Bull ESCALA

Expandable Storage Plus 2104 Models DS4 and TS4 Service Guide

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Expandable Storage Plus 2104 Models DS4 and TS4 Service Guide

Hardware

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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)

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, 2104 Model TS4, 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 or Model TS4 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 or Model TS4.

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 or Model TS4

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 or Model TS4. See Figure 1.
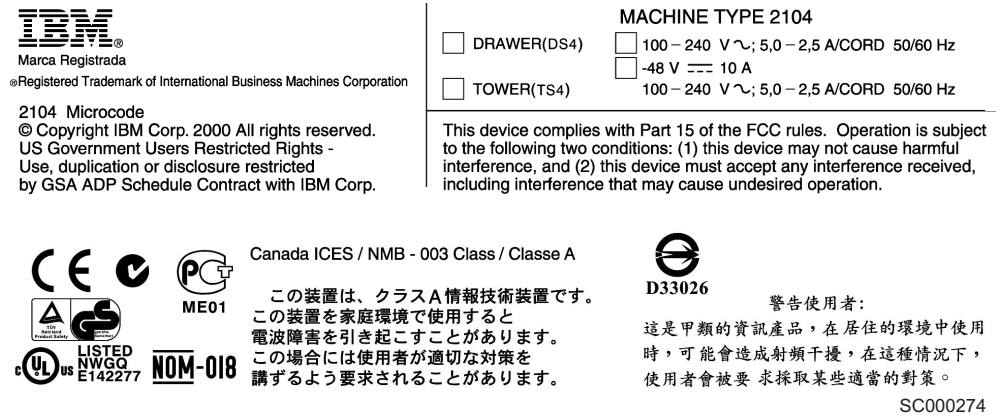
Figure 1. 2104 Model DS4 or Model TS4 label

2. Verify that the linecord caution label is installed on the 2104 Model DS4 and Model TS4 power supply. See Figure 2.

   CAUTION:
   This unit might have two linecords. To remove all power, disconnect both linecords. (1)
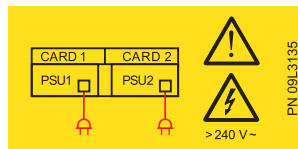
Figure 2. Linecord caution label

3. Verify that the power supply cover caution label is installed on the 2104 Model DS4 and Model TS4 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 and Model TS4 power supply. See Figure 4.
   CAUTION:
   Double Pole/Neutral Fusing. (3)
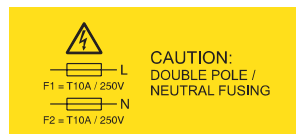
Figure 4. Fusing caution label

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)

Refer to manuals   32 Kg (70.5 lbs)

SC000220

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.

> 18 Kg (37 lbs)   > 32 Kg (70.5 lbs)

SC000334

6. Verify that the weight label is installed on the 2104 Model TS4. See Figure 6.

    CAUTION:

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

SC000219

Figure 6. 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.

> 18 Kg (37 lbs)   > 32 Kg (70.5 lbs)

SC000325

7. Verify that the standby condition label is installed on the 2104 Model DS4 and Model TS4. See Figure 7.

   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)
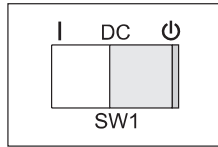
Figure 7. Standby condition label

Checking the grounding of the 2104 Model DS4 or Model TS4

This section contains instructions for checking the grounding of the 2104 Model DS4 or Model TS4.

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 8. 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.
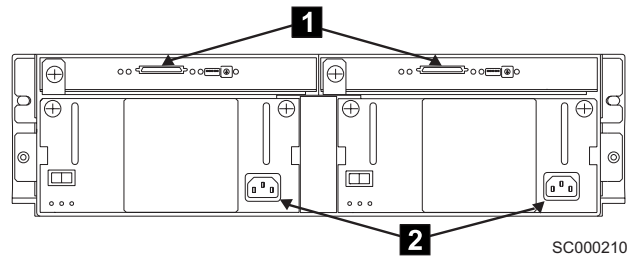
Figure 8. Power cables and SCSI connectors on the 2104 Model DS4

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 9.
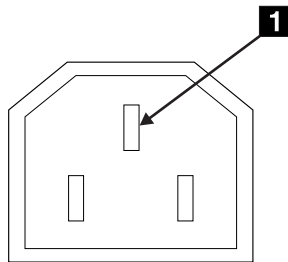
Figure 9. Ground pin (220 V 2104 Model DS4)

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 10.
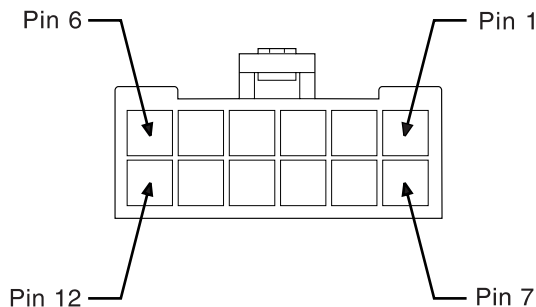
Figure 10. Ground pins (-48 V 2104 Model DS4)

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.

Checking the grounding of the 2104 Model TS4

Perform the following steps to check the grounding of the 2104 Model TS4:

1. Ensure that a power cable is plugged into each power socket **1** . See Figure 11.

SC000230
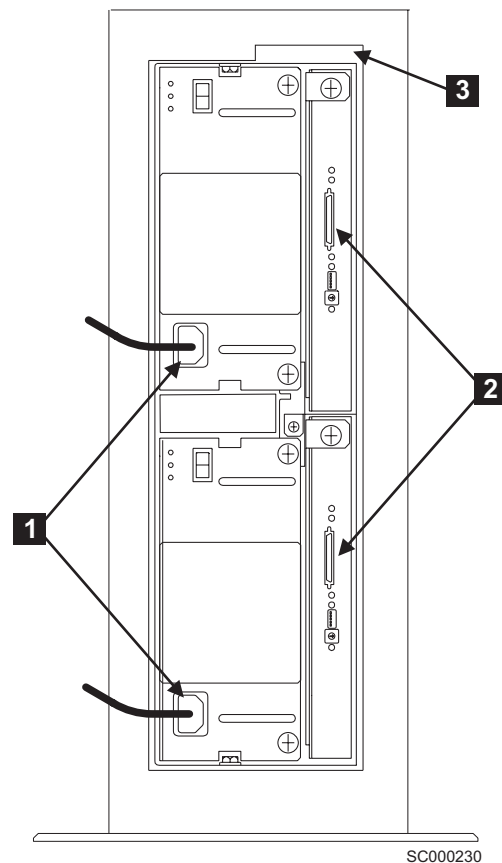
Figure 11. Power cables and SCSI connectors (2104 Model TS4)

2. Ensure that the other ends of the power cables are *not* plugged into electrical power outlets. Unplug the cables if necessary.

3. **Attention:** Some electrical circuits could be damaged if the external SCSI cables are connected to the 2104 Model TS4 while the grounding check is being done.

   Ensure that no external SCSI cables are connected at the SCSI connectors **2** . See Figure 11 on page xxiii.

4. Check for continuity between the chassis of the 2104 Model TS4 **3** and the ground pin of each power cable.

   a. Check the power cables and ensure that the third-wire ground connector is in good condition.

   b. Use a meter to check that the third-wire ground continuity is 0.1 ohm or less between the external ground pin and the chassis ground.

5. If the continuity is good, the grounding check is complete.

6. If the grounding is not correct, unplug the power cables from the mainline power connectors.

   a. Check each power cable for continuity.

   b. If either power cable is failing, exchange it for a new one.

   c. Check for continuity between the chassis of the 2104 Model TS4 and the ground pin **1** of the power connector on each fan-and-power-supply assembly. See Figure 12.
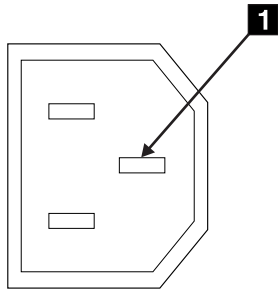
Figure 12. Ground pin (2104 Model TS4)

   d. If either fan-and-power-supply assembly does not have continuity, exchange that assembly for a new one. (See the section about fan and power supply assemblies in *Expandable Storage Plus 2104 Model DS4 and Model TS4 Service Guide*.)

   Perform step 1 on page xxiii through step 6d to complete the grounding check again.

Removing power from the 2104 Model DS4 or Model TS4

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 13.

   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.
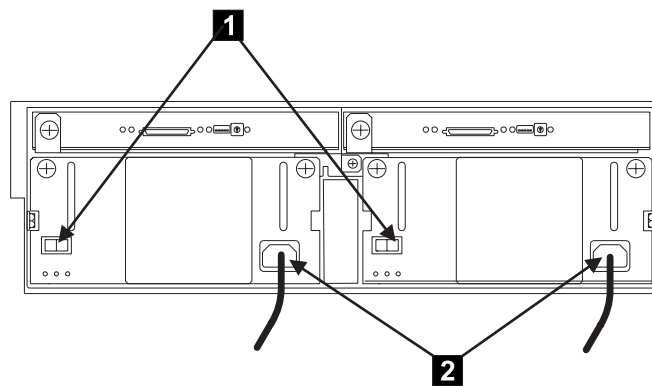
SC000206

Figure 13. 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 13 on page xxv.

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*.

Removing power from a 2104 Model TS4

Note: Unless you have a particular reason to do so, do not remove power from the host system or from the 2104 Model TS4 unless the instructions that you are following tell you to.

Perform the following steps to remove the power from a 2104 Model TS4:

1. Verify with the customer that all operations between the 2104 Model TS4 and the host system have stopped.
2. At the back of the 2104 Model TS4, set the dc on/standby switch **1** of each fan-and-power-supply assembly to standby. See Figure 14 on page xxvii.

   Notes:
   a. Some 2104 Model TS4s 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.

