange that assembly for a new one. See the section about fan and power supply assemblies in the *Expandable Storage Plus 2104 Model DS4 and Model TS4 Service Guide*. Perform the complete grounding check again.

   If each fan-and-power-supply assembly has continuity, you might have a problem with the power cable or with the grounding of the host system.

If you are servicing a 220-volt 2104 Model DS4, go to step 10.

If you are servicing a -48 volt 2104 Model DS4, see the installation document for the rack or host system to isolate the fault. Perform the complete grounding check again.

10. Check the power cable for continuity.

    If the power cable does not have continuity, exchange it for a new one, then perform the complete grounding check again.

    If the power cable does have continuity, see the installation document for the rack or host system to isolate the fault.

Removing power from a 2104 Model DS4

Note: Unless you have a particular reason to do so, do not remove power from the host system or from the 2104 Model DS4 unless the instructions that you are following tell you to.

Perform the following steps to remove the power from a 2104 Model DS4:

1. Verify with the customer that all operations between the 2104 Model DS4 and the host system have stopped.
2. Set the dc on/standby switch **1** of each fan-and-power-supply assembly to standby. See Figure 10.

   Notes:

   a. Some 2104 Model DS4s have a fan-and-power-supply assembly and a fan assembly. The fan assembly has no dc on/standby switch.

   b. A fan-and-power-supply assembly might have its CHK light on although its dc on/standby switch is set to standby.

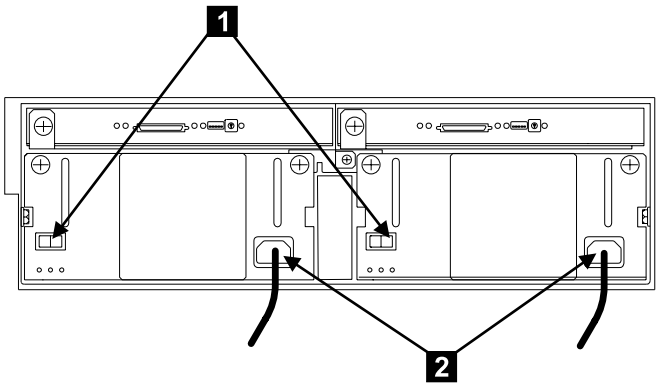


Figure 10. Removing the power from a 2104 Model DS4

3. **DANGER**

   In the following step you are going to remove the power cables. These cables are live if the rack power distribution unit or uninterruptible power supply (UPS) unit is still switched on. (1)

   Remove the power cables **2** from the back of the 2104 Model DS4. See Figure 10 on page xviii.

4. Perform the following steps to return power to the 2104 Model DS4:
   a. Reinstall the power cables **2**.
   b. Set the dc on/standby switch **1** of each fan-and-power-supply assembly to on.

   Note: You can configure the motor-start sequencing of the 2104 Model DS4. For more information, see the sections about the drive autostart switch and the delay motor start mode switch in the *Expandable Storage Plus 2104 Model DS4 and Model TS4 Service Guide*.

Danger notices

DANGER

In the following step you are going to remove the power cables. These cables are live if the rack power distribution unit or uninterruptible power supply (UPS) unit is still switched on. (1)

DANGER

Do not try to open the covers of the fan-and-power-supply assembly. (2)

DANGER

Do not plug a power cable into the fan-and-power-supply assembly until the assembly is fully home and its thumbscrews are fully tightened. (3)

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to that system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. During an electrical storm, do not disconnect cables for display stations, printers, telephones, or station protectors for communication lines. (4)

DANGER

During an electrical storm, do not disconnect cables for display stations, printers, telephones, or station protectors for communication lines. (5)

Caution notices

CAUTION:
This unit might have two linecords. To remove all power, disconnect both linecords. (1)

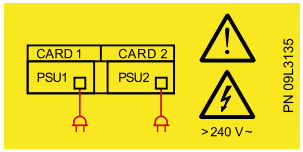


Figure 11. Linecord caution label

CAUTION:
Do not remove cover, do not service, no serviceable parts. (2)

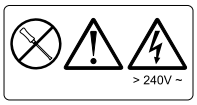


Figure 12. Power supply cover caution label

CAUTION:
Double Pole/Neutral Fusing. (3)

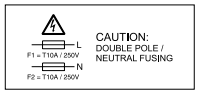


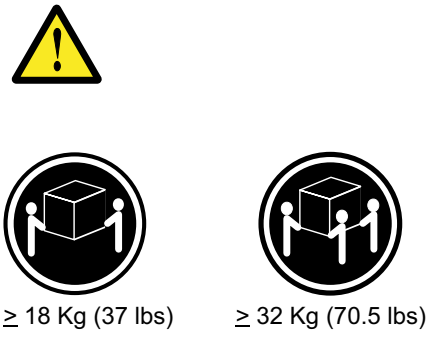
Figure 13. Fusing caution label

CAUTION:
This unit weighs over 32 Kg (70.5 lbs). Refer to manuals. (4)

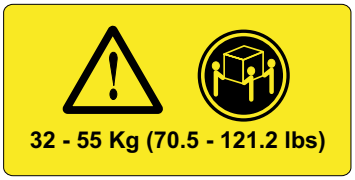
Figure 14. 2104 Model DS4 weight label

CAUTION:
If a 2104 Model DS4 is fully loaded with 14 drives and two power supplies, its total weight exceeds 32 Kg (70.5 lbs). You must remove at least six drives from the 2104 Model DS4 before you lift it or install it into a rack or 2104 Model TS4. This reduces the total weight to less than 32 Kg (70.5 lbs) and the 2104 Model DS4 can then be safely handled by two people. Failure to do so can result in injury.

Attention:
If you have data stored on the drives, label the drives before you remove them. When you replace the drives, install each one in the same drive bay from which you removed it. Failure to do so could result in a loss of data.



CAUTION:
This unit weighs between 32 Kg - 55 Kg (70.5 lbs - 121.2 lbs). (5)



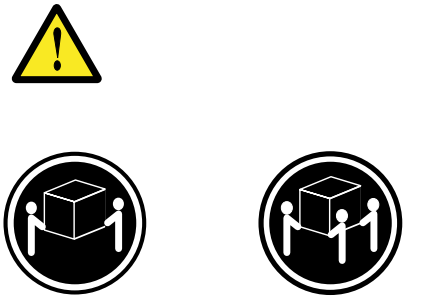
SC000219

Figure 15. 2104 Model TS4 weight label

CAUTION:
The provided cardboard lifting tool is required for moving, installing, and relocating the product when fully populated. Three people are required to safely move the product. Failure to do so might result in injury.

In case the lifting tool is not readily available, you must reduce the weight to 32 Kg or less by removing all of the heavy components (disk drives and power supplies) from the product. Then only two people are required to move, install, and relocate the product. (6)

Attention:
If you have data stored on the drives, label the drives before you remove them. When you replace the drives, install each one in the same drive bay from which you removed it. Failure to do so could result in a loss of data.



SC000325

CAUTION:
A standby condition is indicated by the symbol to the right of DC directly above the switch, SW1. When you toggle SW1 to the right position directly under the standby symbol, the ac-power to the unit is not shut off. (7)

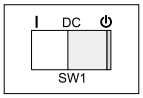


Figure 16. Location of standby condition

CAUTION:
The stabilizer must be correctly attached to the bottom front of the rack to prevent the rack from tipping forward while the 2104 Model DS4 is being removed from the rack. Do not pull out or install any unit if a stabilizer is not attached to the rack. (8)

CAUTION:
The stabilizer must be correctly attached to the bottom front of the rack to prevent the rack from tipping forward while the 2104 Model DS4 is being installed into the rack. Do not remove or install any unit if a stabilizer is not attached to the rack. (9)

CAUTION:
Do not insert hands or tools into the empty space that contained the fan assembly. (10)

CAUTION:
Do not insert hands or tools into the empty space that contained the fan-and-power-supply assembly. (11)

CAUTION:
Do not insert hands or tools into the empty space that contained the SCSI interface card assembly. (12)

CAUTION:
This product is equipped with a 3-wire power cable and plug for the user's safety. Use this power cable in conjunction with a correctly grounded electrical outlet to avoid an electrical shock. (13)

CAUTION:
Do not touch the power outlet or the power outlet face plate with anything other than test probes before you complete this safety check. (14)

CAUTION:
If the reading is not infinity, do not proceed. Make the necessary corrections to the wiring before you continue. Do not switch on the branch circuit CB until you satisfactorily complete the previous steps. (15)

CAUTION:
Do not use the handles of the fan or fan-and-power-supply assemblies to carry the 2104 Model DS4. These handles are not intended to support the weight of the unit. (16)

CAUTION:
As you push the assembly fully home, the lever automatically moves toward its closed position. Ensure that your fingers do not become pinched between the lever and the assembly. (17)

CAUTION:
Ensure that the mainline power cable has been removed from the failing fan-and-power supply before you continue. (18)

CAUTION:
Do not insert hands or tools into the empty space above the fan-and-power supply assembly. (19)

CAUTION:
Do not insert hands or tools into the empty space between the power supply assemblies. (20)

CAUTION:
If the 2104 Model DS4 is installed in a Model T00 or T42 rack, you must also observe the safety notices for those racks before you start to remove the frame assembly. You can find the safety notices in the section about system installation in the *7014 Model T00 and T42 Rack Installation and Service Guide***, SA38-0577, or at the following Web site: www-1.ibm.com/servers/eserver/pseries/library/hardware_docs/7014_t00.html (21)**

CAUTION:
The 2104 Model DS4 and Model TS4 are designed to be installed by the customer and are certified as customer setup. Make sure that the system or rack into which the 2104 Model DS4 or Model TS4 will be installed is also designed and certified for customer setup. If they are not, then the 2104 Model DS4 or Model TS4 must be installed by a CE. (22)

CAUTION:
Do not insert hands or tools into the space that contained the card assembly. (23)

CAUTION:
It takes three people to lift the 2104 Model TS4. Do not attempt to lift the 2104 Model TS4 by yourself. Do not attempt to lift it without help from two other people. (24)

CAUTION:
Do not use the handles of the fan or fan-and-power-supply assemblies to carry the 2104 Model TS4. These handles are not intended to support the weight of the unit. (25)

CAUTION:
The 2104 Model DS4 is designed to be installed by the customer and is certified as customer setup. Make sure that the system or rack into which the 2104 Model DS4 will be installed is also designed and certified for customer setup. If they are not, then the 2104 Model DS4 must be installed by a CE. (26)

CAUTION:
The 2104 Model TS4 is designed to be installed by the customer and is certified as customer setup. Make sure that the system into which the 2104 Model TS4 will be installed is also designed and certified for customer setup. If it is not, then the 2104 Model TS4 must be installed by a CE. (27)

Environmental notices and statements

This section describes the environmental notices and statements.

Fire suppression systems

A fire suppression system is the responsibility of the customer. The customer's own insurance underwriter, local fire marshal, or a local building inspector, or both, should be consulted in selecting a fire suppression system that provides the correct level of coverage and protection. IBM designs and manufactures equipment to internal and external standards that require certain environments for reliable operation. Because IBM does not test any equipment for compatibility with fire suppression systems, IBM does not make compatibility claims of any kind nor does IBM provide recommendations on fire suppression systems.

Product recycling

This unit contains recyclable materials. Recycle these materials where processing sites are available and according to local regulations. In some areas, IBM provides a product take-back program that ensures proper handling of the product. Contact your IBM representative for more information.

About this document

This publication introduces the Expandable Storage Plus 2104 Model DS4 (hereafter referred to as the 2104 Model DS4).

Important: The installation of this product is the responsibility of the customer.

Who should read this document

This document provides installation instructions for any person who is required to install a 2104 Model DS4, which is a rack-mounted Small Computer Systems Interface (SCSI) disk enclosure.

Additional information

This section contains the following information:

- A list of the documents in the 2104 Model DS4 and Model TS4 library
- A list of the related documents
- The available Web sites
- Information about how to send your comments

2104 Model DS4 and Model TS4 library

The following documents contain information related to this product:

- *Expandable Storage Plus 2104 Model DS4 and Model TS4 Hardware Technical Information*, 86 A1 19EM
- *Expandable Storage Plus 2104 Model DS4 and Model TS4 Operator's Guide*, 86 A1 17EM
- *Expandable Storage Plus 2104 Model DS4 Installation Guide*, 86 A1 14EM
- *Expandable Storage Plus 2104 Model TS4 Installation Guide*, 86 A1 15EM
- *Expandable Storage Plus 2104 Model DS4 and Model TS4 Service Guide*, 86 A1 18EM
- *Expandable Storage Plus 2104 Model DS4 and Model TS4 Translated Safety Notices*, 86 X1 16EM

Related documents

The following documents contain information related to this product:

- The operator's guide for your system
- The user's guide for your using system SCSI attachment (for example, your SCSI adapter)
- The site and hardware planning information for your system
- The problem solving guide and reference for your system
- The *7014 Model T00 and T42 Rack Installation and Service Guide,* 86 A1 94KX

The following documents contain information related to the Expandable Storage Plus disk enclosures that attach to the RISC systems:

- *Diagnostic Information for Multiple Bus Systems*, 86 A1 26HX
- *Site Preparation for Rack Systems*, 86 A1 30PX
- *Adapters for Multiple Bus Systems*, 86 A1 27HX

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Installing a 2104 Model DS4

The installation of this product is a customer responsibility. Before you continue with any of the actions described in this book, see the *Expandable Storage Plus 2104 Model DS4 and Model TS4 Translated Safety Notices*.

This section describes how to perform the following actions:

- Install a 2104 Model DS4 into an RS/6000™ or IBM™ @server pSeries rack (system rack or expansion rack)
- Install the switch cover plate
- Set the options
- Connect the 2104 Model DS4 to a power source
- Connect the 2104 Model DS4 to the host system
- Switch on and test the installation

The instructions assume that the following actions are complete:

- The rack is set up.
- A stabilizer is correctly attached to the bottom front of the rack to prevent the rack from tipping forward while the 2104 Model DS4 is being installed into the rack. If necessary, see the installation and service guide, or equivalent, for the rack.
- You have access to:
  - Preinstallation planning information for the system
  - 2104 Model DS4 configuration information

If the 2104 Model DS4 is installed in the rack:

- Go to “Connecting the 2104 Model DS4 to the power source” on page 27 if the power cables for the 2104 Model DS4 are not connected.
- Go to “Connecting the 2104 Model DS4 to the host system” on page 29 if the power cables for the 2104 Model DS4 are connected.

Notes:

1. Each rack-mounted 2104 Model DS4 requires an airflow of 1.1 m^3 per minute (40 ft^3 per minute). When racks containing many 2104 Model DS4s are to be installed together, the following requirements must be met to ensure that the 2104 Model DS4s are adequately cooled:
   - The airflow enters at the front of the rack and leaves at the back. To prevent the air that is leaving the rack from entering the intake of another piece of equipment, racks should be positioned in alternate rows, back-to-back and front-to-front.
   - The front of the racks should be positioned on floor-tile seams, with a full line of perforated tiles immediately in front of the racks. Each perforated tile should have an air flow of at least 11.34 m^3 per minute (400 ft^3 per minute). The temperature under the floor must not exceed 15°C (60°F).
   - Where the racks are in rows front-to-front or back-to-back, there should be a gap of at least 1220 mm (48 in.) separating the rows.
   - To ensure correct air flow within each rack, the rack filler plates must be installed in unused positions. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 2104 Model DS4s.
2. Maintain the operating temperature at 22°C (72°F) or lower.