SC000207
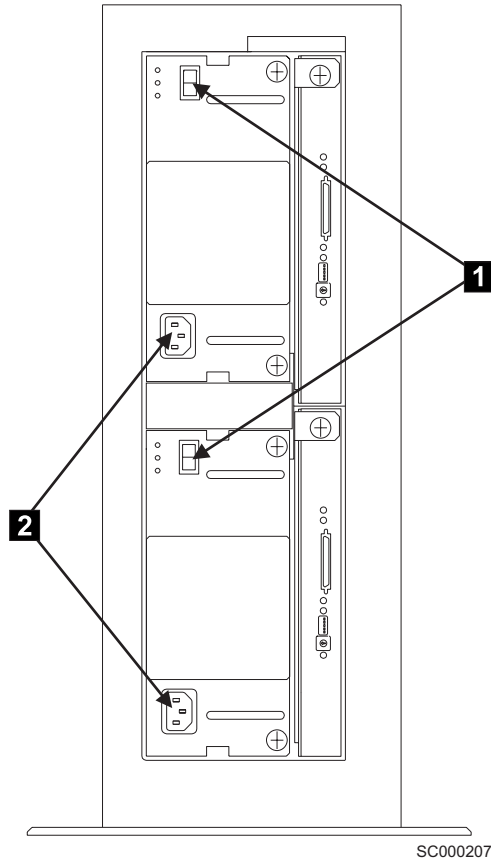
Figure 14. Removing power from a 2104 Model TS4

3. Remove the power cables **2** from the electrical power outlet and from the back of the 2104 Model TS4. See Figure 14.

4. Perform the following steps to return power to the 2104 Model TS4:

   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 TS4. For more information, see the sections about the drive autostart switch and the delay motor start mode switch in *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)
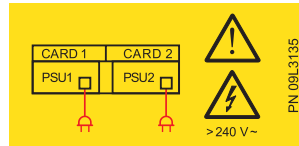
Figure 15. Linecord caution label

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

Figure 16. Power supply cover caution label

CAUTION:
Double Pole/Neutral Fusing. (3)
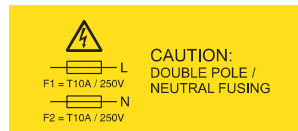
Figure 17. Fusing caution label

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

Figure 18. 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.

> 18 Kg (37 lbs)   > 32 Kg (70.5 lbs)

SC000334

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

Figure 19. 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.


> 18 Kg (37 lbs)   > 32 Kg (70.5 lbs)

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)**
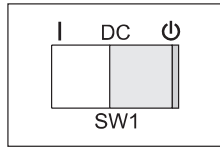
Figure 20. Location of standby condition

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 document introduces the Expandable Storage Plus 2104 Model DS4 and Model TS4 (hereafter referred to as the 2104 Model DS4 and Model TS4).

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

Who should read this document

This publication is intended for service representatives who service the 2104 Model DS4 and Model TS4 disk subsystems. The term *service representative* applies to the person who is authorized by your organization to maintain your 2104 Model DS4 or Model TS4.

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

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 Information for Multiple Bus Systems*, 86 A1 27HX

Chapter 1. Reference information

You can attach the Expandable Storage Plus: 2104 Model DS4 and Model TS4 subsystems (see Figure 21) to any RS/6000™ or IBM™ @server™ pSeries computer that provides support for Small Computer System Interfaces (SCSIs). The 2104 Model DS4 **1** is a rack mounted unit that you can install into a standard Electrical Industries Association (EIA) 19-inch rack, a 7104 Model T00 rack, or a 7104 Model T42 rack. The 2104 Model TS4 **2** is a deskside unit.
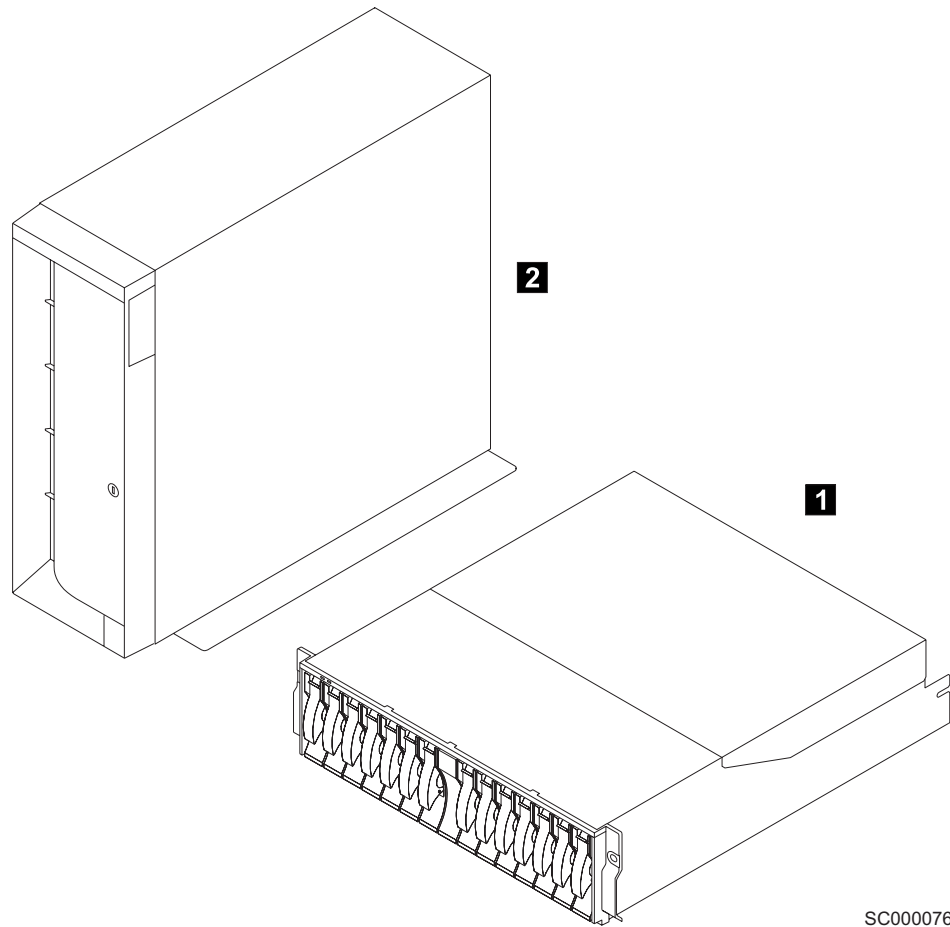
SC000076

Figure 21. 2104 Model DS4 and Model TS4 subsystems

The 2104 Model DS4 or Model TS4 can contain up to 14 SCSI disk drive modules. These modules can be a mixture of various types, which vary in size (see Chapter 4, "Parts catalog", on page 103).

You can disconnect a 2104 Model DS4 or Model TS4 from its related SCSI attachments (for example, SCSI adapters) while the host system is running. You can also remove and replace most of the field-replaceable units (FRUs) from the 2104 Model DS4 or Model TS4 while the 2104 Model DS4 or Model TS4 and the host system are running. For a list of those FRUs, see "Concurrent maintenance" on page 55.

The 2104 Model DS4 or Model TS4 has two fan-and-power-supply assemblies, or one fan-and-power-supply assembly and one fan assembly, to provide all the

1

necessary power and cooling. It also has up to two SCSI interface cards, which monitor and control the various functions of the 2104 Model DS4 or Model TS4 (see also "Functions that the SCSI interface cards perform" on page 3). Each SCSI interface card can be accessed to collect enclosure information only if it is connected to a SCSI attachment.

You can configure the 2104 Model DS4 or Model TS4 to the host system as a device, if applicable. See "Configuring a 2104 Model DS4 or Model TS4 to an AIX host system" on page 111 for more information. When a 2104 Model DS4 or Model TS4 is configured as a device:

- Errors that are detected in the 2104 Model DS4 or Model TS4 are collected by the diagnostics.
- Vital product data (VPD) for the 2104 Model DS4 or Model TS4 is accessible.

Most FRUs contain VPD information. A host system can access the VPD data while the 2104 Model DS4 or Model TS4 is being configured.

Enclosure configuration information is stored in several locations in the 2104 Model DS4 or Model TS4 to allow concurrent replacement of FRUs. When you install a new FRU, any special configuration information that is required by that FRU is read from other locations in the 2104 Model DS4 or Model TS4. That information is then used to update the new FRU. Always exchange FRUs one at a time to ensure that the configuration is not corrupted or changed.

Functions that the SCSI interface cards perform

The SCSI interface card of the 2104 Model DS4 or Model TS4 can perform the following functions:

- Provide SCSI Enclosure Services (SES)
- Read the VPD from the backplanes and the fan-and-power-supply assemblies
- Control the Subsystem Check light and the disk drive module Check lights
- Control the speed of the fan or the fan-and-power-supply assemblies
- Monitor the Emergency Power Off Warning (EPOW) signal from the power supply assembly or assemblies. If an EPOW signal occurs, the SCSI interface card sends a SCSI Reset signal to all the disk drive modules.
- Provide support for the hot plugging of the disk drive modules
- Monitor itself. The SCSI interface card detects a self-failure if:
  - The microprocessor fails.
  - An SES function fails.
  - The enclosure temperature is outside the specified limits.
- Provide support for SCSI Ultra320 MB per second operation, Low Voltage Differential mode

  Note: It does not provide support for Single Ended (SE) mode.

If the 2104 Model DS4 or Model TS4 has two SCSI interface cards, each SCSI interface card can be accessed to collect enclosure information only if it is connected to a SCSI attachment. If both cards are operational, the SES-active card provides all the functions described previously. The other card only detects self-failure and drives the internal SCSI bus.

Error logging support

Errors that the 2104 Model DS4 or Model TS4 detect are not automatically logged to the system error log.

To collect error data, run diagnostics. For more details, see "Collecting Errors" in Appendix A, "Additional information for RISC systems".

Configurations

Each SCSI interface card can be attached to only one host system. A 2104 Model DS4 or Model TS4 that has one SCSI interface card can, therefore, be attached to only one host system. A 2104 Model DS4 or Model TS4 that has two SCSI interface cards can be attached to two host systems. No SCSI terminators are needed.

-48 volt power supply (2104 Model DS4 only)

The -48 volt power supply feature provides power supply assemblies that allow a 2104 Model DS4 to be connected to -48 V power sources. The 2104 Model DS4 must be connected to two separate power sources to ensure that operations are not interrupted if one power source fails. The -48 V power distribution panel in the rack provides the power sources and the power cables. For details about how to connect a 2104 Model DS4 to a -48 V power source, see the *2104 Model DS4 Installation Guide*.

Attention: Both power supply assemblies in a 2104 Model DS4 must be of the same voltage rating. Do not mix power supply assemblies of different voltage ratings.