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Installing a 2104 Model DS4 into a rack

The following sections describe how to install a 2104 Model DS4 into an RS/6000 or IBM @server pSeries rack.

Checking the items for a 2104 Model DS4

Ensure that you have received all the parts required for your 2104 Model DS4. See Figure 17.

Note: If your 2104 Model DS4 has only one fan-and-power-supply assembly, only one power cable is supplied.

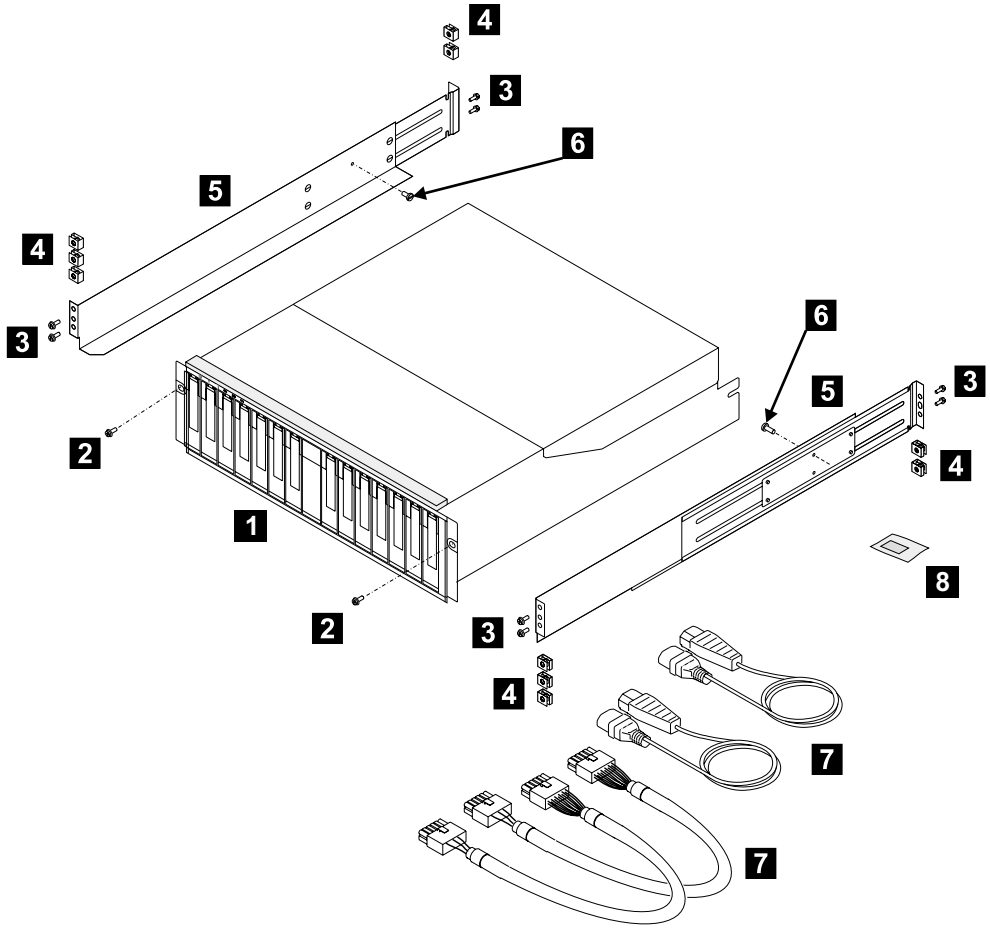


Figure 17. Items for the 2104 Model DS4

1. The box ID label 8 contains small labels. Use these to label your disk enclosure. See step 3 on page 19.
2. Refer to “Web sites” on page xxx for the latest microcode and system software levels. When you complete the installation, you will be asked to ensure that the latest levels of software and microcode are installed.

Preparing the rack (system or expansion)

Perform the following steps to prepare the rack (system or expansion):

1. Find the two support rails **5** that are supplied with the 2104 Model DS4. See Figure 17 on page 2.
2. The 2104 Model DS4 is three Electronics Industries Association (EIA) units high. Using the preinstallation planning information, or other relevant information, determine where you are going to locate the 2104 Model DS4 in the rack.

   Notes:

   a. If you are installing the 2104 Model DS4 into an empty rack, install it into the lowest available position so that the rack does not become unstable.

   b. If you are installing more than one 2104 Model DS4 into the rack, start at the lowest available position, and work upward.

   c. You might need to remove the power distribution unit before you install the support rails. See the installation and service guide, or equivalent, for the rack.
3. Refer to the EIA markings on the rack and decide where you are going to install the support rails. If appropriate, allow for possible future installation of other disk enclosures.
4. Perform the following steps for each support rail:

   a. Attach the nut clips **2** at the selected holes in the front of the rack. See Figure 18. These nut clips must align with the upper and lower holes in the support rail.

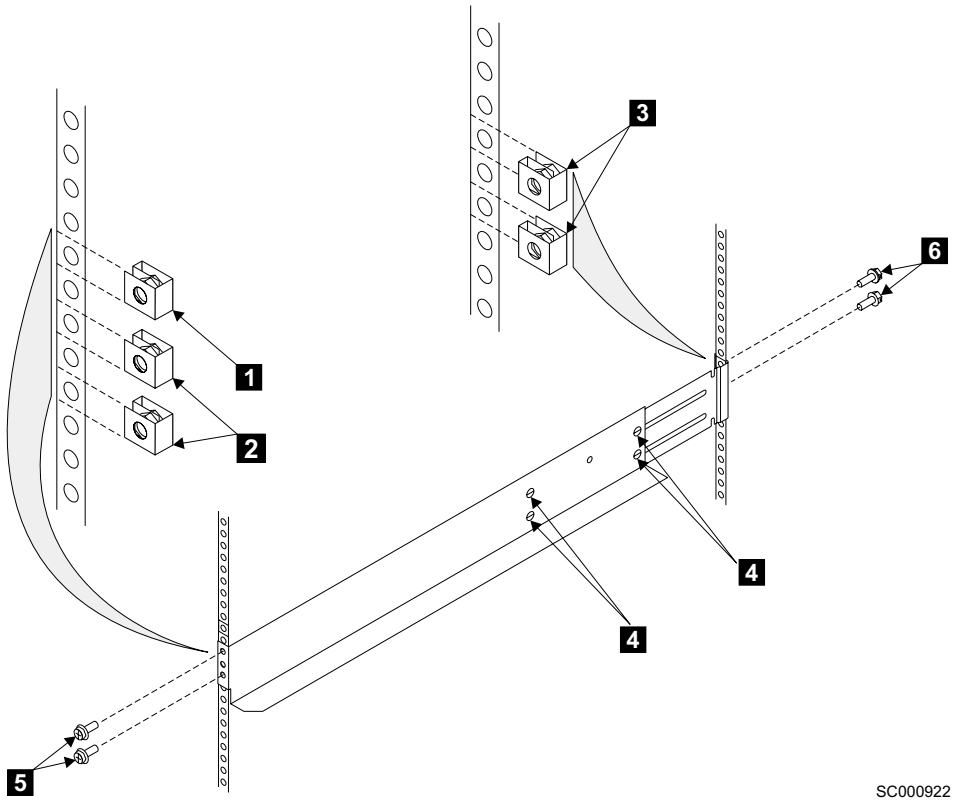


Figure 18. Installing the support rails

b. Count two holes upward from the upper nut clip, and attach a nut clip **1** .
c. At the back of the rack, install the two nut clips **3** at the selected holes.
d. Loosen the four adjustment screws **4** so that you can adjust the length of the support rail.
e. At the front of the rack, locate the support rail so that its mounting lug is outside the nut clips **2** .
f. Insert the rail screws **5** through the holes in the lug and into the nut clips.
g. Partially tighten the screws.
h. At the back of the rack, locate the support rail so that its mounting lug is outside the nut clips **3** .
i. Insert the rail screws **6** through the holes in the lug and into the nut clips.
j. Partially tighten the screws.
k. Check whether the support rail is horizontal (a spirit level might be useful here). If the rail is not horizontal, position it as necessary.
l. Fully tighten the front and back rail screws.
m. Fully tighten the four adjustment screws **4** .

5. Go to “Removing the disk drive modules and dummy disk drive modules” on page 5.

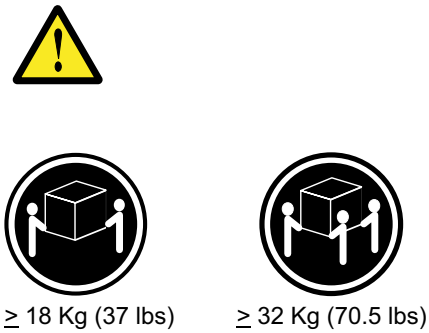
Removing the disk drive modules and dummy disk drive modules

CAUTION:
This unit weighs over 32 Kg (70.5 lbs). Refer to manuals. (4)

Figure 19. 2104 Model DS4 weight label

CAUTION:
If a 2104 Model DS4 is fully loaded with 14 drives and two power supplies, its total weight exceeds 32 Kg (70.5 lbs). You must remove at least six drives from the 2104 Model DS4 before you lift it or install it into a rack or 2104 Model TS4. This reduces the total weight to less than 32 Kg (70.5 lbs) and the 2104 Model DS4 can then be safely handled by two people. Failure to do so can result in injury.

Attention:
If you have data stored on the drives, label the drives before you remove them. When you replace the drives, install each one in the same drive bay from which you removed it. Failure to do so could result in a loss of data.



Attention: Disk drive modules are fragile. Handle them with care, and keep them well away from strong magnetic fields.

Perform the following steps to remove the disk drive modules and the dummy disk drive modules:

1. Before you start to remove any modules, make a list of which disk drive modules are in which slots in the 2104 Model DS4. This action helps you to reinstall the modules into their correct slots after you have installed the 2104 Model DS4 into the rack.

   Disk drive modules have a serial number label **1** . Figure 20 shows the label on the 2104 Model DS4. This label carries the last 8 to 10 digits of the serial number of the disk drive, and also the disk drive type (SCSI) and capacity (for example, 36.4 GB).

   Note: Each disk drive module also has a SCSI address that is related to its position in the 2104 Model DS4. You must reinstall the disk drive modules into the same slots from which they were removed.

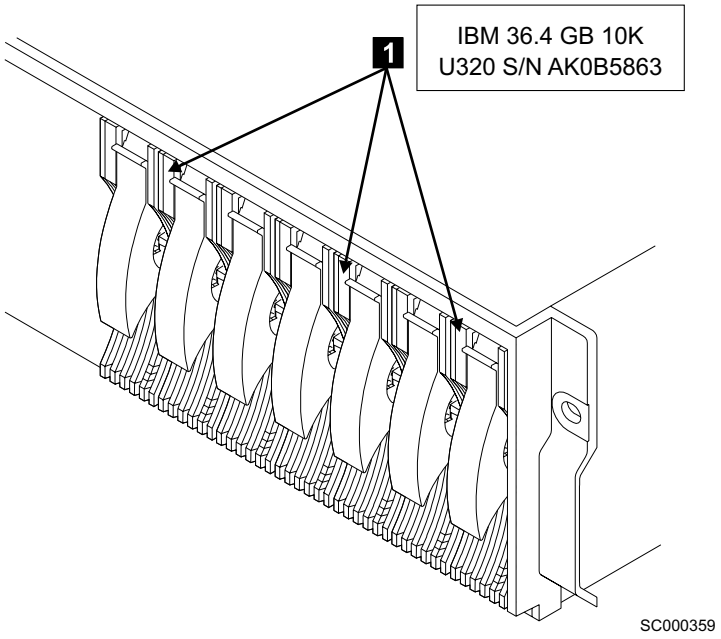


Figure 20. Disk drive modules that show the position of the 2104 Model DS4 serial number label

2. Press the blue latch **1**, and pull the handle **2** fully up. See Figure 21. This action pulls the disk drive module partially out of its slot.

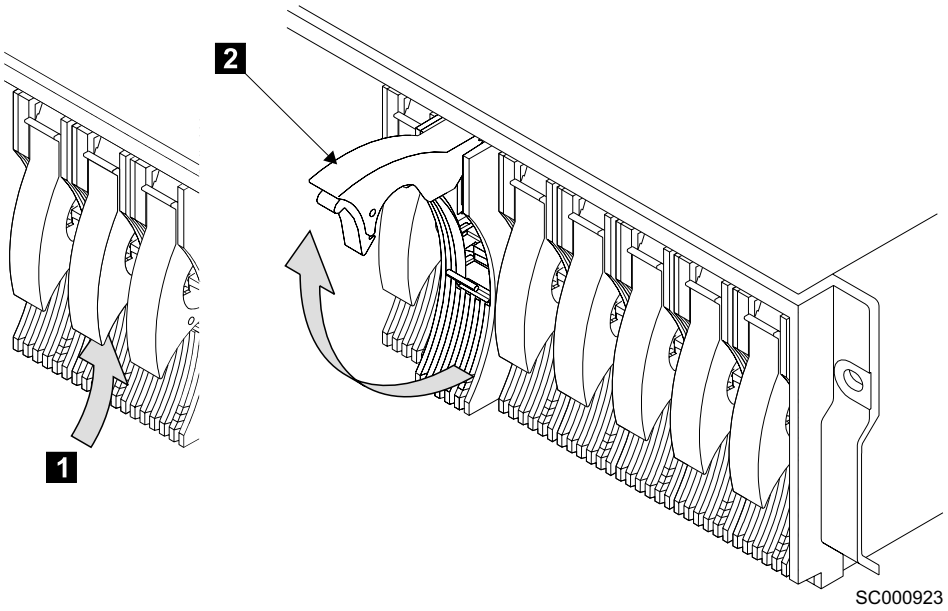


Figure 21. Opening the handle of a disk drive module

3. Grip the handle **1**, and carefully pull the disk drive module. See Figure 22. As the module comes out, put one hand under its base to prevent it from falling.

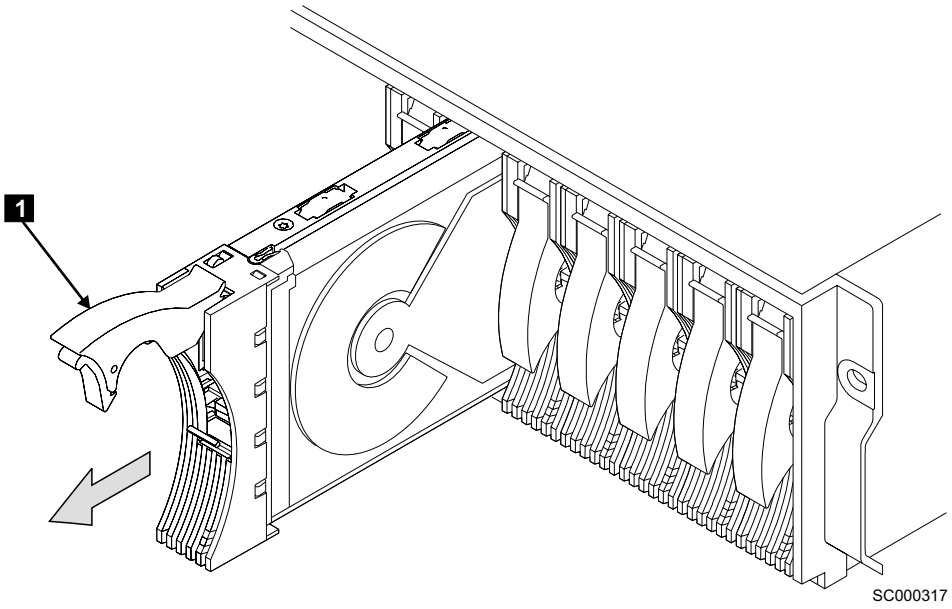


Figure 22. Removing a disk drive module

4. Lay the disk drive module on its side. See Figure 23. It rests on blue supports (not visible in the figure) on the bottom of the disk drive module. This prevents the disk drive module from falling over and becoming damaged.