Lights and switches

The 2104 Model DS4 or Model TS4 have the following lights and switches:

- Subsystem lights
- SCSI interface card lights
- Fan-and-power-supply assembly lights and switch
- Fan assembly light
- SCSI card switches
- Disk drive module lights

Figure 22 shows the lights and switches on the 2104 Model DS4. Figure 23 shows the lights and switches on the 2104 Model TS4.
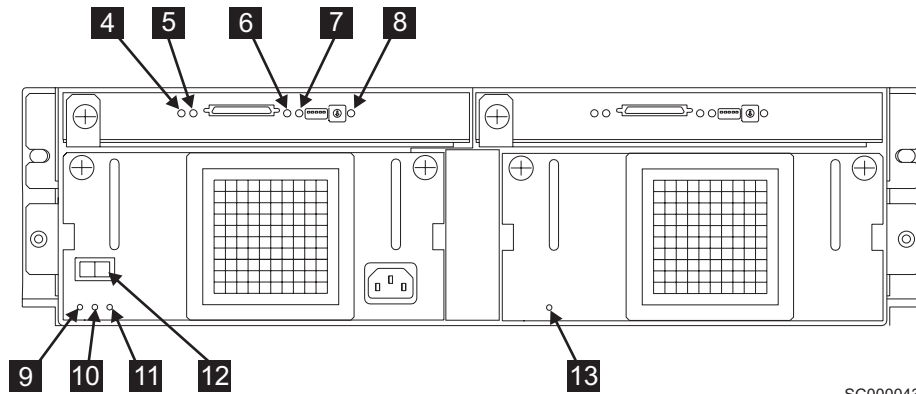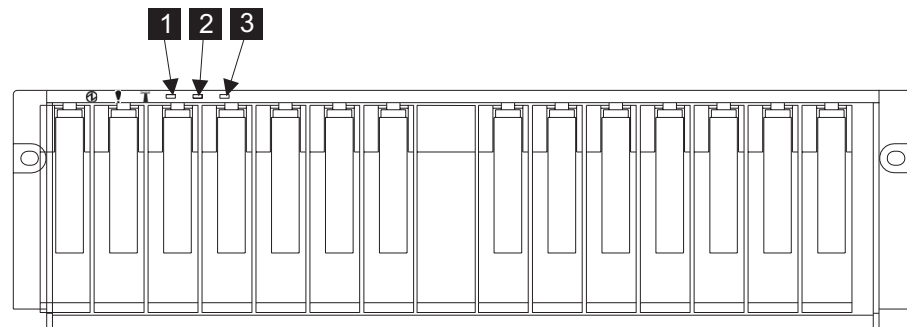
Figure 22. Lights and switches on the 2104 Model DS4

SC000043
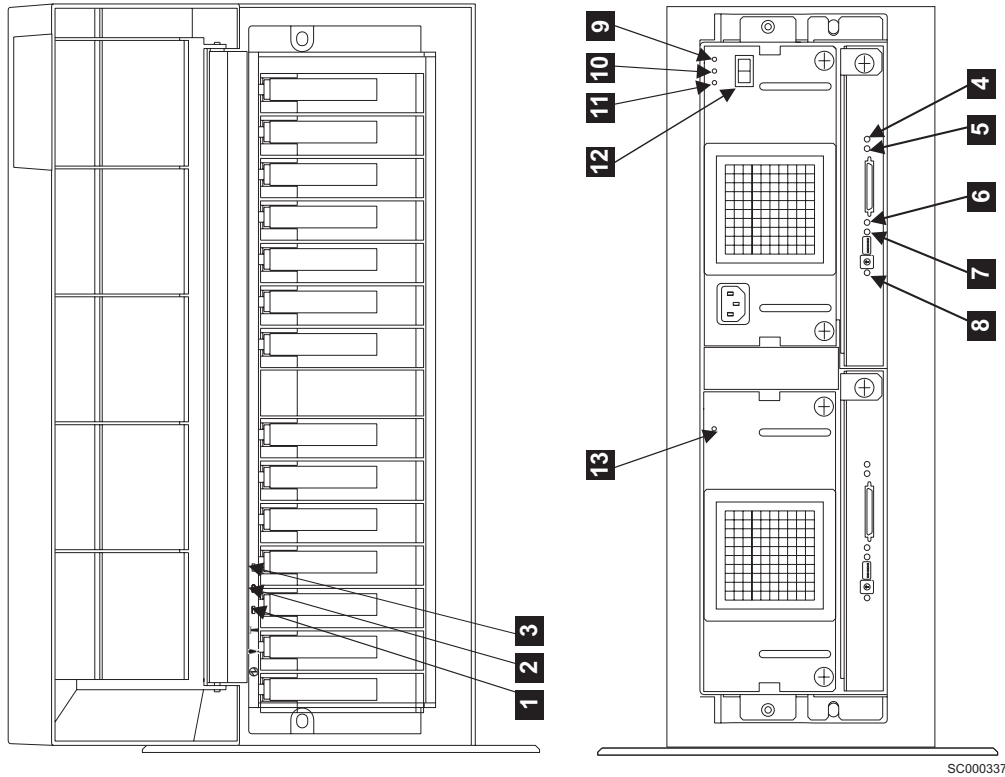
Figure 23. Lights and switches on the 2104 Model TS4

Subsystem lights

To identify the lights that this section describes, see Figure 22 on page 5 and Figure 23 on page 6.

The Subsystem Power light and Subsystem Check light are located on the backplane assembly. The lights are made visible by light pipes that pass through the bezel at the front of the 2104 Model DS4 or Model TS4. The Unit Identify light is not used at this time.

Subsystem Power light **1** :
This green light is on continuously when dc voltage is present in the 2104 Model DS4 and Model TS4.

Subsystem Check light **2** :
This amber light comes on continuously if a failure occurs in the 2104 Model DS4 and Model TS4. The 2104 Model DS4 and Model TS4 might be able to continue operating satisfactorily although the failure of a particular part has been detected. The light flashes when a service aid identifies a disk drive module.

Note: The Subsystem Check light comes on only when dc voltage is present in the 2104 Model DS4 and Model TS4.

Unit Identify light **3** :
This blue light is off. This function is not used at this time.

SCSI interface card lights

To identify the lights that this section describes, see Figure 22 on page 5 and Figure 23 on page 6.

TERMINATOR POWER light **4** **:** This green light is on when the TERMPWR signal is present on the external SCSI connector, and the voltage is correct.

LVD light **5** **:** This green light is on for differential SCSI operation, and off for single-ended SCSI operation.

ACTIVE light **6** **:** This green light is on when a SCSI command is in progress.

SCSI RESET light **7** **:** This green light comes on when a power-on reset (POR) signal or a SCSI bus reset signal occurs.

CARD FAULT light **8** **:** This amber light comes on if the SCSI interface card fails.

Fan-and-power-supply assembly lights and switches

To identify the lights and the switch that this section describes, see Figure 22 on page 5 and Figure 23 on page 6.

AC PWR light **9** **:** This green light is on when mainline electrical power is present in the power supply assembly.

DC PWR light **10** **:** This green light is on when the power supply assembly is supplying dc power to the 2104 Model DS4 or Model TS4.

CHK light **11** **:** This amber light is on continuously if the fan-and-power-supply assembly fails or goes into Standby mode. When a power supply fails, the CHK light gets its power from the other fan-and-power-supply assembly (if present). The light can, therefore, indicate a critical power supply failure only if the 2104 Model DS4 or Model TS4 have two fan-and-power-supply assemblies.

Note: The CHK light is active only when the dc on/standby switch is set to on.

DC on/standby switch **12** **:** This switch controls the dc electrical power to the disk drive modules and other components of the 2104 Model DS4 or Model TS4. You must set switch on for the power supply and the fan unit to start.

If you do not set the dc on/standby switch on (on either fan-and-power-supply assembly, if two are present), dc power in the 2104 Model DS4 or Model TS4 is turned on automatically if all the following conditions exist:

*   Mainline power is present at the 2104 Model DS4 or Model TS4.
*   At least one fan-and-power-supply assembly is correctly installed.
*   Either the Power Control switch on the card assembly is set to on, or terminator power is active in an external SCSI connection.

Fan assembly light

To identify the light that this section describes, see Figure 22 on page 5 and Figure 23 on page 6.

CHK light **13** **:** This amber light comes on if the fan fails.

SCSI Interface card switches

Figure 24 shows the switches on the SCSI interface card.

SC000191
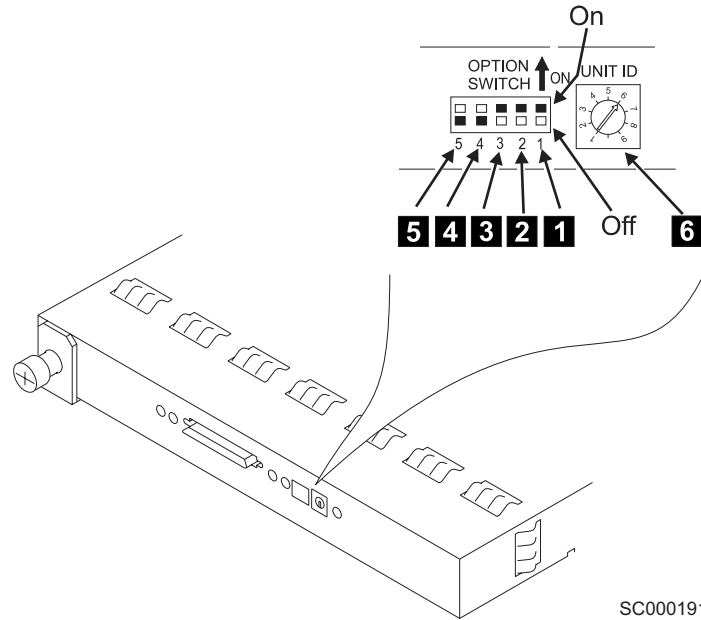
Figure 24. SCSI interface card switches

The SCSI Interface card contains the following switches that are accessible to the operator.

Note: Switch configuration is only valid on the SCSI interface card-1 and the configuration on the SCSI interface card-2 is ignored. The SCSI Interface card must be placed in the left slot (viewing from the rear) when using a single SCSI Interface card configuration.

Drive autostart switch-1 **1**

The disk drive motors are controlled by the combination of this switch and the drive autostart switch-2 **2** .

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 the disk motor startup is under the control of the host system software.

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 12 seconds by its SCSI ID. For example, the disk drive motor of a disk drive having a SCSI ID equal to two starts 24 (2 x 12) seconds after power is applied to the 2104.

When this switch 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 start when power is applied to the 2104.

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

Drive autostart switch-2 **2**

Refer to the explanation of the drive autostart switch-1 **1** .

Enable enclosure services switch `3`

When this switch is set to on, the enclosure services can operate.

When this switch is set to off, no response occurs to any request to use the enclosure services.