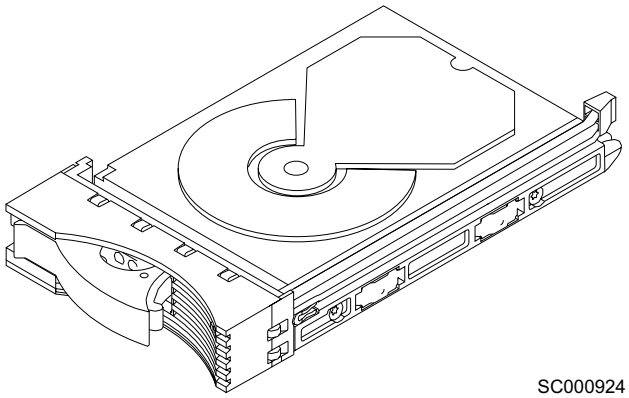


Figure 23. Disk drive module on its side for safe storage

Note: Keep the removed disk drive modules in the sequence they were in before you removed them from the 2104 Model DS4.

5. Repeat step 2 through step 4 for each disk drive module. Ensure that you remove all the disk drive modules from the 2104 Model DS4.

6. You might also want to remove the dummy disk drive modules. See Figure 24. A dummy disk drive module has a simple handle. There is no latch to pull up.

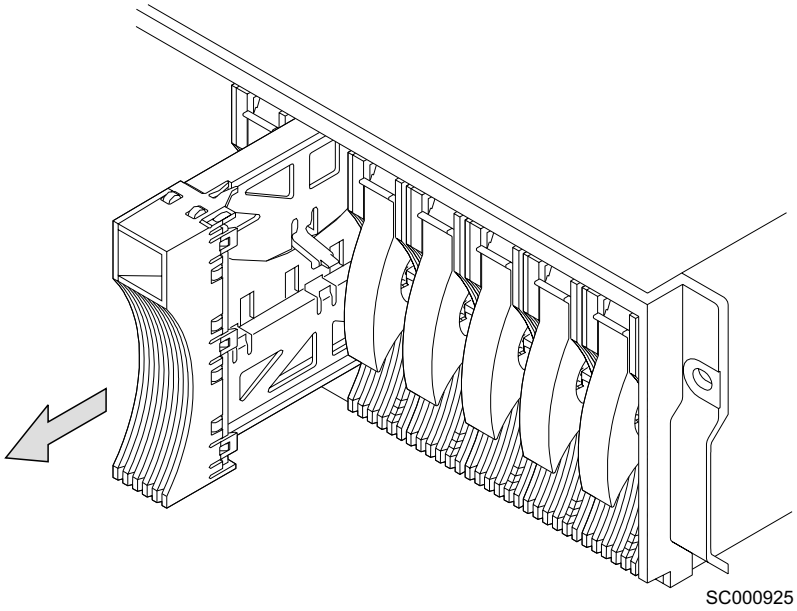


Figure 24. Removing a dummy disk drive module

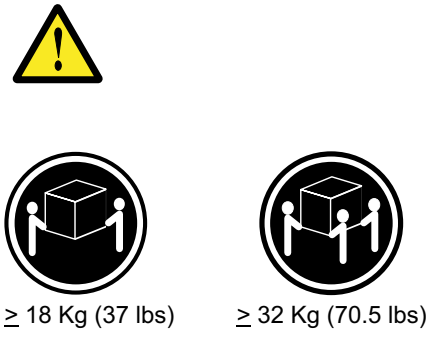
Installing the 2104 Model DS4 into the rack

CAUTION:
This unit weighs over 32 Kg (70.5 lbs). Refer to manuals. (4)

Figure 25. 2104 Model DS4 weight label

CAUTION:
If a 2104 Model DS4 is fully loaded with 14 drives and two power supplies, its total weight exceeds 32 Kg (70.5 lbs). You must remove at least six drives from the 2104 Model DS4 before you lift it or install it into a rack or 2104 Model TS4. This reduces the total weight to less than 32 Kg (70.5 lbs) and the 2104 Model DS4 can then be safely handled by two people. Failure to do so can result in injury.

Attention:
If you have data stored on the drives, label the drives before you remove them. When you replace the drives, install each one in the same drive bay from which you removed it. Failure to do so could result in a loss of data.



CAUTION:
Do not use the handles of the fan or fan-and-power-supply assemblies to carry the 2104 Model DS4. These handles are not intended to support the weight of the unit. (16)

CAUTION:
The stabilizer must be correctly attached to the bottom front of the rack to prevent the rack from tipping forward while the 2104 Model DS4 is being installed into the rack. Do not remove or install any unit if a stabilizer is not attached to the rack. (9)

Note: If you are going to install the 2104 Model DS4 into a Model T00 or T42 rack, you must also observe the safety notices for those racks before you start. You can find the safety notices in the system installation chapter of the *7014 Model T00 and T42 Rack Installation and Service Guide,* SA38-0577, or at the following Web site:

www-1.ibm.com/servers/eserver/pseries/library/hardware_docs/sa38/380577.pdf

Perform the following steps to install the 2104 Model DS4 into the rack:

1. If you have not already done so, remove all of the disk drive modules from the 2104 Model DS4. For more information, see “Removing the disk drive modules and dummy disk drive modules” on page 5.
2. Stand at the front of the rack. With help from another person, place the back of the 2104 Model DS4 onto the support rails. Slide the 2104 Model DS4 into the rack.
3. Install the two front mounting screws **1** and tighten them. See Figure 26.

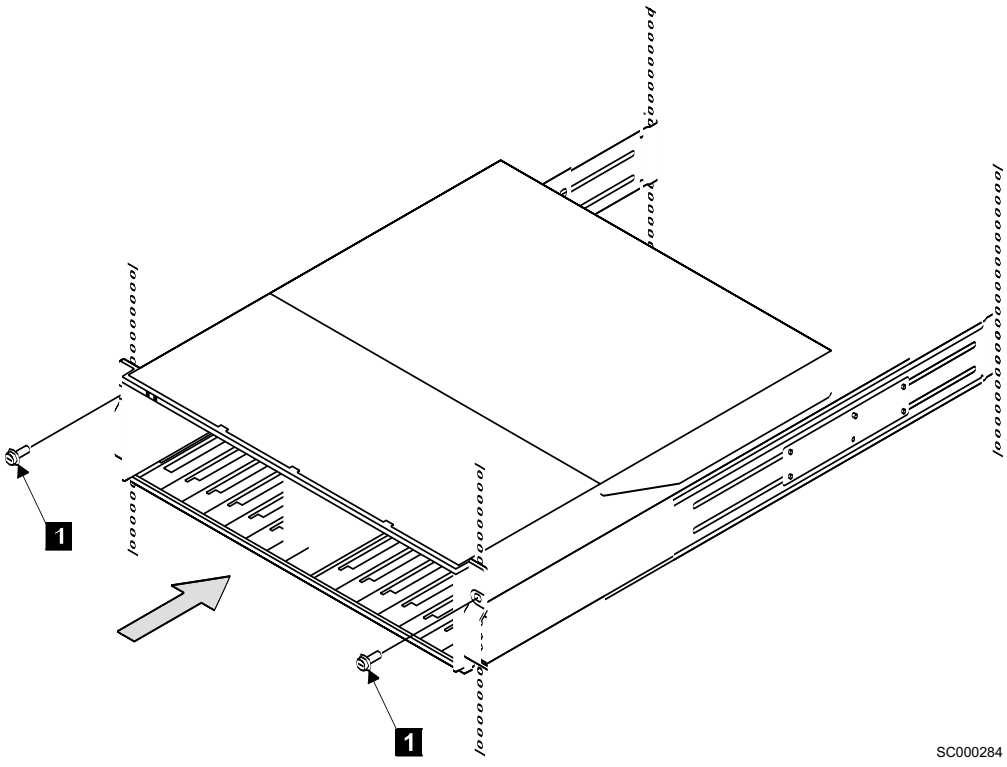


Figure 26. Installing the front mounting screws

4. At the back of the rack, install and tighten the two screws **1** . See Figure 27.

   Note: These are the screws identified as **6** in Figure 17 on page 2.

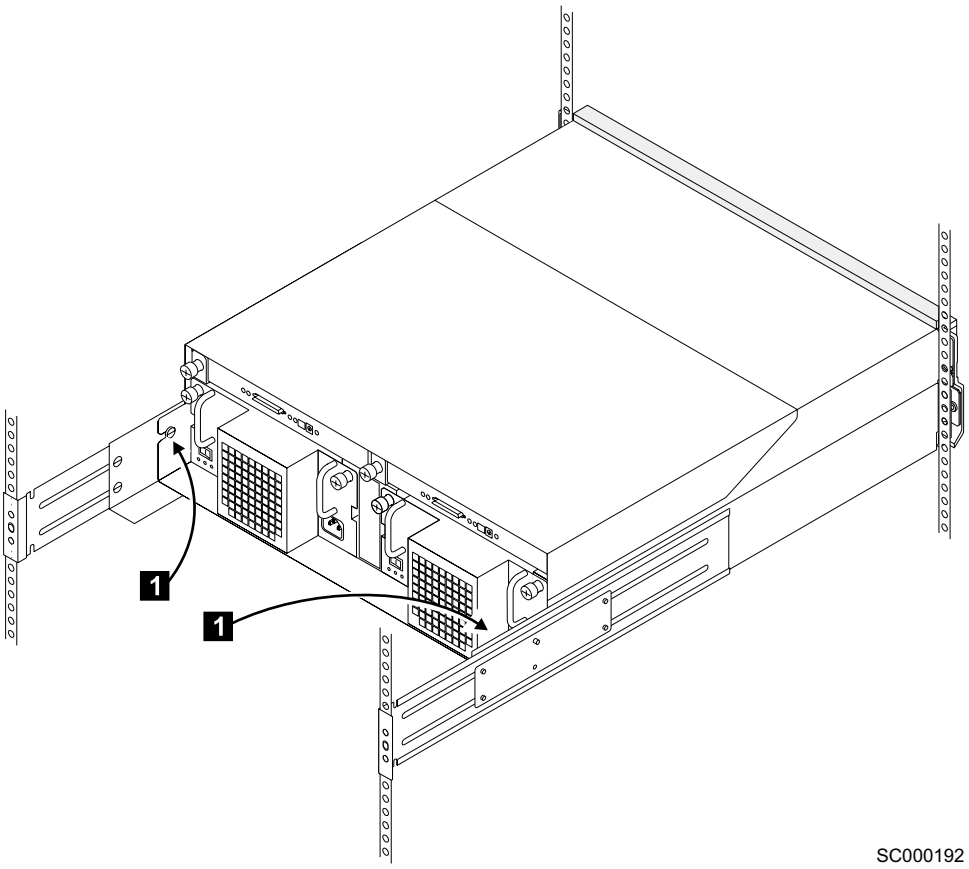


Figure 27. Installing the back mounting screws

5. Go to “Reinstalling the disk drive modules and dummy disk drive modules” on page 14.

Reinstalling the disk drive modules and dummy disk drive modules

Attention:

- Disk drive modules are fragile. Handle them with care, and keep them well away from strong magnetic fields.
- Any slot that has no disk drive module installed *must* contain a dummy disk drive module. The dummy disk drive module ensures that the correct airflow is maintained around the disk drive modules in the other slots.

Perform the following steps to reinstall the disk drive modules in the same sequence that you removed them:

1. Refer to the note that you made about the original locations of the disk drive modules.
2. Ensure that the handle **1** is fully open on the disk drive module that you are going to install. See Figure 28.

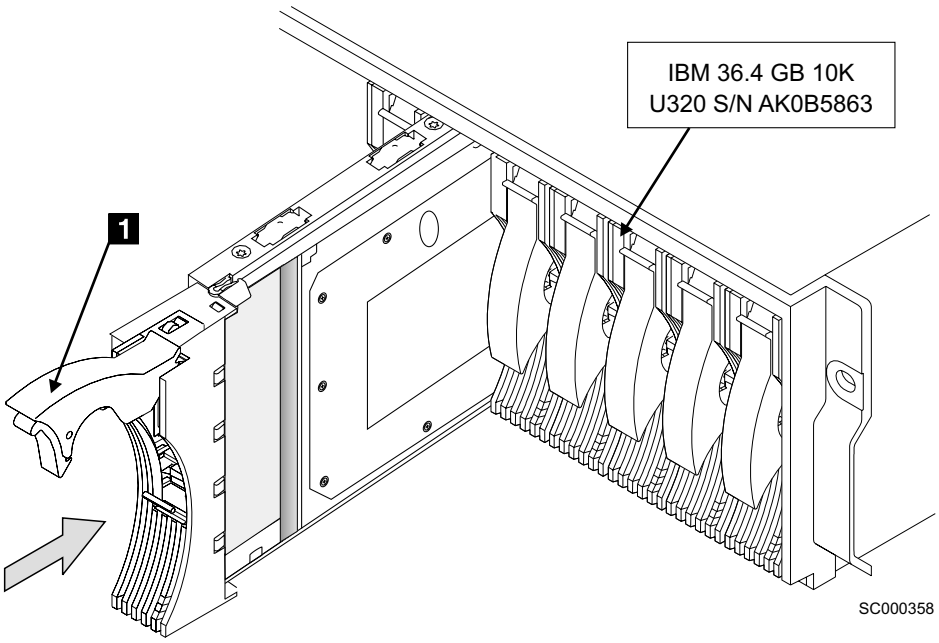


Figure 28. Reinstalling a 2104 Model DS4 disk drive module

3. With one hand giving support to the base of the disk drive module and the other hand holding the handle **1**, insert the disk drive module and push it into the slot.

   When the handle touches the front surface of the enclosure, the module stops. The disk drive module is not yet fully home.

4. While you continue to push the disk drive module into the slot, slowly close the handle **1** until it stops with a click. See Figure 29. This action pushes the module fully home.

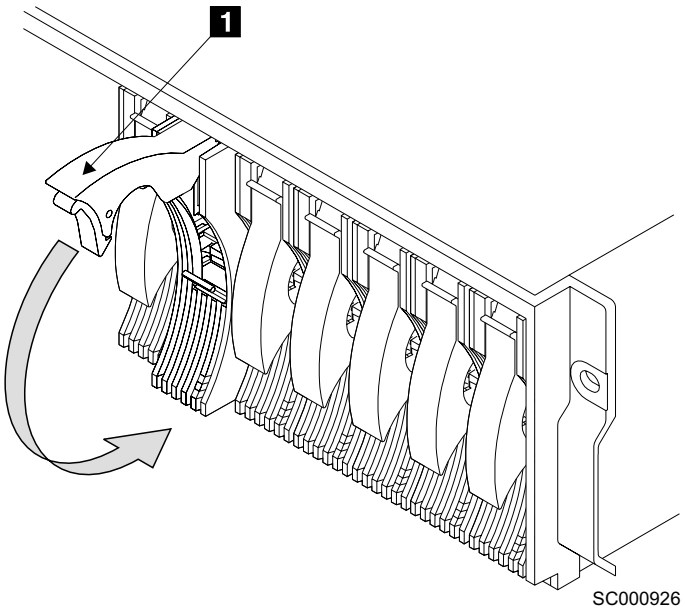


Figure 29. Closing the handle of a disk drive module

5. Verify that the disk drive module that you have just installed is aligned with the sides of the 2104 Model DS4 and that no gap exists between this module and the modules that are next to it.