Note: Enclosure services are not supported for Linux for pSeries, however, it is recommended that this switch be left on to support possible use of AIX stand-alone diagnostics.

Select enclosure services switch `4`

This switch selects which enclosure services can be used - SAF-TE or SES.

When set to off, it selects SAF-TE.

When set to on, it selects SES.

Note: SAF-TE services are not used with RS/6000 or IBM @server pSeries computers.

Note: Enclosure services are not supported by Linux on pSeries servers, however, it is recommended that this switch be left on to support possible use of AIX stand-alone diagnostics.

Power control switch `5`

When this switch is set to off, the 2104 Model DS4 or Model TS4 is automatically switched off or on when the host system is switched off or on.

When this switch is set to on, the 2104 Model DS4 or Model TS4 is powered up or down by the DC on/standby switch on a fan-and-power-supply assembly.

Box ID switch `6`

This 10-position rotary switch indicates the ID of the 2104 Model DS4 or Model TS4. The operator selects the required setting that the **SES Inquiry** command and the **SAF-TE buffer 1** command can use.

Note: SAF-TE services are not used with RS/6000 or IBM @server pSeries computers.

The SCSI Interface card has other switches that are accessible only when the SCSI Interface card is removed from the 2104 Model DS4 or Model TS4. See Figure 25 on page 11 for other switches on the SCSI Interface card.
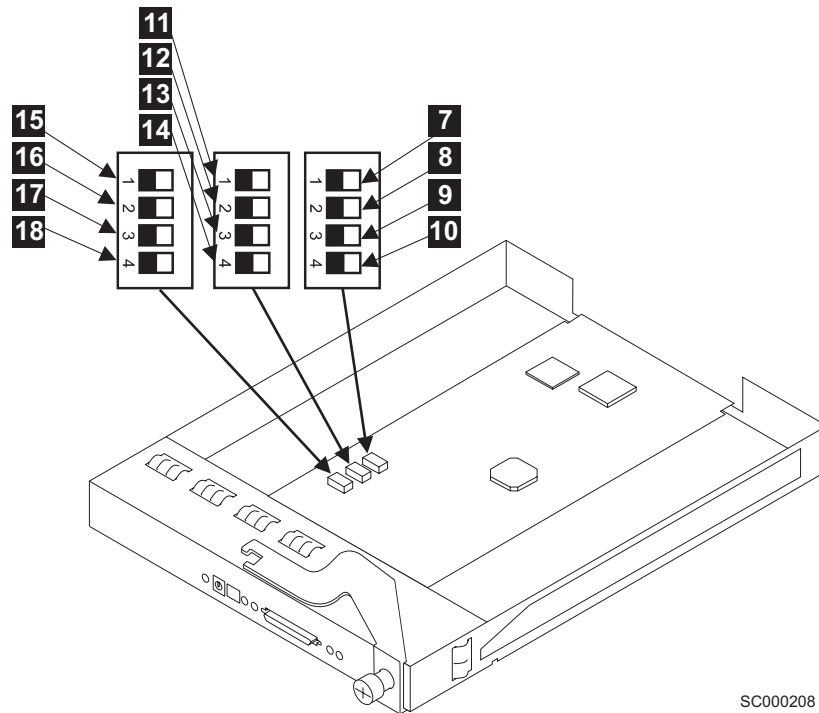
Figure 25. Other switches on SCSI interface card

Configuration switches 7 through 18

This section describes the switch settings for the SCSI bus ID configurations.

SCSI bus split control 7

This switch 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.

Drawer/tower LED switch 8

Reserved for future use. This switch should be turned off.

Enable fail over function switch 9

Reserved for future use. This switch should be turned off.

Disable SCSI ID6 switch 10

The SCSI ID6 is automatically disabled and removed from the system when all of the following conditions are met:

- This switch is turned off.
- Two SCSI interface cards are installed with single bus configuration.
- Two hosts are connected to the 2104 Model DS4 or Model TS4 and both are powered on.

When two SCSI Interface cards are installed and the 2104 Model DS4 or Model TS4 is configured for single-bus mode, an ID conflict exists if a drive is installed in the slot of SCSI ID 6. The 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 ID6, there will be an ID conflict between the HBA 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 SCSI ID6 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 continuously remains in RESET under these conditions until power is removed and the disable ID6 switch is turned on.

Switches 11 through 18

These switches must always be set to off in a 2104 Model DS4 or Model TS4. These switches are not intended for user configuration.

Disk drive module lights

Figure 26 shows the lights on the disk drive modules.
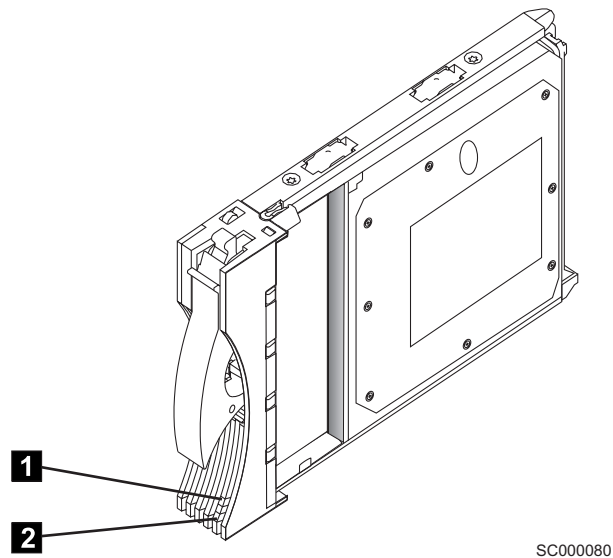
SC000080

Figure 26. Disk drive module lights

The disk drive module lights (LEDs) are located on the backplane of the 2104 Model DS4 or Model TS4. They are made visible by light pipes that pass through the disk drive module.

1 **Activity light:** When on, this green light shows that a SCSI command is in progress.

2 **Check light:** This amber light shows the following conditions:

Status of Light	Meaning
Off	Normal operating condition.
Permanently on	One of the following conditions exists:
	• If a disk drive module is present, the service aid has set **Remove** (see "SCSI device identification and removal" in "Appendix A, "Additional information for RISC systems"").
	• If a disk drive module is not present, the service aid has set **Insert** (see "SCSI device identification and removal" in "Appendix A, "Additional information for RISC systems"").
	• The disk drive has reported a Predictive Failure Analysis (PFA) error. This error indicates that the disk drive has had an excessive number of internally recovered errors.
	• The disk drive module is failing.
Slow flash (two seconds on, two seconds off)	The Check light has been set by a service aid to identify the position of this particular disk drive module.
Fast flash (0.25 seconds on, 0.25 seconds off)	The disk drive module is a member of a RAID array, and is being rebuilt. (This action is a SAF-TE function.)

Parts locations

This section has two subsections: one is for the 2104 Model DS4, the other is for the 2104 Model TS4.

Parts locations for a 2104 Model DS4

The 2104 Model DS4 (shown as Figure 27) can have two fan-and-power-supply assemblies or one fan-and-power-supply assembly and one fan assembly. Either assembly can be installed in either position 1 or position 2.

The disk drive modules are numbered 1 through 14 from left to right.

1	Frame assembly	**5**	Fan-and-power-supply assembly or fan assembly (position 1)
2	Disk drive modules	**6**	SCSI interface card assembly or dummy card assembly (position 2)
3	SCSI bus bridge card assembly	**7**	SCSI interface card assembly (position 1)
4	Fan-and-power-supply assembly or fan assembly (position 2)		

SC000081

Figure 27. Parts locations on the 2104 Model DS4

Parts locations for a 2104 Model TS4

The 2104 Model TS4 (shown as Figure 28) can have two fan-and-power-supply assemblies or one fan-and-power-supply assembly and one fan assembly. Either assembly can be installed in either position 1 or position 2.

The disk drive modules are numbered 1 through 14 from bottom to top.

1	Frame assembly	**5**	Fan-and-power-supply assembly or fan assembly (position 1)
2	Disk drive modules	**6**	SCSI interface card assembly or dummy card assembly (position 2)
3	SCSI bus bridge card assembly	**7**	SCSI interface card assembly (position 1)
4	Fan-and-power-supply assembly or fan assembly (position 2)		

SC000082

Figure 28. Parts locations on the 2104 Model TS4

Connectors

This section shows the locations of the external connectors on the 2104 Model DS4 and Model TS4.

Back connectors on a 2104 Model DS4

The 2104 Model DS4 that is shown in Figure 29 has two SCSI interface cards and two fan-and-power-supply assemblies. A 2104 Model DS4 that has only one SCSI interface card has only one SCSI connector. A 2104 Model DS4 that has one fan-and-power-supply assembly and a fan assembly has only one mainline power connector.

1	SCSI connectors
2	Mainline power connectors

SC000012
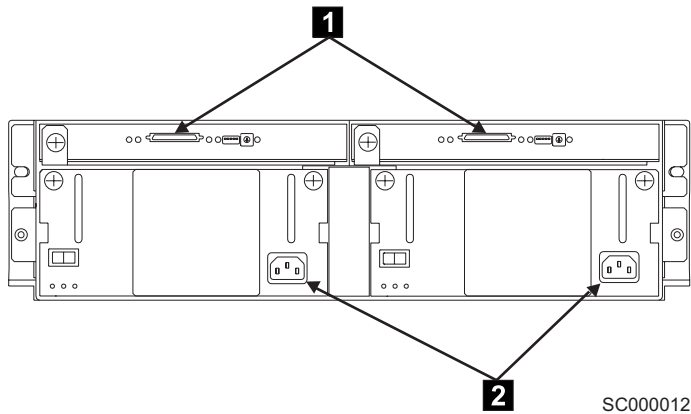
Figure 29. Back connectors on the 2104 Model DS4

Back connectors on a 2104 Model TS4

The 2104 Model TS4 that is shown in Figure 30 has two SCSI interface cards and two fan-and-power-supply assemblies. A 2104 Model TS4 that has only one SCSI interface card has only one SCSI connector. A 2104 Model TS4 that has one fan-and-power-supply assembly and a fan assembly has only one mainline power connector.

1	Mainline power connectors
2	SCSI connectors

SC000013
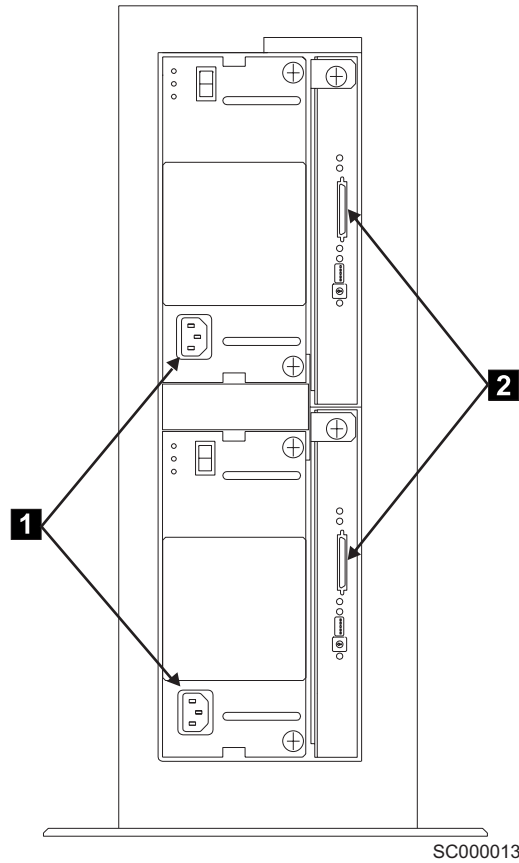
Figure 30. Back connectors of the 2104 Model TS4

Mainline power connector (220 V ac)

This type of connector is on each fan-and-power-supply assembly. It permits the 2104 Model DS4 or Model TS4 to be connected to a mainline power source. Figure 31 shows the connector for a 2104 Model DS4 (left) and for a 2104 Model TS4 (right).

1	Ground
2	Neutral
3	Live
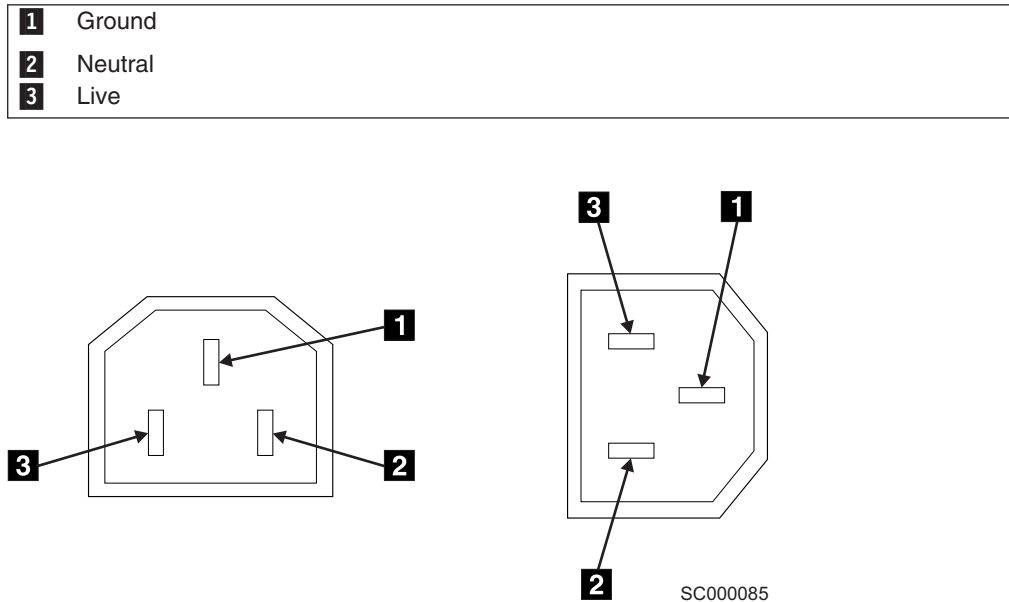
Figure 31. Mainline-power connector (220 V ac)

Mainline power connector (2104 Model DS4, -48 V dc)

This type of connector is on each -48 V power supply assembly. Figure 32 shows the pin locations.
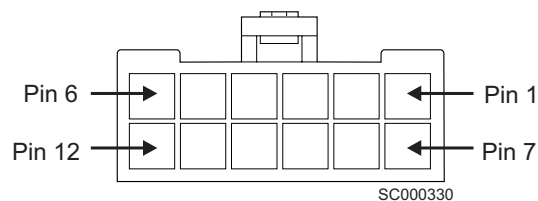
Figure 32. Mainline power connector (-48 V dc)

Table 1. Mainline power connector (2104 Model DS4, -48 V dc pin assignments

Pin	Assignment	Pin	Assignment
1	Frame ground	7	Frame ground
2	Not used	8	Not used
3	-48 V return (0 V)	9	-48 V return (0V)
4	-48 V return (0 V)	10	-48 V return (0V)
5	-48 V in	11	-48 V in
6	-48 V in	12	-48 V in

Labels

Figure 33 shows the location of the serial number labels on the 2104 Model DS4 and Model TS4 and the disk drive module.

1	Serial number (2104 Model DS4)
2	Serial number (2104 Model TS4)
3	Serial number, size, and type(disk drive module)

IBM 18.2 GB 10K
U320 S/N XXXXXXXX
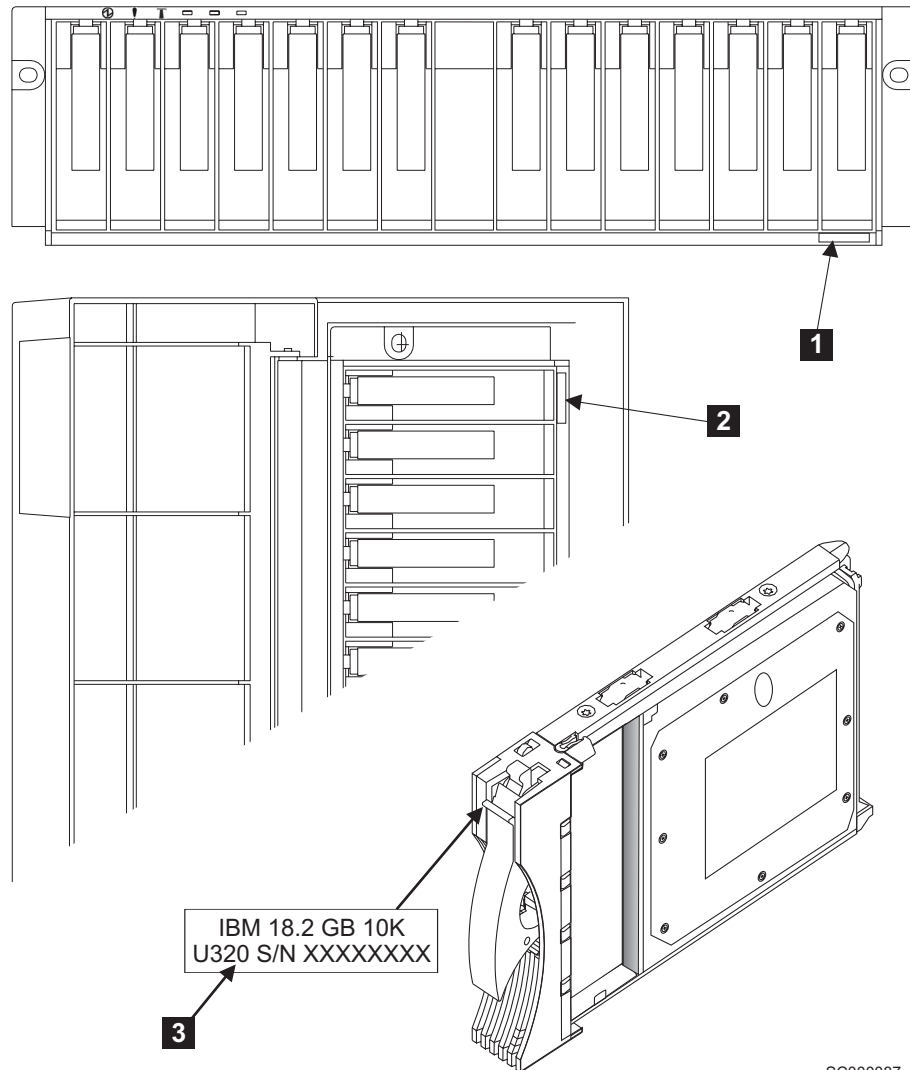
SC000087

Figure 33. Serial number labels

Product characteristics

The following tables describe the weight, voltage, operating range and operating altitudes for the 2104 Model DS4 and Model TS4.

Table 2 describes the dimensions and weight of the 2104 Model DS4.

Table 2. Dimensions and weight of the 2104 Model DS4.

Height	Width	Depth	Approximate Minimum Weight	Approximate Maximum Weight
128 mm	445 mm	552 mm	21.5 kg	37.4 kg
(5 in.)	(18 in.)	(22 in.)	(48 lb)	(83 lb)

Table 3 describes the dimensions and weight of the 2104 Model TS4.

Table 3. Dimensions and weight of the 2104 Model TS4

Height	Width at Foot	Depth	Approximate Minimum Weight	Approximate Maximum Weight
529 mm	281 mm	594 mm	39.3 kg	54.7 kg
(21 in.)	(11 in.)	(23.5 in.)	(87 lb)	(121 lb)

Table 4 describes the power and electrical requirements for the 2104 Model DS4 and Model TS4.

Table 4. AC and DC input voltage requirements for the 2104 Model DS4 and Model TS4

Power Supply Assembly Type	Voltage	Frequency
220 V	100 to 240 V ac	47 to 63 Hz
-48 V	-40 to -60 V dc	–

Table 5 describes the safe temperature and humidity environments for the 2104 Model DS4 and Model TS4.

Table 5. Environmental limits for the 2104 Model DS4 and Model TS4.

	Operating Environment	Nonoperating Environment	Storing Environment	Shipping Environment
Air temperature	10°C to 40°C (50°F to 104°F)	10°C to 52°C (50°F to 125°F)	1°C to 60°C (34°F to 140°F)	-40°C to 60°C (-40°F to 140°F)
Relative Humidity	8% to 80% noncondensing	8% to 80% noncondensing	5% to 80% noncondensing	5% to 100% condensing but not precipitating
Maximum wet bulb	27°C (80°F)	27°C (80°F)	29°C (84°F)	29°C (84°F)

Notes:

1. Each rack-mounted 2104 Model DS4 requires an airflow of 1.1 m³ per minute (40 ft³ per minute). When you install several racks together that contain many

2104 Model DS4s, 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. Position racks in alternate rows, back to back and front to front to prevent the air that is leaving the rack from entering the intake of another piece of equipment.
- Position the front of racks on floor-tile seams, with a full line of perforated tiles immediately in front of the racks.
- Leave a gap of at least 1220 mm (48 in) separating the rows where racks are in rows front-to-front or back-to-back.
- Use rack filler plates in unused positions to ensure correct air flow within each rack. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 2104 Model DS4.