   Verify also that the front edge of this disk drive module aligns with the front edges of the modules that are next to it.

   If the disk drive module is not correctly aligned, remove it (see “Removing the disk drive modules and dummy disk drive modules” on page 5). Repeat step 1 on page 14 through step 4 to reinstall the disk drive module.
6. Repeat step 1 through step 5 for each disk drive module.

   Attention: Any slot that has no disk drive module installed *must* contain a dummy disk drive module. The dummy disk drive module ensures that the correct airflow is maintained around the disk drive modules in the other slots.

7. Ensure that the 2104 Model DS4 has no empty slots. Install dummy disk drive modules if necessary. See Figure 30.

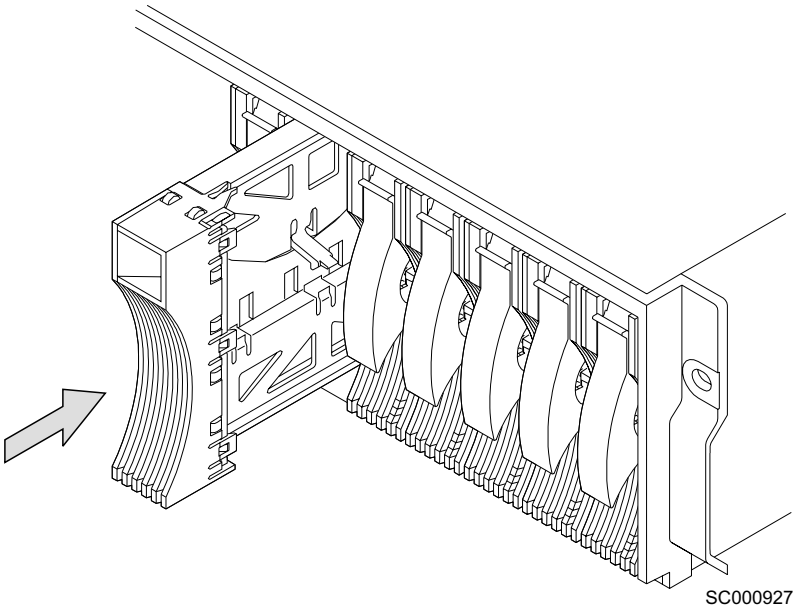


Figure 30. Reinstalling a dummy disk drive module

8. Go to “Installing the switch cover plate” on page 17.

Installing the switch cover plate

Note: Switch configuration is only valid on the SCSI interface card-1, which is on the left side (left side from the rear view). The configuration on the SCSI interface card-2, which is on the right side, is ignored. The switch cover plate is on card-2 so that it can be masked. See Figure 31. You must place the SCSI interface card in the left side from the rear view in a single SCSI interface card configuration. See JBOD 1 in Figure 31.

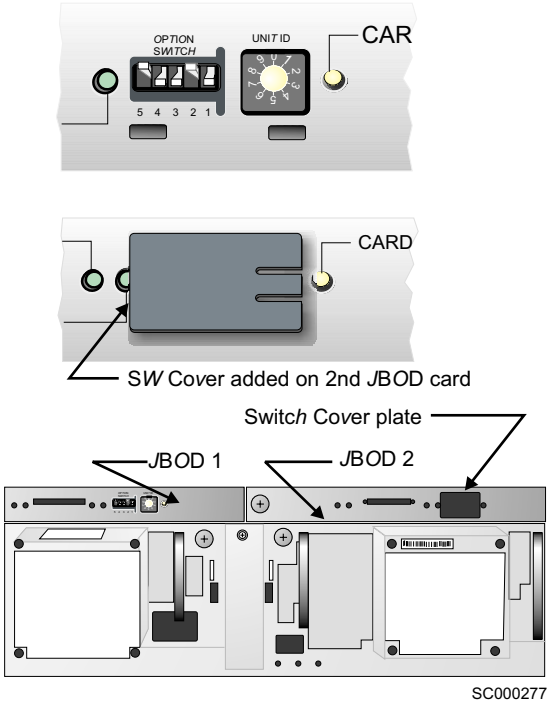


Figure 31. Installing the switch cover plate onto the panel of the SCSI Interface card-2 (second JBOD interface card) box

Perform the following steps to install the switch cover plate onto the panel of the SCSI Interface card-2 (second JBOD interface card).

Note: If the switch cover plate is already installed, you do not need to perform step 1 through step 3 on page 18.

1. Locate the hook, latch, and pins. See Figure 32 on page 18.

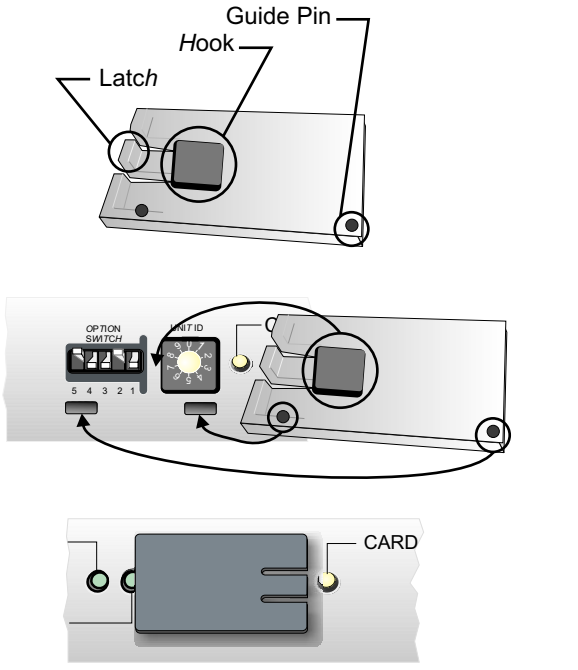


Figure 32. Inside the switch cover plate showing the hook, latch, and two guide pins with the SCSI Interface card assembly

2. Align the plate to the holes.
3. Plug and slide to the left until plate is latched.
4. Go to “Setting the options” on page 19.

Setting the options

Perform the following steps to set the options on the 2104 Model DS4:

1. Refer to your 2104 Model DS4 configuration information for details to set the options.
2. Use a small screwdriver to rotate the Box ID rotary switch (see Figure 33) to the ID you have chosen for this 2104 Model DS4 disk enclosure.

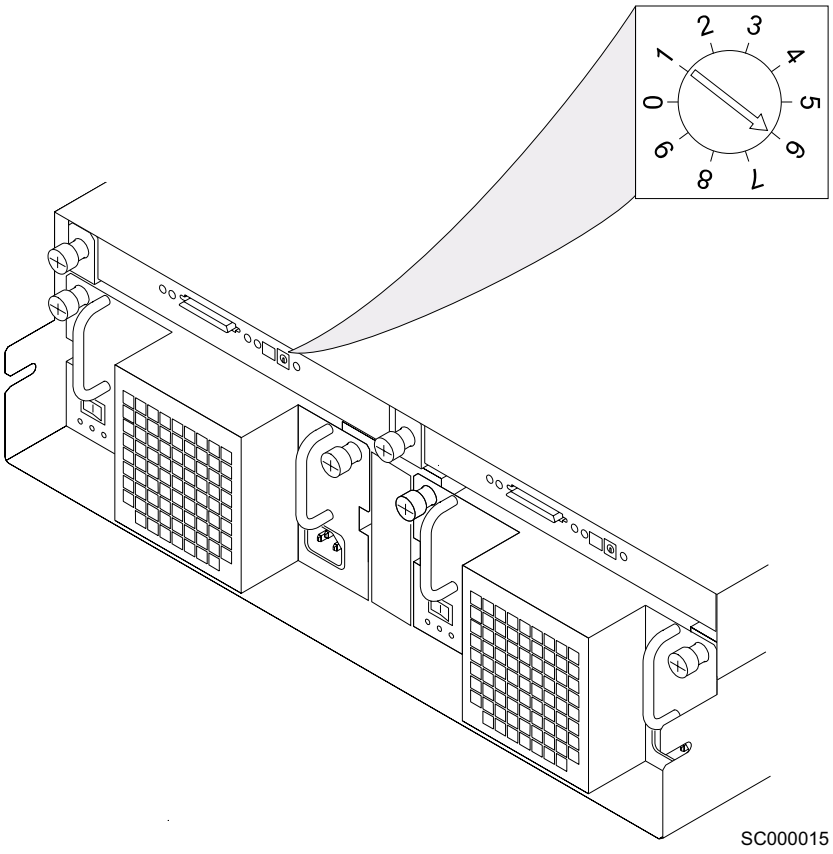


Figure 33. Setting the box ID

3. Find the sheet of labels supplied with your 2104 Model DS4. These are numbered 0 through 9. Select the one that represents your setting of the Box ID rotary switch. Attach it to the front of the 2104 Model DS4.

   Note: When running the Linux operating system, you can set the Box ID switch and attach the Box ID label. Your Linux operating system might or might not display the Box ID in its system messages.

   Note: The Box ID is used when running the standalone AIX Diagnostics CD.

4. Figure 34 shows the option switches. When the drive autostart switch-1 **1** is set to off, and the drive autostart switch-2 **2** is set to on, the disk drive motors do not start until you issue a **START MOTOR** command. The timing sequence of disk motor startup is under the control of the host system software.

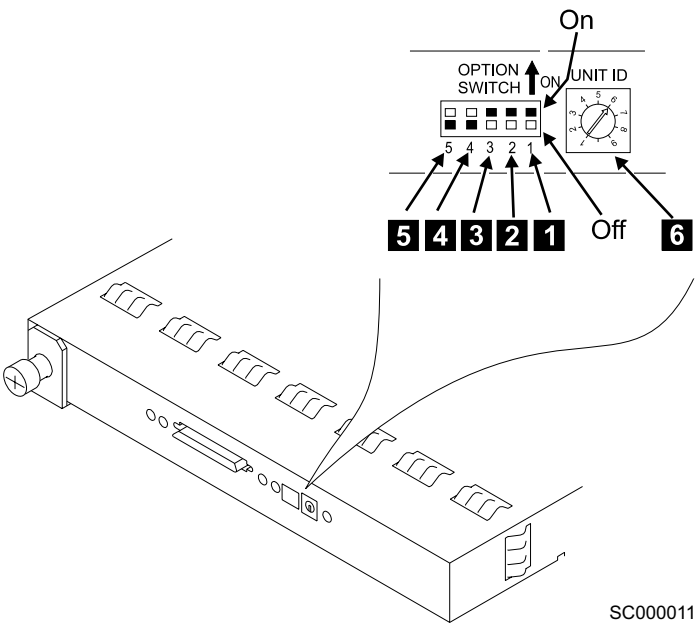


Figure 34. Setting the option switches

When the drive autostart switch-1 **1** is set to on and the drive autostart switch-2 **2** is set to off, the disk drives are set to delay motor start mode. The disk motor startup delay time is different for each disk drive, and is usually computed by multiplying its SCSI ID by 12 seconds. For example, the disk drive motor of a disk drive with a SCSI ID equal to 2 will start 24 (2 x 12) seconds after power is applied to the 2104 Model DS4.

When the drive autostart switch-1 **1** is set to off, and the drive autostart switch-2 **2** is set to off, the disk drives are set to normal start mode. The disk drive motors will start when power is applied to the 2104 Model DS4.

The effect of both this switch and the drive autostart switch-2 **2** being set to on is undefined.

5. To set the drive autostart switch-2 **2**, see step 4 for an explanation about the drive autostart switch-1 **1**.
6. Ensure that the enable enclosure services switch **3** and the select enclosure services switch **4** are both set to on to allow ANSI SCSI-3 Enclosure Services (SES) to operate. This applies to both AIX and Linux users. Your Linux operating system might not support SES, but the SES functions are used when running the standalone AIX Diagnostics CD.
7. When the power control switch **5** is set to off, the 2104 Model DS4 automatically switches off or on when the host system is switched off or on. When this switch is set to on, the 2104 Model DS4 is powered on or off by the dc on/standby switch on a fan-and-power-supply assembly.

8. Remove the card assembly. Check and, if necessary, change the settings of the internal switches of SCSI interface card-1 (left side from the rear view). You do not need to set internal switches of SCSI interface card-2 (right side) because they are ignored.
   a. Unscrew the thumbscrew **1** . See Figure 35.

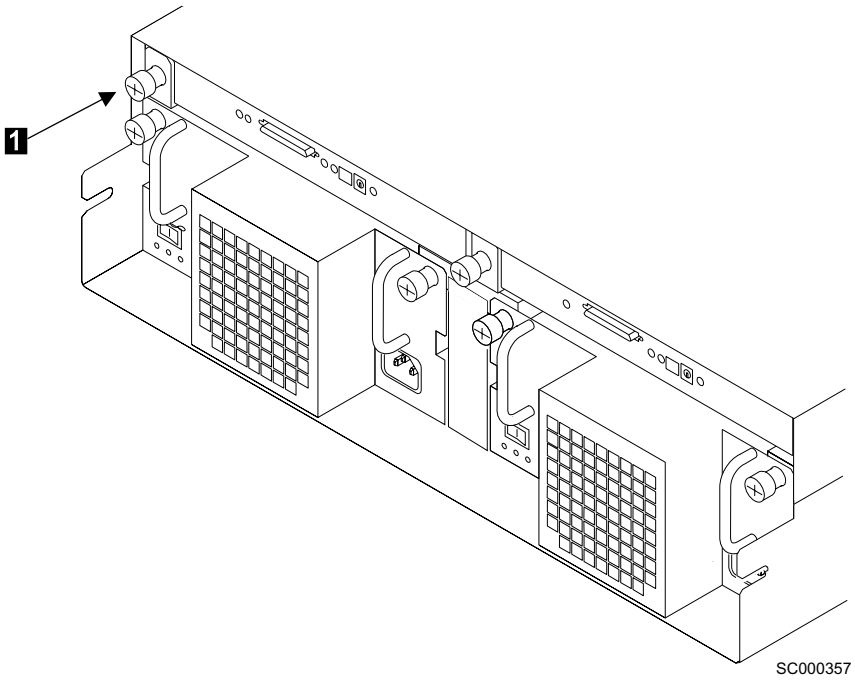


Figure 35. Unscrewing the thumbscrew

b. Pull the lever **1** out to unplug the card assembly from the 2104 Model DS4. See Figure 36.

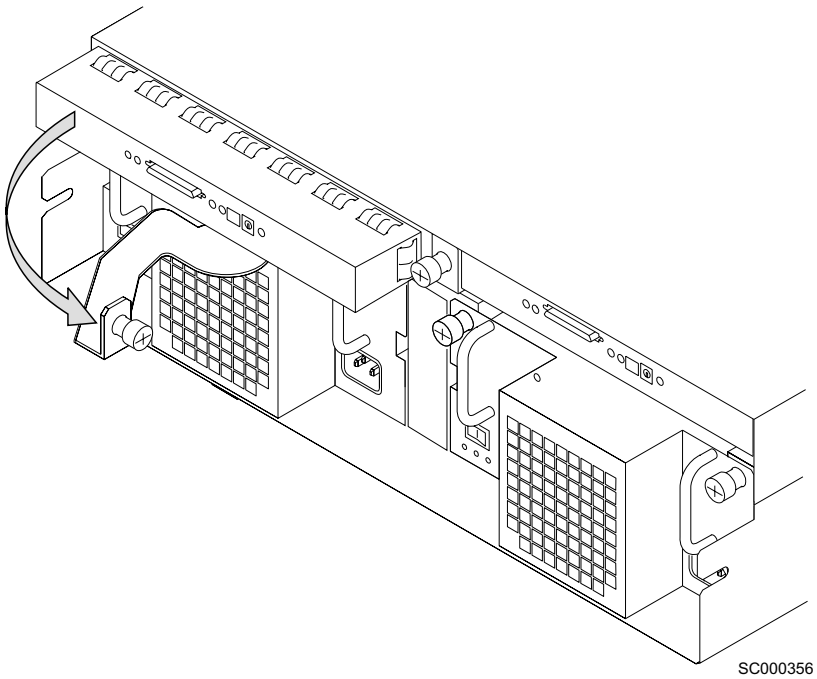


Figure 36. Opening the lever on the card assembly

c. **CAUTION:**
Do not insert hands or tools into the space that contained the card assembly. (23)
Pull the card assembly out from the 2104 Model DS4. See Figure 37.

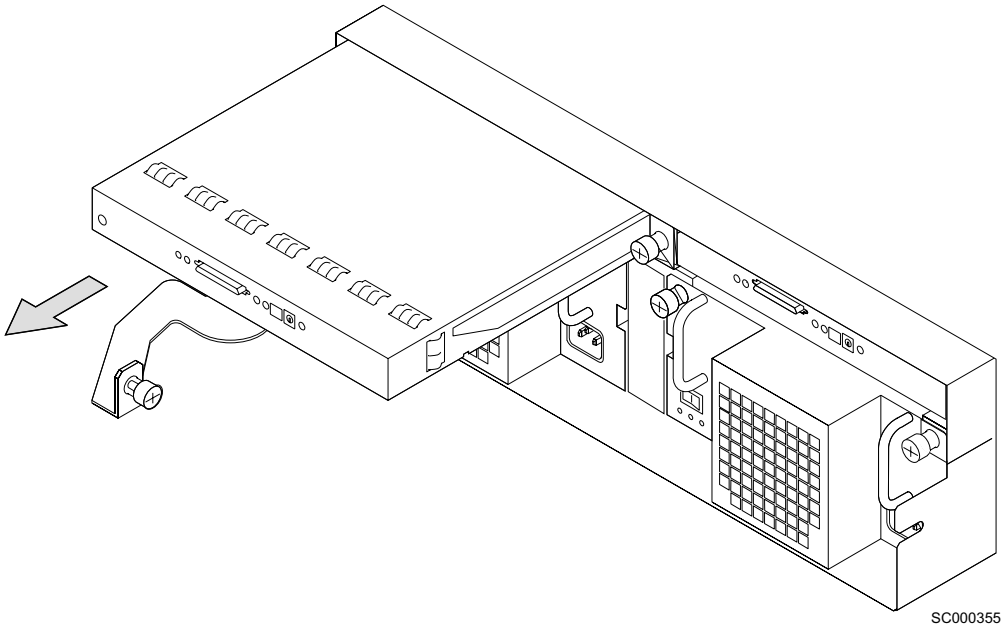


Figure 37. Removing the card assembly

9. Figure 38 shows other switches on the SCSI interface card.

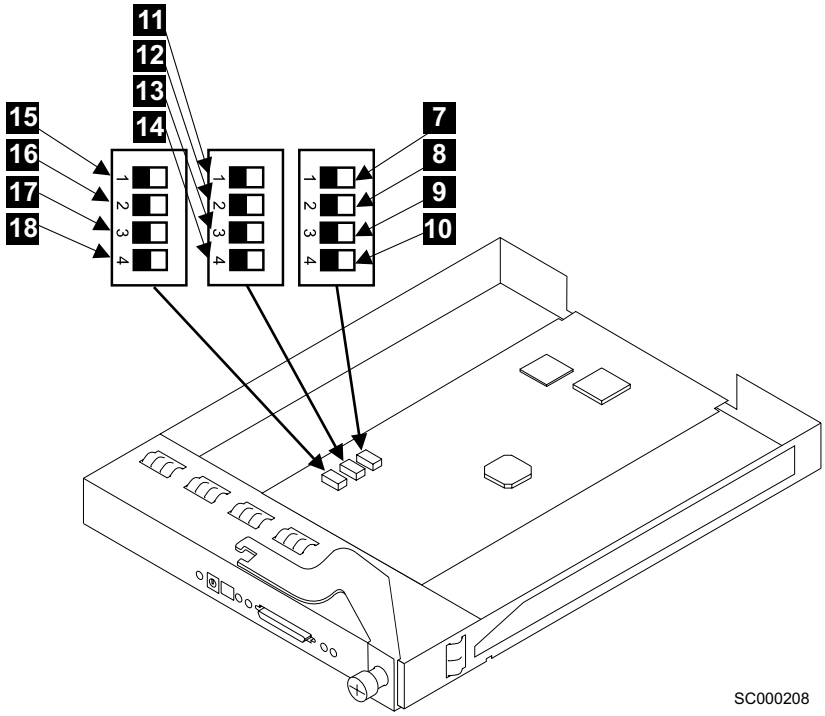


Figure 38. Card assembly switches

10. The SCSI bus split control **7** controls the SCSI bus mode. When the switch is off, the enclosure is configured as a single SCSI bus. When this switch is on, the enclosure is configured as a dual or split SCSI bus.
11. Verify that switch **8** and **9** (reserved) are off.
12. Verify that the disable ID 6 handling switch **10** is off. The SCSI ID 6 is automatically disabled and removed from the system when the following conditions are met:
    - The switch is off.
    - Two SCSI interface cards are installed with single-bus configuration.
    - Two hosts are connected to the 2104 Model DS4 and both are on.

    When you install two SCSI Interface cards and you configure the 2104 Model DS4 for single-bus mode, an ID conflict occurs if you install a drive in the slot of SCSI ID 6. The ID conflict exists because one of the host bus adapter (HBA) SCSI IDs should be set to 6 when using both host ports. Unless the disable ID 6 handling switch is off or the drive is removed from the slot of SCSI ID 6, there will be an ID conflict between the HBA that is using ID 6 and the drive in the slot of SCSI ID 6. Removing the drive from slot 6 and replacing it with a dummy carrier eliminates the conflict.

    An alternative is to turn the disable ID 6 handling switch off, which continuously applies a SCSI RESET signal to the drive in the slot of ID 6 when TERMPWR is present on both JBOD interface cards. While the drive is held in RESET, it releases all bus signals, effectively removing it from the system. The drive in the slot of SCSI ID 6 will continuously remain in RESET under these conditions until power is removed and the disable SCSI ID 6 handling switch is on.

13. The configuration switch **11 - 18** must always be set to off in the 2104 Model DS4. See Figure 38 on page 24.
14. Reinstall the card assembly.
    a. **CAUTION:**
    As you push the assembly fully home, the lever automatically moves toward its closed position. Ensure that your fingers do not become pinched between the lever and the assembly. (17)

    Insert the card assembly into the 2104 Model DS4. See Figure 39. Push the assembly in until it stops.

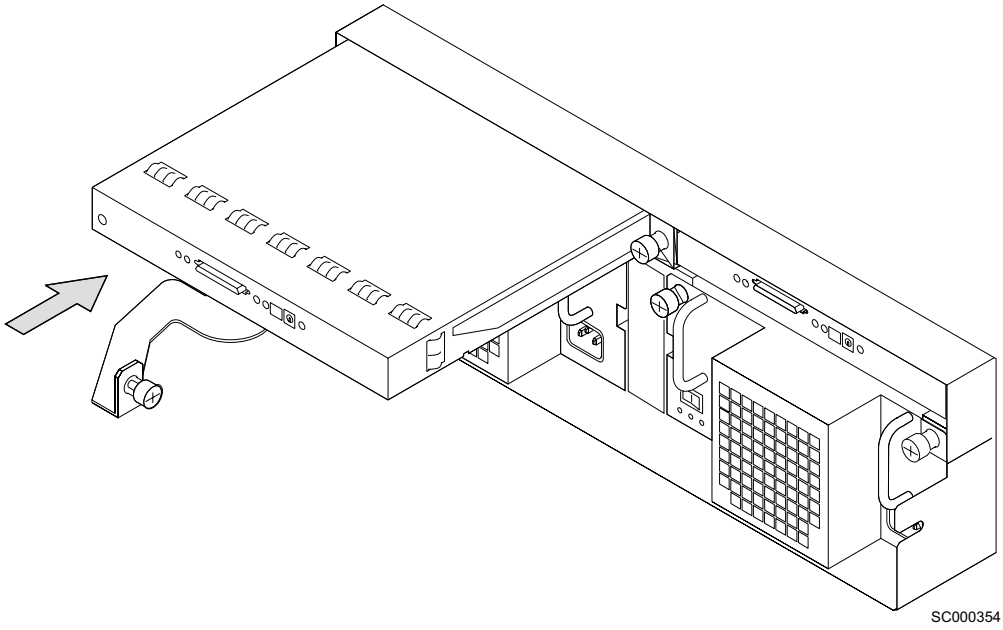


Figure 39. Inserting the card assembly

b. Push the lever **1** until it is fully closed to plug the card assembly into the 2104 Model DS4. See Figure 40.
c. Tighten the thumbscrew **1** fully.

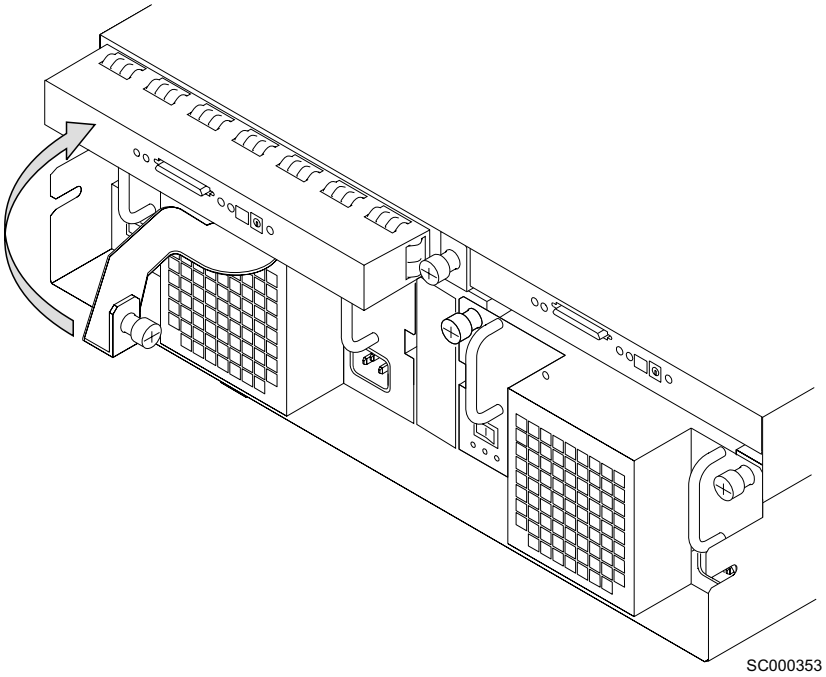


Figure 40. Closing the lever on the card assembly

15. Go to “Connecting the 2104 Model DS4 to the power source” on page 27.

Connecting the 2104 Model DS4 to the power source

Perform the following steps to connect the 2104 Model DS4 to the power source:

1. **Attention:** Never use power cables from another drawer to connect a 2104 Model DS4 to the mainline power outlet. Use only the shielded power cables that are supplied with the 2104 Model DS4.

   At the back of the 2104 Model DS4, plug a power cable into the mainline power connector **1** on each fan-and-power-supply assembly. See Figure 41.

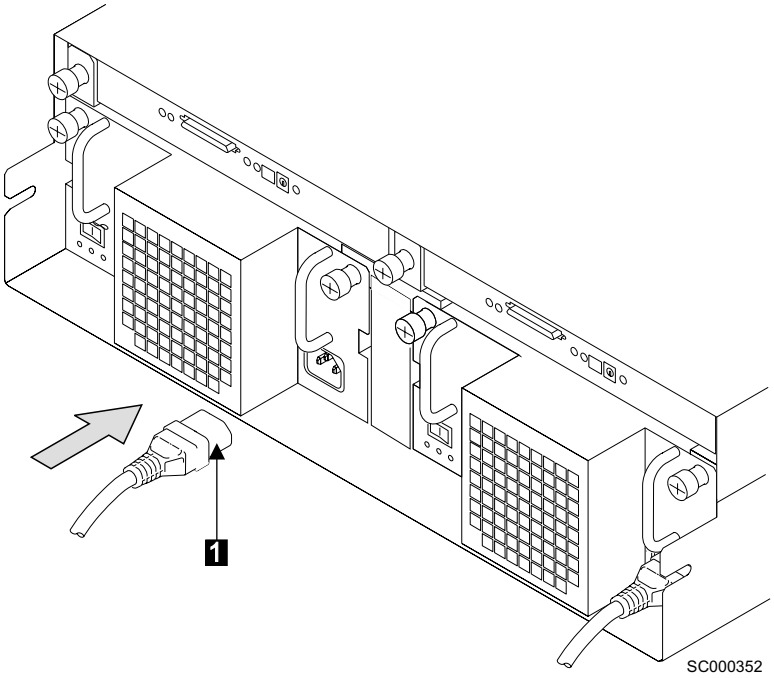


Figure 41. Connecting the power plugs

2. Ensure that the dc on/standby switch **1** is set to standby. See Figure 42.

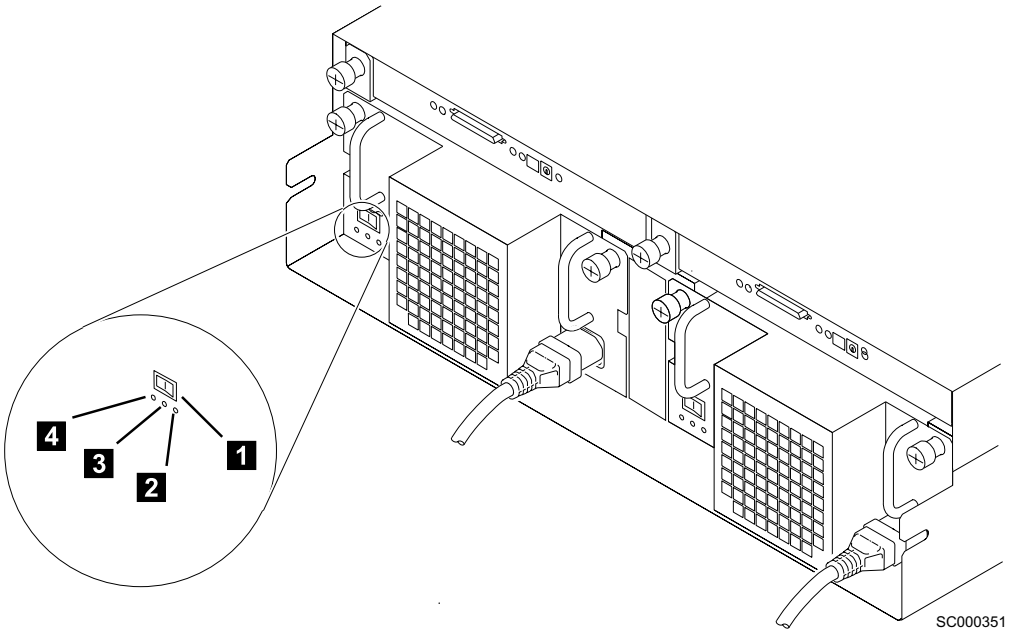


Figure 42. Checking the power supply switch and lights

3. Ensure that all power is removed from the rack.
4. Plug the other end of the power cable into the power source in the rack (see the installation and service guide, or equivalent, for the rack).
5. Perform the grounding checks described in the *Expandable Storage Plus: 2104 Model DS4 and Model TS4 Service Guide*.
6. If the grounding check is satisfactory, turn the power on to the rack. The green AC PWR light **4** comes on.
7. Switch on the dc on/standby switch **1** on each power supply. If option switch **5** (see Figure 34 on page 20) is on, the green DC PWR light **3** comes on and the check light **2** becomes off. See Figure 42. If option switch **5** (see Figure 34 on page 20) is off, the green DC PWR light **3** (see Figure 42) stays off and the check light **2** stays on. It will come on when the 2104 Model DS4 is connected to the host system.
8. Go to “Connecting the 2104 Model DS4 to the host system” on page 29.