2. The recommended operating temperature is 22°C (72°F) or lower.

Table 6 describes the safe altitude range for the 2104 Model DS4 or Model TS4.

Table 6. Altitude limits

	Operating Environment	Nonoperating Environment	Storing Environment	Shipping Environment
Altitude (from sea level)	0 to 2133 m (0 to 7000 ft)	-305 to 12 192 m (-1000 to 40 000 ft)	-305 to 12 192 m (-1000 to 40 000 ft)	-305 to 12 192 m (-1000 to 40 000 ft)

Table 7 describes the heat output for a maximum configuration of 10 disk drive modules for the 2104 Model DS4 and Model TS4.

Table 7. Heat output (maximum) for the 2104 Model DS4 and Model TS4

Maximum configuration (14 disk drive modules)	330 watts (1126 BTU per hour)

Disk drive acclimation

If you bring a disk drive module into the operating environment from an environment where the temperature is outside the specified operating range (see Table 5), allow the disk drive module time to acclimate to the operating environment (approximately 2 hours). Remove the disk drive module from any shipping packaging, but leave it in its sealed plastic bag (if present) to prevent condensation forming.

Power sequencing

You can configure the power sequencing of the 2104 Model DS4 or Model TS4. For more information, see "Drive autostart switch-1" on page 9.

SCSI addresses

Each disk drive module is identified to the host system by a SCSI address. This address is related to the slot in which the disk drive module is installed.

Table 8 shows the SCSI addresses of the slots.

Note: In the 2104 Model DS4, slot 1 is the left most slot (viewed from the front of the 2104 Model DS4). In the 2104 Model TS4, slot 1 is the bottom most slot (viewed from the front of the 2104 Model TS4).

Table 8. SCSI addresses of disk drive module slots

Disk drive module slot	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Device SCSI address	0	1	2	3	4	5	6	8	9	10	11	12	13	14

Note: When you configure the 2104 Model DS4 or Model TS4 for single SCSI bus mode with two SCSI attachments, SCSI addresses 5 and 6 cannot be used; that is, disk drive module slots 6 and 7 must contain dummy disk drive modules.

Note: Linux for pSeries server configurations do not support single SCSI bus with two SCSI attachments.

The SCSI enclosure services (SES) use address 15 if the Enable Enclosure Services switch is set to on (see Figure 24 on page 9).

Attention: The SCSI address of the SCSI attachment that is connected to the 2104 Model DS4 or Model TS4 must be different from the addresses of the installed disk drive modules. When a second SCSI attachment is connected to a 2104 Model DS4 or Model TS4, the SCSI address of that SCSI attachment must be different from the address of the first SCSI attachment and different from the addresses of the installed disk drive modules.

SCSI bus configurations and addresses

The SCSI bus bridge card assigns the disk drive modules to a SCSI bus as determined by the setting of the SCSI Bus Split switch that is on the card assembly. The following three SCSI bus modes are available:

- Single bus, one SCSI attachment (for example, a SCSI adapter in the host system. See Figure 34.): SCSI address 7 is assigned to the SCSI attachment. The 2104 Model DS4 or Model TS4 can have 14 disk drive modules (SCSI addresses 0 through 6, and 8 through 14).

- Single bus, two SCSI attachments (see Figure 35 on page 24): SCSI address 5 is assigned to one SCSI attachment; SCSI address 6 is assigned to the other. SCSI address 7 is reserved. The 2104 Model DS4 or Model TS4 can have 12 disk drive modules (SCSI addresses 0 through 4, and 8 through 14). The slots whose SCSI addresses are 5 and 6 must contain dummy disk drive modules. See see "SCSI addresses" on page 22.

  Note: Linux for pSeries servers does not support this configuration.

- Dual bus, two SCSI attachments (see Figure 36 on page 25): Each SCSI attachment has SCSI address 7. Each SCSI bus can have seven disk drive modules (SCSI addresses 0 through 6, and 8 through 14).

When single bus mode and two SCSI attachments are configured, SCSI addresses 5 and 6 are used by a SCSI attachment. Always install dummy disk drive modules into the slots that have SCSI addresses 5 and 6 (see "SCSI addresses" on page 22).
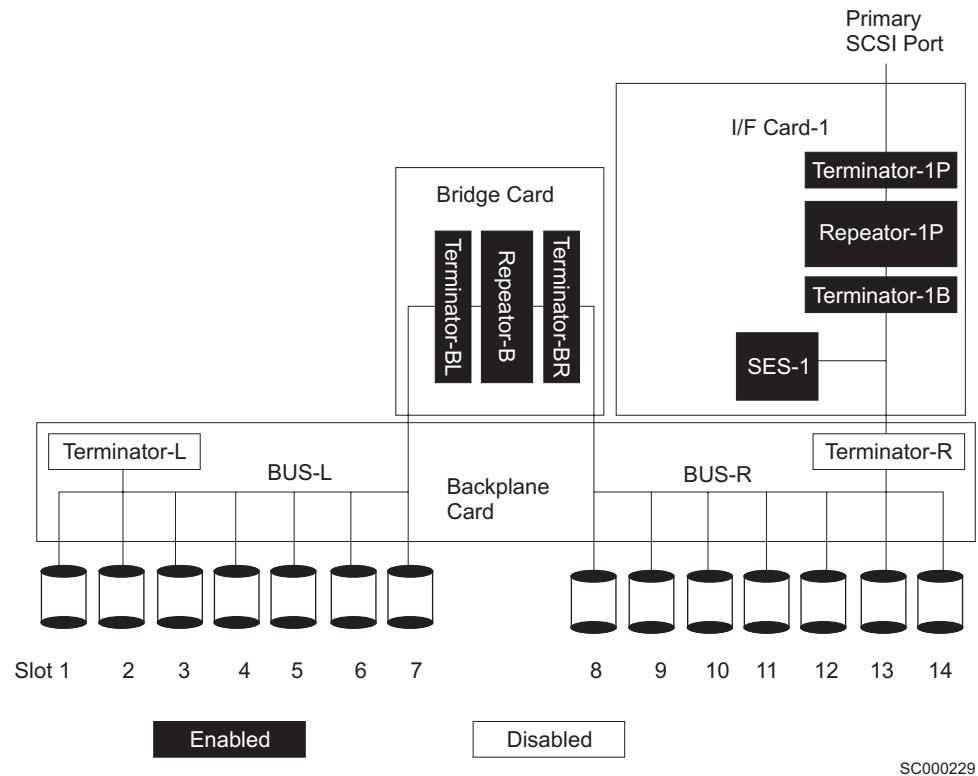
Figure 34. Single bus, one SCSI attachment, 14 disk drive modules
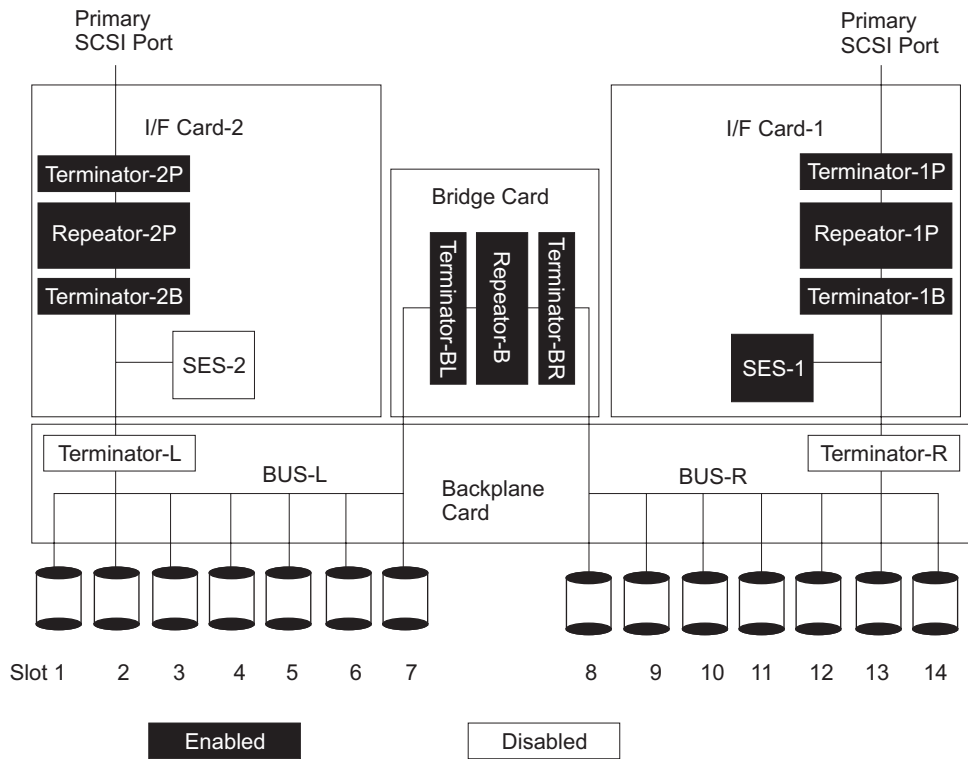
Figure 35. Single bus, two SCSI attachments, 12 disk drive modules

Notes:

1. Disk drive module slots 6 and 7 (SCSI addresses 5 and 6) must contain dummy disk drive modules.
2. The two host bus adapters cannot both have the same SCSI address.
3. This configuration is not supported in Linux for pSeries servers.
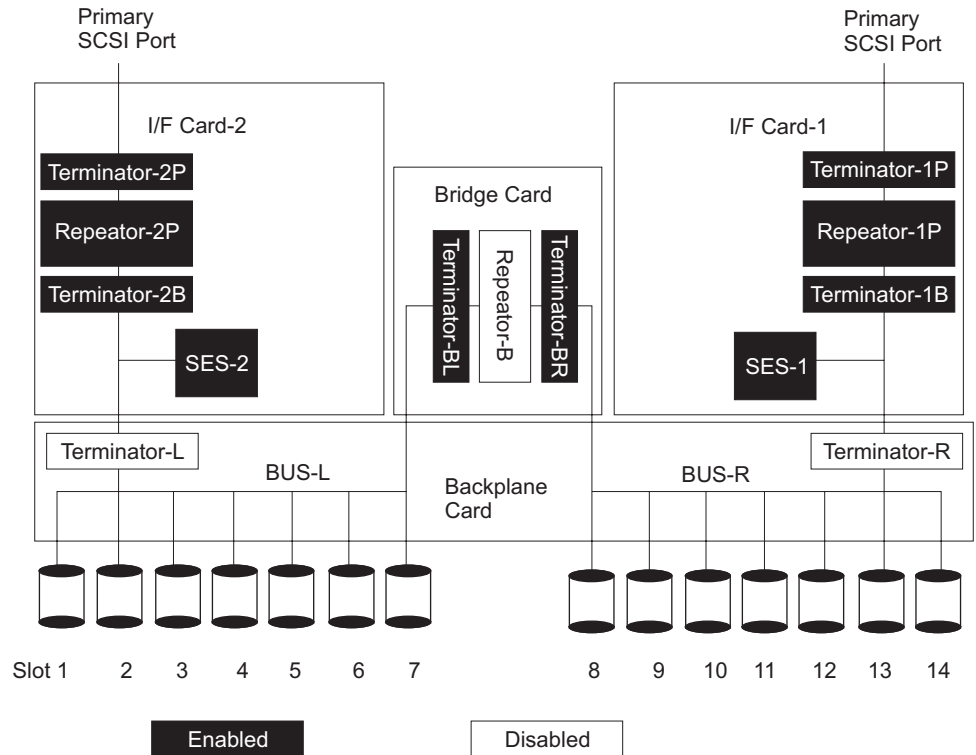
Figure 36. Dual bus, two SCSI attachments, seven disk drive modules x 2

Microcode maintenance

When a new level of SCSI interface card microcode or disk drive microcode becomes available, that microcode and the appropriate installation instructions are put onto the Web support page (see Web sites in Appendix A, "Additional information for RISC systems"). The supplied installation instructions ensure that the microcode is downloaded to the correct location.

To update the 2104 Model DS4 or Model TS4 vital product data (VPD) that is held in the host system, you might need to reconfigure the 2104 Model DS4 or Model TS4 to the host system. For more details, see Configuring a 2104 Model DS4 or Model TS4 to an AIX host system in Appendix A, "Additional information for RISC systems".

Vital product data

You can display the VPD for the 2104 Model DS4 or Model TS4 by using the AIX service aids or by running the appropriate list config command. This section shows the types of information that are contained in the VPD.

The following abbreviations are used in this section:

FRU   Field-replaceable unit

RAM   Random-access memory

ROM   Read-only memory

ROS   Read-only storage

SCSI   Small computer systems interface

SCSI disk drives

SCSI disk drive VPD data:

Manufacturer	Manufacturer and plant code
Machine type and model	Type and model
Part number	Disk drive part number
ROS Level and ID	ROM and RAM code load part number
Serial number	Disk enclosure serial number
EC level	Disk enclosure engineering change level
FRU number	FRU part number
Device Specific Z0	
Device Specific Z1	
Device Specific Z2	
Device Specific Z3	
Device Specific Z5	
Device Specific Z6	

2104 Model DS4 and Model TS4

Machine VPD data:

Manufacturer	Manufacturer and plant code
Machine type and model	Type and model
ROS Level and ID	ROM code load part number
Device Specific (Z0)	

Service aids

Service aids are available for the 2104 Model DS4 or Model TS4. For descriptions, see "System service aids" in Appendix A, "Additional information for RISC systems".

Service inspection guide

This service inspection guide helps you to identify possible unsafe conditions on the 2104 Model DS4 or Model TS4. Each 2104 Model DS4 or Model TS4 has the necessary safety items installed to protect users and service personnel from injury. This guide addresses only those items. You should use your good judgment, however, to identify possible safety hazards that are not covered by this guide.

If any unsafe conditions are present, you must determine how serious the possible hazard could be, and whether you should continue without first correcting the problem.

Consider the following conditions and the safety hazards they present:

Electrical hazards (especially primary power)
> Primary voltage on the frame can cause serious or lethal electrical shock.

Mechanical hazards
> Loose or missing items (for example, nuts and screws) can cause serious injury.

Inspection checklist

Use the following inspection checklist as a guide to inspect the 2104 Model DS4 or Model TS4 for unsafe conditions. See, if necessary, any suitable safety publications.

1. Remove all power from the 2104 Model DS4 or Model TS4 (see "Removing and replacing power to the 2104 Model DS4 or Model TS4" on page 59).
2. Check the frame for damage (loose, broken, or sharp edges).
3. Check the power cables and ensure that:
   a. The third-wire ground connector is in good condition. Use a meter to check that the third-wire ground continuity is 0.1 ohm or less between the external ground pin and the frame ground.
   b. The insulation is not worn or damaged.
4. Check for any obvious nonstandard changes. Use good judgment about the safety of any such changes.
5. Check inside the 2104 Model DS4 or Model TS4 for any obvious unsafe conditions, such as metal particles, water or other fluids, or marks of overheating, fire, or smoke damage.
6. Check for worn, damaged, or pinched cables.
7. Ensure that the voltage specified on the product-information label matches the specified voltage of the electrical power outlet. If necessary, verify the voltage.
8. Inspect the fan-and-power-supply assemblies, and check that the fasteners in the cover of the power-supply unit (screws or rivets) have not been removed or disturbed.
9. Before you connect the 2104 Model DS4 or Model TS4 to the host system, check the grounding as described in "Checking the grounding" on page 29.

Checking the grounding

This sections describes the steps you need to perform to check the grounding of a 2104 Model DS4 or Model TS4 that you are servicing. Each model is described in the following sections.

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 and Service Guide, or equivalent, for the rack or host system.

2. Ensure that the power cables **2** are plugged into each fan-and-power-supply assembly. Ensure also that the other ends of the power cables are plugged into the power distribution unit or battery-backup unit in the rack (see the Installation and Service Guide, or equivalent, for the rack or host system).
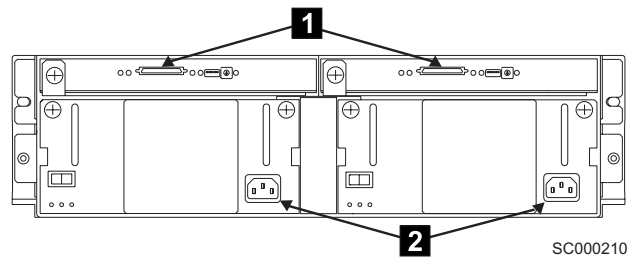
Figure 37. Power cables and SCSI connectors for the 2104 Model DS4

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.

3. 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 on page xxii.

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

5. Check for continuity between the frame of the 2104 Model DS4 and the ground pin **1** of the power connector on each fan-and-power-supply assembly, as shown in Figure 38.

6. Go to step 9.

7. Check for continuity between the frame of the 2104 Model DS4 and the ground pins 1 and 7 of each mainline power connector as Figure 38 shows.

Pin 6 → Pin 1
Pin 12 → Pin 7
SC000330
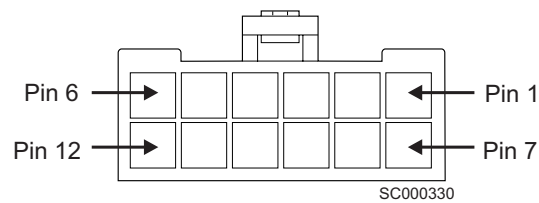
Figure 38. Ground Pins (2104 Model DS4: -48 V)

8. Go to step 9.

9. If any fan-and-power-supply assembly has no continuity, exchange that assembly for a new one (see "Removing and replacing fan-and-power-supply assemblies" on page 72), then do 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 rack or using-system Installation and Service Guide, or equivalent, to isolate the fault, then do 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 do the complete grounding check again.

    If the power cable does have continuity, see the rack or using system Installation and Service Guide, or equivalent, to isolate the fault.

Checking the grounding of the 2104 Model TS4

Perform the following steps to check the grounding of the 2104 Model TS4.

SC000013
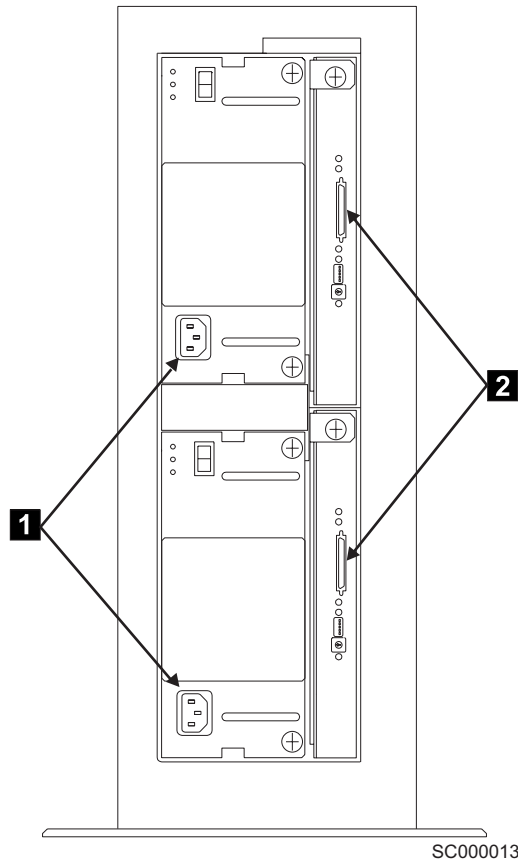
Figure 39. Power cables and SCSI connectors (2104 Model TS4)

1. Ensure that a power cable is plugged into each power socket **1** .
2. Ensure that the other ends of the power cables are not plugged into electrical power outlets. Unplug the cables if necessary.
3. Ensure that no external SCSI cables are present at the SCSI connectors **2** .

   Attention: When you perform the grounding check some electrical circuits could be damaged if the external SCSI cables are present.
4. Check for continuity between the frame of the 2104 Model TS4 **3** and the ground pin of each power cable.
5. If the continuity is good (see step 3a on page 28), the grounding of the 2104 Model TS4 is correct. Go no farther with these instructions.
6. If the grounding is not correct, unplug the power cables from the mainline power connectors. Then continue with step 7.
7. Check each power cable for continuity.
8. If either power cable is failing, exchange it for a new one, then go to step 9 on page 33.

SC000095
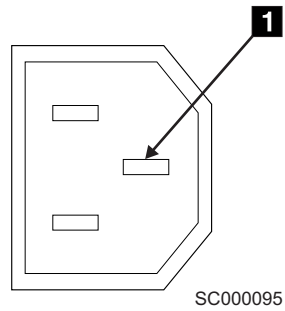
Figure 40. Ground pin (2104 Model TS4)

9. Check for continuity between the frame of the 2104 Model TS4 and the ground pin **1** of the power connector on each fan-and-power-supply assembly. See Figure 40.