Connecting the 2104 Model DS4 to the host system

Perform the following steps to connect the 2104 Model DS4 to the host system:

1. Refer to the 2104 Model DS4 configuration information and check how the 2104 Model DS4 is to be connected to the host system. Go to “Valid configurations” on page 35 to verify your configuration.
2. Attach identification labels to the external SCSI signal cables. For details, see the appropriate adapters, devices, and cables information manual.
3. Plug the SCSI signal cables into the connectors **1** on the SCSI interface cards. See Figure 43.

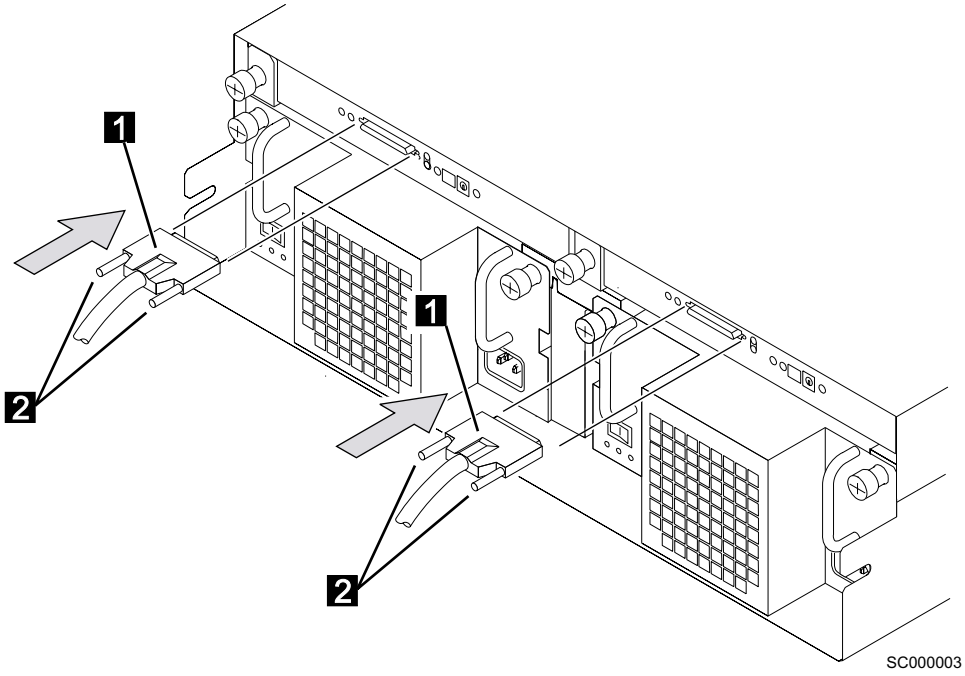


Figure 43. Plug in the SCSI signal cable

4. **Attention:** Do not use a power-driven screwdriver.
   Tighten the retaining screws **2**. You might need a small screwdriver to do this.

5. Ensure that all signal cables are correctly connected. See Figure 44. An incorrect connection can prevent the 2104 Model DS4 from becoming ready.

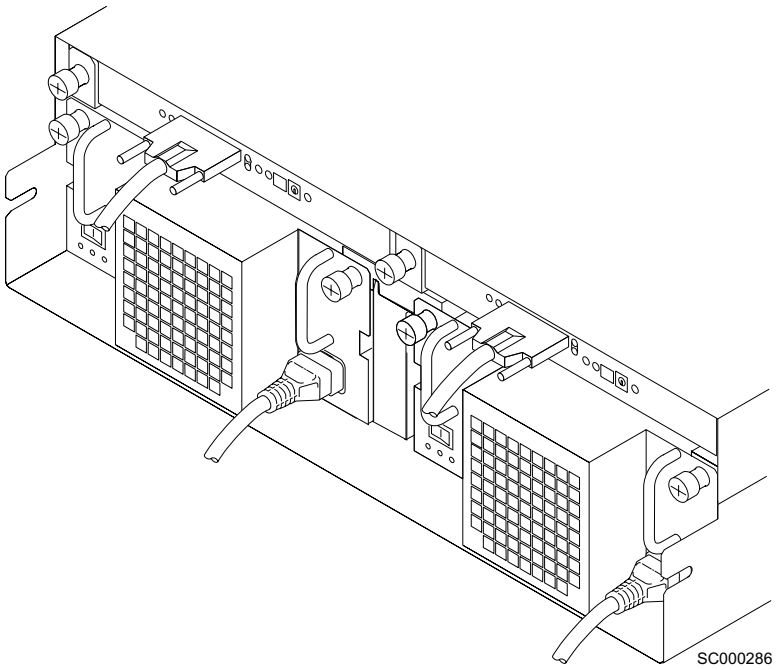


Figure 44. Back of fully configured 2104 Model DS4 after connection to the host system

Switching on and testing the 2104 Model DS4

Perform the following steps to switch on and test the 2104 Model DS4:

1. If the power to the host system is switched off, switch it on.
2. Refer to Figure 45.

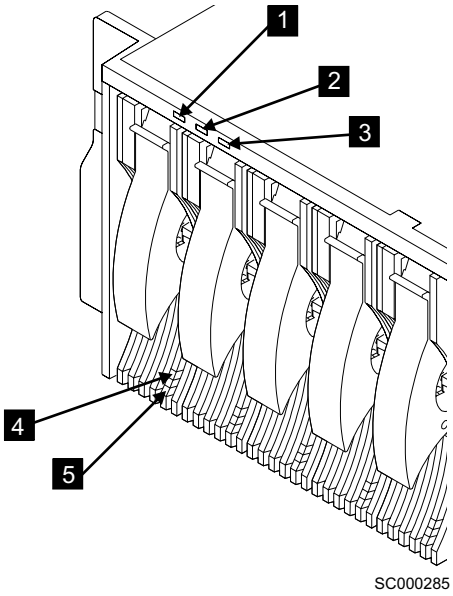


Figure 45. Checking the lights

The 2104 Model DS4 has three lights. The green power light **1** comes on and stays on. The amber check light **2** comes on for approximately 2 seconds and goes off. The unit identity light **3** is off. See Figure 45.

Each disk drive module has two lights. The green activity light **4** comes on for approximately 2 seconds when power is first supplied to the disk drive; it then goes off. The amber check light **5** then comes on for approximately 2 seconds and then goes off.

Note: Dummy disk drive modules have no lights.

Configuration is complete when the lights on the 2104 Model DS4 and its installed disk drive modules are as follows:

2104 Model DS4 power light **1** is on.
2104 Model DS4 check light **2** is off.
2104 Model DS4 unit identify light **3** is off.
Activity light **4** on each installed disk drive module is off.
Check light **5** on each installed disk drive module is off

If the lights are correct:

a. Refer to “Web sites” on page xxx for the latest microcode and system software levels. Ensure that the using system software is at the correct level for the 2104 Model DS4, and that the correct level of microcode for the disk drive modules has been loaded.
b. Go to Appendix B, “Cable configurations,” on page 35, which gives information about how to configure your 2104 Model DS4 to the host

system, what service aids are available, and how to collect statistics during the operation of your 2104 Model DS4.

If the lights are not as described here, refer to the *Expandable Storage Plus: 2104 Model DS4 and Model TS4 Service Guide* for help in identifying the cause of this fault.

Appendix A. Operating with RISC systems

This appendix describes how to operate an RS/6000 or IBM @server pSeries computer to which one or more 2104 Model DS4s are attached.

System service aids

Service aids are available on the host system to help you service the 2104 Model DS4. The following service aids are described in the *Expandable Storage Plus 2104 Model DS4 and Model TS4 Service Guide*:

- Format Media
- Certify Media
- SCSI Device Identification and Removal
- Download Microcode

Identifying a 2104 Model DS4 and the disk drive modules

You can identify a 2104 Model DS4 and the disk drive modules installed in it by running either AIX or Linux.

Note: Refer to the 2104 Interoperability Matrix link located at the following Web site to learn which versions of AIX or Linux are supported for the Expandable Storage Plus family of products.

www.storage.ibm.com/disk/expplus/supserver.htm/

AIX

When running AIX, you can identify an 2104 Model DS4 and the disk drive modules installed in it either by the location code contained in system messages that refer to that unit, or by using the SCSI Device Identification and Removal service aid.

For more information, see the section about location codes in the operator guide for your system.

Linux

When running Linux, you can identify an 2104 Model DS4 and the disk drive modules installed in it by using the **List Configuration** command. Consult your Linux operating system documentation for information on how to use this command.

Configuring a 2104 Model DS4 to an AIX host system

Use the **cfgmgr** command to configure or reconfigure a 2104 Model DS4 to the host system.

Note: This command might not be valid for your RAID adapter.

Unconfiguring a 2104 Model DS4 from an AIX host system

To remove a 2104 Model DS4 from the host system, use the following command:

rmdev -l [enclosurenumber] -d

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where [enclosurenumber] is the enclosure device that was generated by the **cfgmgr** command (for example, [ses0], [ses1], [ses2]).

Remove the ses_healthcheck job from the system cron table.

Configuring a 2104 Model DS4 in a SuSE Enterprise Server for pSeries environment

In general, SuSE Enterprise Server for pSeries systems are automatically configured during initial start up or restart up. See the SuSE Enterprise Server for pSeries documentation for more information.

Collecting Errors

Note: Collecting errors through the cron job is only available on systems that are running AIX.

To collect enclosure errors, add this cron job SES Healthcheck to the system cron table.

Note: You must have root permissions to complete this procedure.
Edit the system crons with the **crontab -e** command. At the bottom of the file, enter:

```
15 * * * * /usr/lpp/diagnostics/bin/run_ses_healthcheck 1> /dev/null 2>
/dev/null
```

For more information about the **crontab** command, see the following Web page:

http://publib16.boulder.ibm.com/pseries/en_US/cmds/aixcmds1/crontab.htm

This cron runs at 15 minutes after each hour, and e-mails the root user with details of any errors in the enclosure. It also presents a console message that indicates which enclosure has a problem. The cron requires a script. To create this script, generate a file named run_ses_healthcheck in the /usr/lpp/diagnostics/bin directory.

The contents of the file must be:

```
#!/bin/ksh
#Name: run_ses_healthcheck
#Location: /usr/lpp/diagnostics/bin
#Function: SCSI SES hourly healthcheck
for i in `lsdev -Cc container -t ses -s scsi -F name -S available`
do
      diag -cd $i > /dev/null
      if [ $? -ne 0 ]
      then
           /usr/lpp/diagnostics/bin/diagrpt -o > /tmp/ses.health.output
           # you may want to process the output prior to placing it in
           # a file.
           # somehow notify the user of the error. A sample is shown
           # below.
           mail -s '2104 Health Check' root < /tmp/ses.health.output
             rm /tmp/ses.health.output
      fi
done
```

This command runs the script:

```
chmod 544 /usr/lpp/diagnostics/bin/run_ses_healthcheck
```

Appendix B. Cable configurations

This appendix shows examples of cable configurations for the 2104 Model DS4. Some of the configurations are valid for all the adapters that the 2104 Model DS4 or Model TS4 supports. Other configurations are valid only for particular types of adapters. Also shown are configurations that are invalid. Do not use any configuration that is shown as invalid; unexpected results might occur.

Valid configurations

Only point-to-point connections are allowed between the SCSI interface cards in a 2104 Model DS4 and the SCSI adapter card or integrated SCSI port in a host system.

A 2104 Model DS4 with only one SCSI interface card can be attached to one SCSI adapter or integrated SCSI port. A 2104 Model DS4 with two SCSI interface cards can be attached to two SCSI adapters or integrated SCSI ports.

When you use an internal connector on the adapter card, do not use the corresponding external connector to connect to a 2104 Model DS4.

A 2104 Model DS4 can be configured to support either a single SCSI bus or a dual SCSI bus. The setting of the SCSI bus split switch on the card in the 2104 Model DS4 defines which configuration is to be used.

An RS/6000 or IBM @server pSeries computer uses one of the following SCSI adapters to connect to the 2104 Model DS4:

- PCI Dual-Channel Ultra3 SCSI adapter (type number 4-Y, feature code 6203)

  This dual-channel adapter has two external SCSI connectors and two internal SCSI connectors. Each pair, consisting of one external and one internal connector, is connected to a separate SCSI channel.
- PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498)

  This 4-channel adapter has four external SCSI connectors and two internal SCSI connectors. The Channel 1 and Channel 2 external connectors share the same SCSI bus as the corresponding Channel 1 and Channel 2 internal connectors. The Channel 3 and Channel 4 external connectors have their own non-shared SCSI bus.
- PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712)

  This dual-channel adapter has two external SCSI connectors and two internal SCSI connectors. Each pair, consisting of one external and one internal connector, is connected to a separate SCSI channel.
- PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)

  This dual channel adapter has two Ultra320 SCSI busses, each with one internal and one external connector.

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An IBM @server pSeries computer running Linux on pSeries uses one of the following SCSI adapters to connect to the 2104 Model DS4:

- PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712)
- PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)
- PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203)

Summary of valid configurations

Table 1 shows a summary of valid configurations and SCSI ID assignments.

Table 1. Valid configurations

SCSI bus mode	Number of connected adapters	SCSI IDs of adapters	Maximum number of disk drive modules	SCSI IDs of disk drive modules	SCSI ID of enclosure services processor	Adapters supported
Single bus	1	7	14	0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14	15	See “Valid configurations” on page 35 for the list of adapters.
Single bus	2	5, 6	12	0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14	15	See Notes 1 and 2.
Dual bus SCSI bus 1	1	7	7	0, 1, 2, 3, 4, 5, 6 See Note 3.	15	See “Valid configurations” on page 35 for the list of adapters.
Dual bus SCSI bus 2	1	7	7	8, 9, 10, 11, 12, 13, 14. See Note 4.	15	See “Valid configurations” on page 35 for the list of adapters.

Notes:

1. In HACMP configurations: PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y) and PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702) in separate host systems
2. In non-HACMP configurations: PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y) and PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702) or Ultra2 SCSI Integrated Port in separate host systems, but not sharing access to the disk drive modules
3. Bottom half of the 2104 Model TS4 and left half of the 2104 Model DS4, viewed from the front
4. Top half of the 2104 Model TS4 and right half of the 2104 Model DS4, viewed from the front

Single-bus mode configurations

For a single-bus mode configuration, the SCSI bus split switch on the card of a 2104 Model DS4 must be set to off.

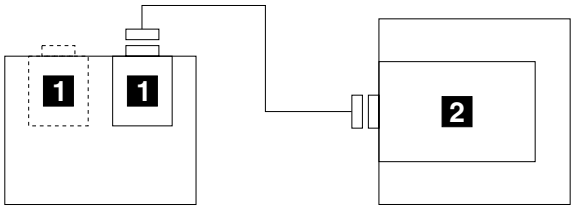
Each 2104 Model DS4 can be connected to one external SCSI connector on a SCSI adapter card, or to one integrated SCSI port, in a host system. If an adapter card has four external SCSI connectors, it can be connected to up to four 2104 Model DS4s.

For High Availability Cluster Multi-Processing (HACMP) configurations, the two SCSI interface cards in a 2104 Model DS4 are connected either to external SCSI connectors on adapter cards, or to integrated Ultra2 SCSI ports, in two different host systems. The adapter cards must be a PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) or PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702).

For non-HACMP configurations, the SCSI interface cards in a 2104 Model DS4 can be connected either to an external SCSI connector on an adapter card, or to an Ultra2 SCSI integrated port, in a host system. Each adapter must be a PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) or PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702). The adapters must be in two different host systems. They must not share access to the disk drives in the 2104 Model DS4.

One adapter in one host system connected to one 2104 Model DS4

Figure 46 shows one adapter in one host system connected to one 2104 Model DS4 (single-bus mode).



1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 is optional.
2	SCSI adapter of one of these types: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Note:** The 2104 Model DS4 can be connected to an integrated SCSI port instead of to one of these adapters. **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: • PCI 4-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code code 5703)

Figure 46. One adapter in one host system connected to one 2104 Model DS4 (single-bus mode)

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules.

Two adapters in one host system connected to two 2104 Model DS4s

Figure 47 shows two adapters in one host system connected to two 2104 Model DS4s (single-bus mode).

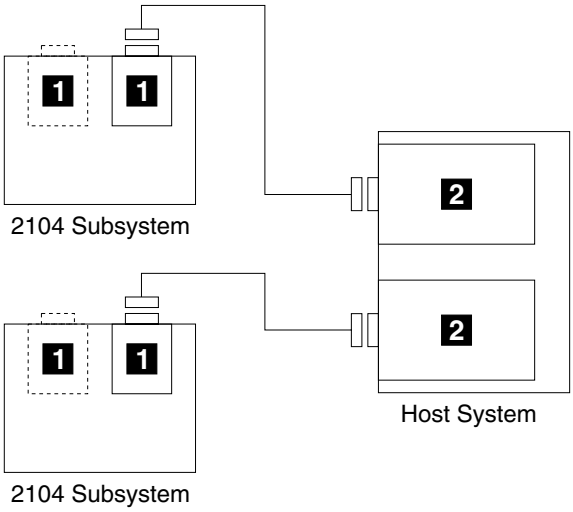


Figure 47. Two adapters in one host system connected to two 2104 Model DS4s (single-bus mode)

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 is optional.
2	SCSI adapter of one of these types: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Note:** The 2104 Model DS4 can be connected to an integrated SCSI port instead of to one of these adapters. **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: • PCI 4-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules.

One adapter in each of two host systems connected to two 2104 Model DS4s

Figure 48 shows one adapter in each of two host systems connected to two 2104 Model DS4s (single-bus mode).

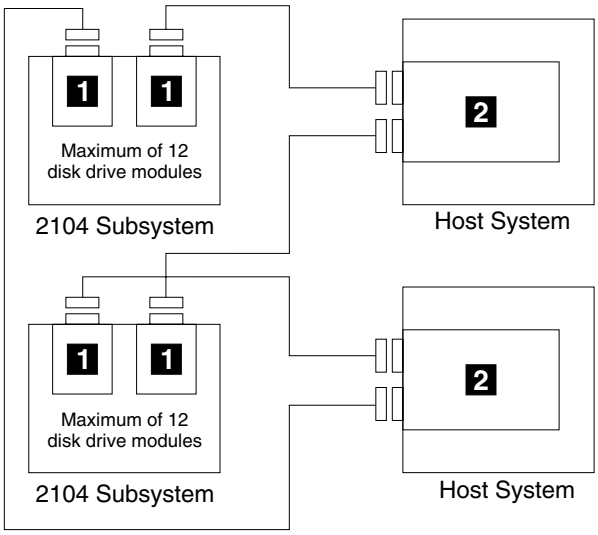


Figure 48. One adapter in each of two host systems connected to two 2104 Model DS4s (single-bus mode)

1	SCSI interface card.
2	For HACMP configurations in standby and mutual takeover mode: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) **Note:** The adapters must be in two separate host systems. • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) For non-HACMP configurations, the connections can be to either two different host systems or to the same host system, but disk drive modules must not be shared: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • Ultra2 SCSI Integrated port • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) **Important:** The 2104 Model DS4 configuration is not supported on the Linux operating system.

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules. When a second adapter is connected to a 2104 Model DS4, the SCSI address of that adapter must be different from the address of the first adapter and the addresses of the disk drive modules installed in the 2104 Model DS4.

In each 2104 Model DS4, slots 6 and 7 (SCSI addresses 5 and 6) must contain dummy disk drive modules. Each 2104 Model DS4 can contain no more than 12 disk drive modules.

One adapter in one host system connected to two 2104 Model DS4s

Figure 49 shows one adapter in one host system connected to two 2104 Model DS4s (single-bus mode).

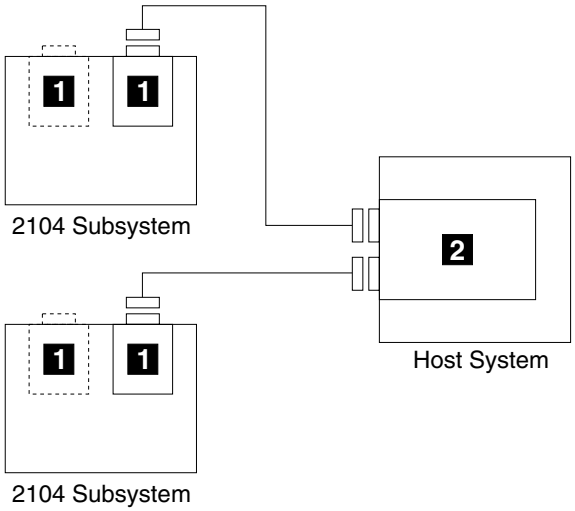


Figure 49. One adapter in one host system connected to two 2104 Model DS4s (single-bus mode)

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 is optional.
2	SCSI adapter of one of these types: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Note:** The 2104 Model DS4 can be connected to an integrated SCSI port instead of to one of these adapters. **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: • PCI 4-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703,)

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules.
2. These configurations are valid with or without an additional integrated port.

One adapter in one host system connected to two 2104 Model DS4s and an internal RAID array

Figure 50 shows one adapter, one host system with internal RAID array, and two 2104 Model DS4s (single-bus mode).

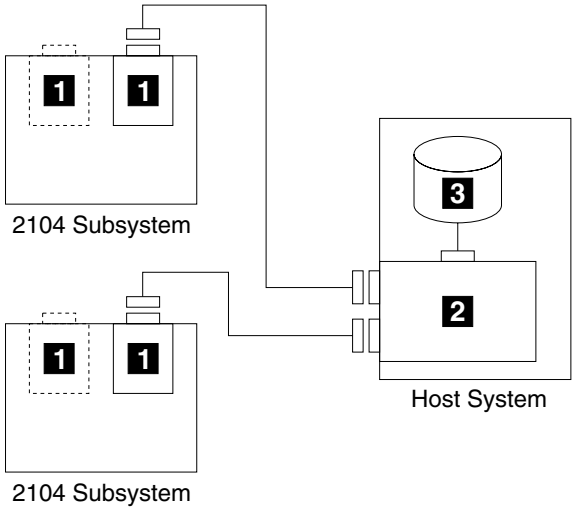


Figure 50. One adapter, one host system with internal RAID array, and two 2104 Model DS4s (single-bus mode)

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 is optional.
2	SCSI adapter: • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)
3	Internal RAID array.

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules.
2. The external connectors of the SCSI RAID adapter must not share a SCSI bus with the internal RAID array.

One adapter in each of two host systems connected to one 2104 Model DS4

Figure 51 shows one adapter in each of two host systems connected to one 2104 Model DS4 (single-bus mode).

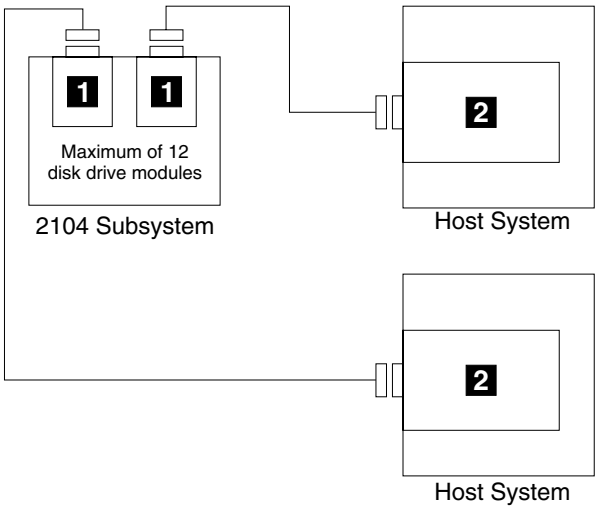


Figure 51. One adapter in each of two host systems connected to one 2104 Model DS4 (single-bus mode)

1	SCSI interface card.
2	For HACMP configurations in standby or mutual takeover mode: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) **Note:** The two adapters must be in separate host systems. • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) For non-HACMP configurations: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • Ultra2 SCSI Integrated Port • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) **Note:** In non-HACMP configurations, connections can be made to two separate host systems or to the same host system. Connection can be to an Ultra2 SCSI integrated port or to an Ultra2 SCSI connector on the SCSI adapters listed. Access to the disks in the 2104 Model DS4 cannot be shared. **Important:** This 2104 Model DS4 configuration is not supported on the Linux operating system.

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules. When a second adapter is connected to a 2104 Model DS4, the SCSI address of that adapter must be different from the address of the first adapter and the addresses of the installed disk drive modules.
2. In each 2104 Model DS4, slots 6 and 7 (SCSI addresses 5 and 6) must contain dummy disk drive modules.
3. Each 2104 Model DS4 can contain no more than 12 disk drive modules.

Dual-bus mode configurations

For a dual-bus mode configuration, the SCSI bus split switches must be set to on.

Each 2104 Model DS4 in the configuration is connected either to one external SCSI connector on an adapter card, or to an integrated SCSI port. If an adapter card has four external SCSI connectors, it can be connected to up to four 2104 Model DS4s.

The external SCSI connectors can be either on the same adapter card, or on two separate adapter cards. If the connectors are on two separate adapter cards, these adapter cards can be either in the same host system or be in two separate host systems.

Two adapters in one non-HACMP host system connected to one 2104 Model DS4

Figure 52 shows two adapters in one non-HACMP host system connected to one 2104 Model DS4 (dual-bus mode).

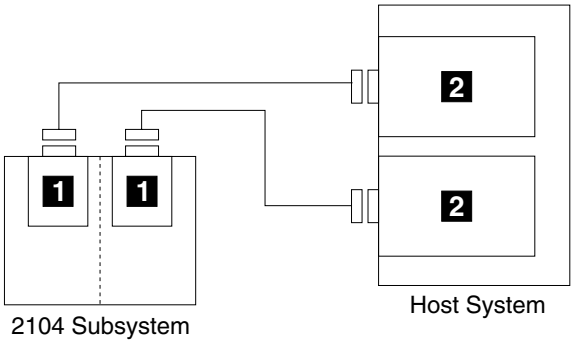


Figure 52. Two adapters in one non-HACMP host system connected to one 2104 Model DS4 (dual-bus mode)

1	SCSI interface card.
2	SCSI or SCSI RAID adapter of one of these types: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Note:** Connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters. **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: • PCI 4-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)

Notes:

1. The SCSI addresses of the adapters that are connected to the 2104 Model DS4 must be different from each other and from the addresses of the installed disk drive modules.
2. A similar configuration that has one adapter with two external SCSI connectors, instead of the two single-connector SCSI adapters, is also a valid configuration.

Three adapters in two non-HACMP host systems connected to two 2104 Model DS4s

Figure 53 shows three adapters in two non-HACMP host systems connected to two 2104 Model DS4s (dual-bus mode).

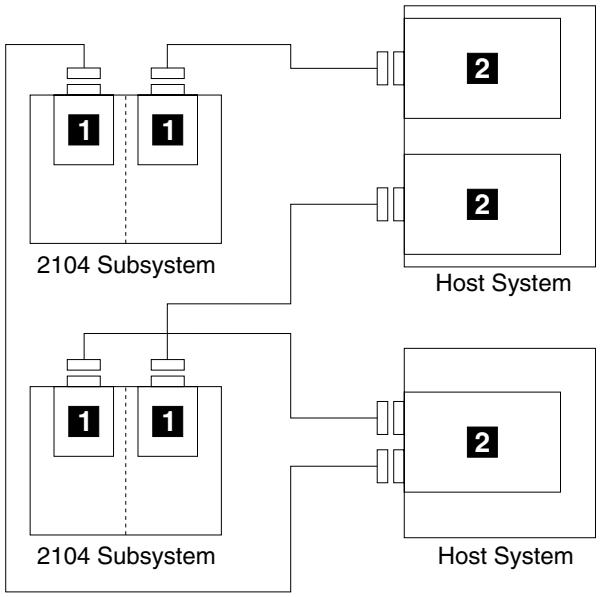


Figure 53. Three adapters in two non-HACMP host systems connected to two 2104 Model DS4s (dual-bus mode)

1	SCSI interface card.
2	SCSI or SCSI RAID adapter of one of these types: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Note:** The connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters. **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: • PCI 4-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules. The SCSI address of a second adapter, which is connected to a 2104 Model DS4, can be the same address of the first adapter but must be different from the addresses of the installed disk drive modules on the same SCSI bus.

2. A similar valid configuration can have two adapters, each with one external SCSI connector, instead of the adapter with two external SCSI connectors.

One adapter in one non-HACMP host system connected to one 2104 Model DS4 and an internal RAID array

Figure 54 shows one adapter in one non-HACMP host system connected to one 2104 Model DS4 and an internal RAID array (dual-bus mode).

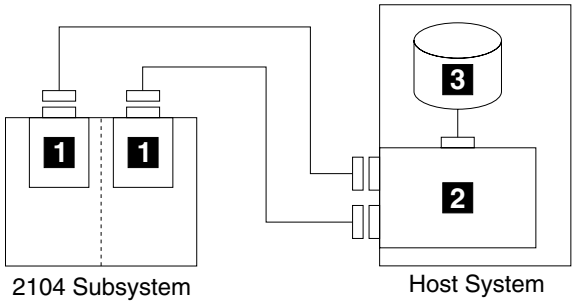


Figure 54. One adapter in one non-HACMP host system connected to one 2104 Model DS4 and an internal RAID array (dual-bus mode)

1	SCSI interface card.
2	SCSI adapter: • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)
3	Internal RAID array.

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules.

One adapter in each of two non-HACMP host systems connected to one 2104 Model DS4

Figure 55 shows one adapter in each of two non-HACMP host systems connected to one 2104 Model DS4 (dual-bus mode).

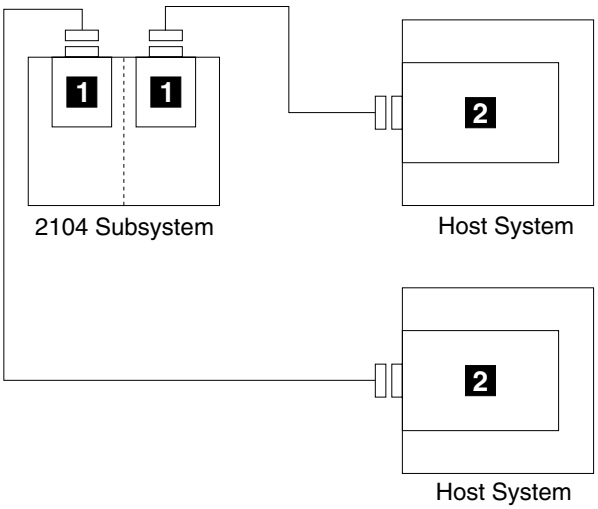


Figure 55. One adapter in each of two non-HACMP host systems connected to one 2104 Model DS4 (dual-bus mode)

1	SCSI interface card.
2	SCSI or SCSI RAID adapter of one of these types: • PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Note:** Connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters. **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: • PCI 4-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) • PCI-X Dual Channel Ultra320 SCSI Adapter (type number 5702, feature code 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules. The SCSI address of a second adapter, which is connected to a 2104 Model DS4, can be the same address of the first adapter but must be different from the addresses of the installed disk drive modules on the same SCSI bus.

One RAID adapter in each of two non-HACMP host systems connected to two 2104 Model DS4s

Figure 56 shows one RAID adapter in each of two non-HACMP host systems connected to two 2104 Model DS4s (dual-bus mode).

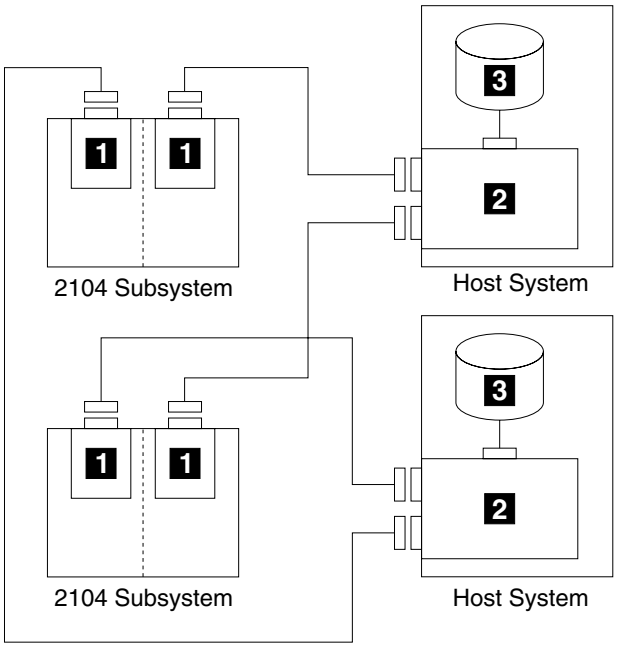


Figure 56. One RAID adapter in each of two non-HACMP host systems connected to two 2104 Model DS4s (dual-bus mode)

1	SCSI interface card.
2	SCSI RAID adapter: • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4: PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 must be different from the addresses of the installed disk drive modules.
2. The external connectors on the SCSI RAID adapter cards and the internal RAID connector must not share a SCSI bus.

Invalid configurations

This section gives examples of configurations that are invalid.

Two adapters in one host system connected to one 2104 Model DS4

Figure 57 shows two adapters in one host system connected to one 2104 Model DS4 (single-bus mode) .

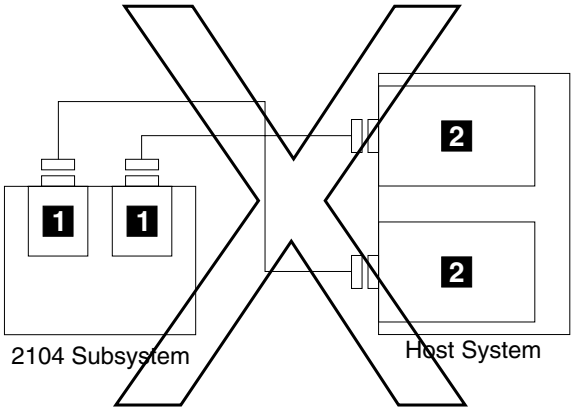


Figure 57. Two adapters in one host system connected to one 2104 Model DS4 (single-bus mode). This configuration is invalid.

1	SCSI interface card.
2	SCSI adapter. This configuration is invalid for any type of adapter.

Note: This configuration is invalid when the 2104 Model DS4 is configured in single-bus mode, but is valid when the 2104 Model DS4 is configured in dual-bus mode. See page 46.

One adapter in one host system connected to two 2104 Model DS4s through the SCSI interface cards

Figure 58 shows one adapter in one host system connected to two 2104 Model DS4s through the SCSI Interface cards.

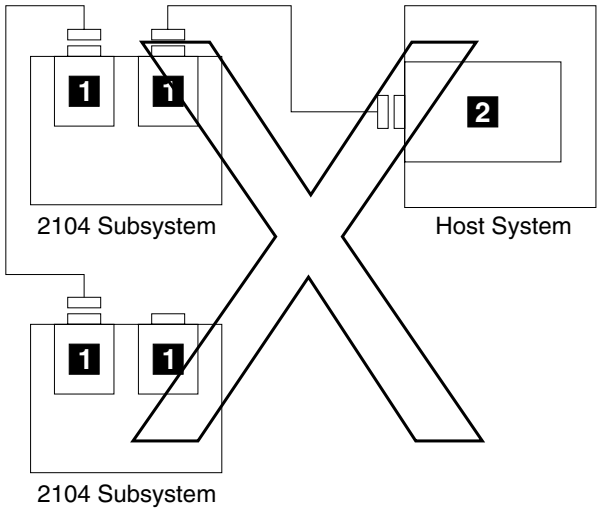


Figure 58. One adapter in one host system connected to two 2104 Model DS4s through the SCSI Interface cards. This configuration is invalid.

1	SCSI interface card.
2	SCSI adapter. This configuration is invalid for any type of adapter.

One adapter in one host system connected to two 2104 Model DS4s through a Y-cable (1)

Figure 59 shows one adapter in one host system connected to two 2104 Model DS4s through a Y-cable (1).

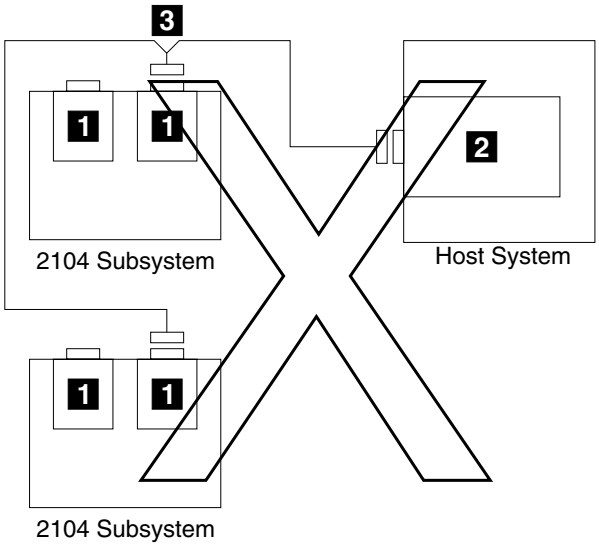


Figure 59. One adapter in one host system connected to two 2104 Model DS4s through a Y-cable (1). This configuration is invalid.

1	SCSI interface card.
2	SCSI adapter. This configuration is invalid for any type of adapter.
3	Y-cable. Not supported for any type of adapter that is used with the 2104 Model DS4.

One adapter in one host system connected to two 2104 Model DS4s through a Y-cable (2)

Figure 60 shows one adapter in one host system connected to two 2104 Model DS4s through a Y-cable (2).

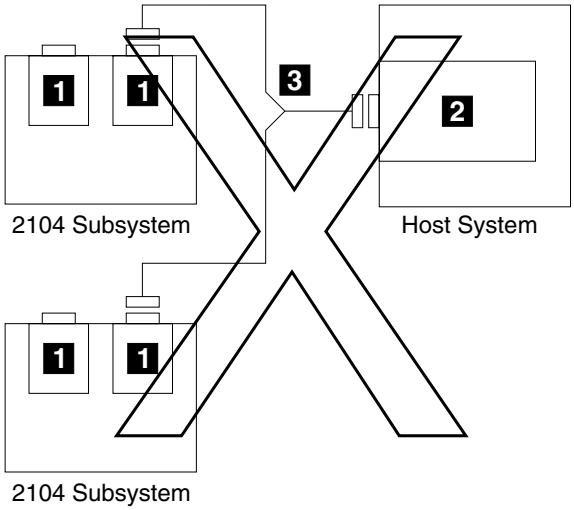


Figure 60. One adapter in one host system connected to two 2104 Model DS4s through a Y-cable (2). This configuration is invalid.

1	SCSI interface card.
2	SCSI adapter. This configuration is invalid for any type of adapter.
3	Y-cable. Not supported for any type of adapter that is used with the 2104 Model DS4.

One dual-channel non-RAID adapter in one host system connected to two 2104 Model DS4s and internal disk drives

Figure 61 shows one dual-channel non-RAID adapter in one host system connected to two 2104 Model DS4s and internal disk drives.

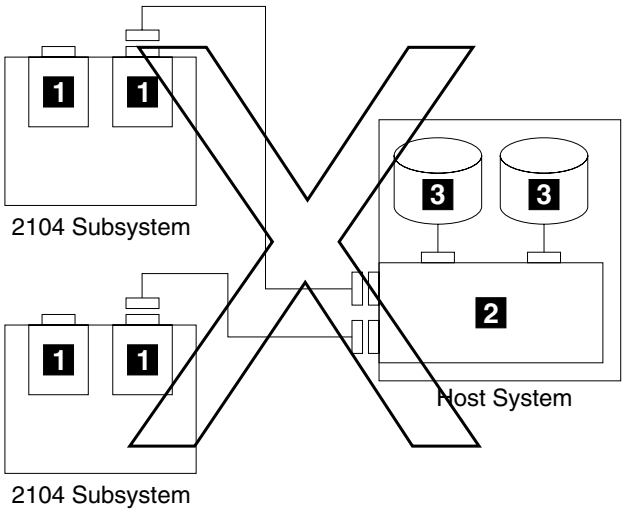


Figure 61. One dual-channel non-RAID adapter in one host system connected to two 2104 Model DS4s and internal disk drives. This configuration is invalid.

1	SCSI interface card.
2	PCI Dual-Channel Ultra3 SCSI Adapter (type number 4-Y, feature code 6203) and PCI-X Dual Channel Ultra320 SCSI adapter (type number 5702, feature code 5712). This configuration is invalid on this adapter because two internal and two external attachments that are on the same SCSI bus exceed the capacity of the adapter.
3	Internal disk drives.

One RAID adapter in each of two host systems connected to two 2104 Model DS4s

Figure 62 shows one RAID adapter in each of two host systems connected to two 2104 Model DS4s. This configuration is invalid.

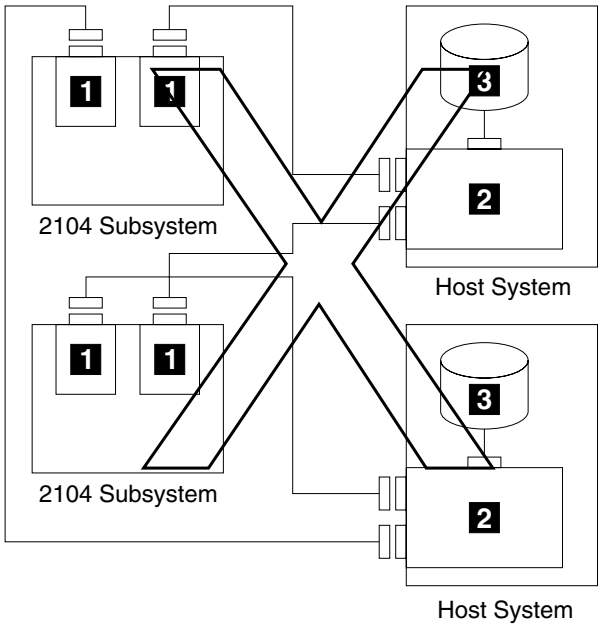


Figure 62. One RAID adapter in each of two host systems connected to two 2104 Model DS4s. This configuration is invalid.

1	SCSI Interface card.
2	This configuration is invalid for RAID adapters because it cannot use HACMP.
3	Internal RAID disk drive array.

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Properly shielded and grounded cables and connectors must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables and connectors are available from IBM authorized dealers. IBM cannot accept responsibility for any interference caused by using other than recommended cables and connectors.

Germany compliance statement

Zulassungsbescheinigung laut Gesetz ueber die elektromagnetische

Vertraeglichkeit von Geraeten (EMVG) vom 30. August 1995.

Dieses Geraet ist berechtigt, in Uebereinstimmung mit dem deutschen EMVG das

EG-Konformitaetszeichen - CE - zu fuehren.

Der Aussteller der Konformitaetserklaeung ist die IBM Deutschland.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Geraet erfuellt die Schutzanforderungen nach EN 50082-1 und EN 55022 Klasse A.

EN 55022 Klasse A Geraete beduerfen folgender Hinweise:

Nach dem EMVG:_lt¹|

“Geraete duerfen an Orten, fuer die sie nicht ausreichend entstoert sind, nur mit besonderer Genehmigung des Bundesministeriums fuer Post und Telekommunikation oder des Bundesamtes fuer Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Stoerungen zu erwarten sind.” (Auszug aus dem EMVG, Paragraph 3, Abs.4)

Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden

Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Nach der EN 55022:

“Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstoerungen verursachen. in diesem Fall kann vom Betreiber verlangt werden, angemessene Massnahmen durchzufuehren und dafuer aufzukommen.”

Anmerkung:

Um die Einhaltung des EMVG sicherzustellen, sind die Geraete wie in den Handbuechern angegeben zu installieren und zu betreiben.

Japanese Voluntary Control Council for Interference (VCCI) class 1 statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korean Government Ministry of Communication (MOC) statement

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this is not suitable for your use, you may exchange it for one with a non-business use.

Taiwan class A compliance statement

警告使用者:
這是甲類的資訊產品，在居住的環境中使用
時，可能會造成射頻干擾，在這種情況下，
使用者會被要求採取某些適當的對策。 VS07171L

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