10. If either fan-and-power-supply assembly does not have continuity, exchange that assembly for a new one (see "Removing and replacing fan-and-power-supply assemblies" on page 72), then do the complete grounding check again.

Chapter 2. Problem determination procedures

Problem determination procedures are provided by power-on self-tests (POSTs), service request numbers, and maintenance analysis procedures (MAPs). Some of these procedures use the service aids that are described in the user or maintenance information for your using system SCSI attachment.

Disk drive module power-on self-tests

The disk drive module POSTs start each time that the module is switched on, or when a Send Diagnostic command is received. They check whether the disk drive module is working correctly. The POSTs also help verify a repair after a Field Replaceable Unit (FRU) has been exchanged.

The tests are POST-1 and POST-2.

POST-1 runs immediately after the power-on reset line goes inactive, and before the disk drive module motor starts. POST-1 includes the following tests:
- Microprocessor
- ROM
- Checking circuits

If POST-1 completes successfully, POST-2 is enabled.

If POST-1 fails, the disk drive module is not configured into the system.

POST-2 runs after the disk drive module motor has started. POST-2 includes the following tests:
- Motor control
- Servo control
- Read and write on the diagnostic cylinder (repeated for all heads)
- Error checking and correction (ECC).

If POST-2 completes successfully, the disk drive module is ready for use with the system.

If POST-2 fails, the disk drive module is not configured into the system.

SCSI interface card power-on self-tests

The SCSI interface card POSTs start each time power is switched on, or when a Reset command is sent from the using system SCSI attachment. They check only the internal components of the SCSI interface card; they do not check any interfaces to other FRUs.

If the POSTs complete successfully, control passes to the functional microcode of the SCSI interface card. This microcode checks all the internal interfaces of the 2104 Model DS4 or Model TS4, and report failures to the host system.

If the POSTs fail, one of the following events occur:
- The SCSI interface card check light and the 2104 Model DS4 or Model TS4 check light come on.
- The functional operation of the 2104 Model DS4 or Model TS4 is not affected. For example, the customer still has access to all the disk drive modules.
- If a second SCSI interface card is present, it becomes the SES active card.
- The failure is reported:
  - If the failure occurs at system bring-up time, the host system might detect that the 2104 Model DS4 or Model TS4 is missing, and reports an error.
  - If the failure occurs at any time other than system bring-up time, the hourly health check reports the failure.

Service request numbers

Service request numbers (SRNs) are generated for the 2104 Model DS4 or Model TS4 by diagnostics and the SES health check (see "Error logging support" on page 3). SRNs help you to identify the cause of a problem, the FRUs, and the service actions that might be needed to solve the problem.

Using the SRN table

This section provides you with an overview of the SRN table and how to use it.

Important: You should have been sent here from MAP 2010: 2104 Model DS4 or Model TS4-START. Do not start problem determination from the SRN table; always go to MAP 2010: 2104 Model DS4 or Model TS4-START first.

1. Locate the SRN in Table 9 on page 37. If you cannot find a particular SRN in the table, go to the SRN list that is in the user or maintenance information for your using system SCSI attachment. If you still cannot find the SRN, you have a problem with the diagnostics, the microcode, or the documentation. Call your support center for assistance.
2. Read carefully the Action that you must take for the problem. Do not exchange FRUs unless you are instructed to do so.
3. Unless instructed otherwise, exchange only one FRU at a time, starting from the top of the FRU list for that SRN. Always use instructions given in Chapter 3, "Removal and replacement procedures" when exchanging FRUs; a page reference is given with each FRU in the FRU list. After each FRU is exchanged, go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Table 9. SRN Table

SRN	FRU List	Problem
807-12X	**Fan-and-power-supply assembly (90%)** ("Removing and replacing fan-and-power-supply assemblies" on page 72) **SCSI interface card assembly (5%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **Frame assembly (5%)** ("Exchanging a frame assembly" on page 81)	Description: A power supply has failed. The diagnostic message indicates the specific position of the failing FRU (for example, Power Supply (n)). Action: Exchange the FRU for a new FRU.
807-13X	**Fan assembly (90%)** ("Removing and replacing a fan assembly" on page 75) **SCSI interface card assembly (5%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **Frame assembly (5%)** ("Exchanging a frame assembly" on page 81)	Description: The fan assembly has failed. The diagnostic message indicates the specific position of the failing FRU (for example, Fan (n)). Action: Exchange the FRU for a new FRU.
807-148	**None**	Description: Temperature warning. Action: Take action to bring the ambient temperature inside the specified limits (see Table 5 on page 20). If the problem remains, exchange the SCSI interface card for a new one (see "Removing and replacing a SCSI interface card assembly" on page 77).
807-149	**None**	Description: Critical temperature warning. Action: Take action to bring the ambient temperature inside the specified limits (see Table 5 on page 20). If the problem remains, exchange the SCSI interface card for a new one (see "Removing and replacing a SCSI interface card assembly" on page 77).
807-17X	**SCSI interface card assembly (100%)** ("Removing and replacing a SCSI interface card assembly" on page 77)	Description: A SCSI interface card has failed. The diagnostic message indicates the specific position of the failing FRU (for example, Enclosure Services (n)). Action: Exchange the FRU for a new FRU.
807-180	**SCSI interface card assembly (95%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **Frame assembly (5%)** ("Exchanging a frame assembly" on page 81)	Description: SCSI interface card assembly failure. Action: Exchange the FRUs for new FRUs.
807-201	**SCSI interface card assembly (60%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **SCSI attachment (40%)** (using system service information)	Description: A device configuration error has occurred. Action: Exchange the FRUs for new FRUs.

Table 9. SRN Table (continued)

SRN	FRU List	Problem
807-202	**SCSI interface card assembly (60%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **SCSI attachment (40%)** (using system service information)	Description: The 2104 Model DS4 or Model TS4 enclosure failed to open. Action: Exchange the FRUs for new FRUs.
807-203	**SCSI interface card assembly (60%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **SCSI attachment (40%)** (using system service information)	Description: The 2104 Model DS4 or Model TS4 enclosure failed to return inquiry data. Action: 1. Observe the card assembly. Ensure that: • Switch 3 (Enable Enclosure Services) is set to On. • Switch 4 (Select Enclosure Services) is set to On. 2. Go to MAP 2010: 2104 Model DS4 or Model TS4-START. 3. If the problem remains, exchange the FRUs for new FRUs.
807-204	**Fan-and-power-supply assembly (45%)** ("Removing and replacing fan-and-power-supply assemblies" on page 72) **Fan assembly (45%)** ("Removing and replacing a fan assembly" on page 75) **SCSI interface card assembly (7%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **Frame assembly (3%)** ("Exchanging a frame assembly" on page 81)	Description: A 2104 Model DS4 or Model TS4 has detected a noncritical enclosure failure. Action: Go to MAP 2010: 2104 Model DS4 or Model TS4-START. If the problem remains, exchange the FRUs for new FRUs.
807-205	**Fan-and-power-supply assembly (45%)** ("Removing and replacing fan-and-power-supply assemblies" on page 72) **Fan assembly (45%)** ("Removing and replacing a fan assembly" on page 75) **SCSI interface card assembly (4%)** ("Removing and replacing a SCSI interface card assembly" on page 77) **Frame assembly (3%)** ("Exchanging a frame assembly" on page 81)	Description: A 2104 Model DS4 or Model TS4 has detected a critical enclosure failure. Action: Go to MAP 2010: 2104 Model DS4 or Model TS4-START. If the problem remains, exchange the FRUs for new FRUs.

Maintenance analysis procedures

These maintenance analysis procedures (MAPs) describe how to analyze a continuous failure that has occurred in a 2104 Model DS4 or Model TS4 that contains one or more SCSI disk drive modules. Failing FRUs of the 2104 Model DS4 or Model TS4 can be isolated with these MAPs.

For more information on additional tools to identify missing resources on Linux, go to "Linux tools" on page 115.

Using the MAPs

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

To isolate the FRUs in the failing 2104 Model DS4 or Model TS4, perform the following actions and answer the questions given in these MAPs:

1. When instructed to exchange two or more FRUs in sequence:
    a. Exchange the first FRU in the list for a new one.
    b. Verify that the problem is solved. For some problems, verification means running the diagnostic programs (see the using system service procedures).
    c. If the problem remains:
        1) Reinstall the original FRU.
        2) Exchange the next FRU in the list for a new one.
    d. Repeat steps 1b and 1c until either the problem is solved, or all the related FRUs have been exchanged.
    e. Perform the next action that the MAP indicates.
2. See "Lights and switches" on page 5 for locations and descriptions of the lights and switches.

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

MAP 2010: 2104 Model DS4 or Model TS4-START

This MAP is the entry point to the MAPs for the 2104 Model DS4 or Model TS4. If you are not familiar with these MAPs, read "Using the MAPs" on page 39 first.

You might have been directed to this section because:

- The system problem determination procedures sent you here.
- Action from an SRN list sent you here.
- A problem occurred during the installation of a 2104 Model DS4 or Model TS4 or a disk drive module.
- Another MAP sent you here.
- A customer observed a problem that was not detected by the system problem determination procedures.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

1. **Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?**

   NO   Go to step 2.

   YES   Go to "MAP 2022: 2104 Model DS4 or Model TS4-Power-on" on page 45.

2. (from steps 1 and 9 on page 41)

   Are you at this MAP because power is not removed completely from the 2104 Model DS4 and Model TS4 when the host systems are switched off?

   NO   Go to step 3.

   YES   Go to "MAP 2030: 2104 Model DS4 or Model TS4-Power control" on page 47.

3. (from step 2)

   Have you been sent to this MAP from an SRN?

   NO   Go to step 4.

   YES   Go to step 7 on page 41.

4. (from step 3)

   Have the system diagnostics or problem determination procedures given you an SRN for the 2104 Model DS4 or Model TS4 (sesn)?

   NO

   - If the system diagnostics for the 2104 Model DS4 or Model TS4 are available, go to step 5 on page 41.
   - If the system diagnostics for the 2104 Model DS4 or Model TS4 are not available, but the stand-alone diagnostics for the 2104 Model DS4 or Model TS4 are available:
     a.   Run the stand-alone diagnostics.
     b.   Go to step 6 on page 41.
   - If neither the system diagnostics nor the stand-alone diagnostics are available, go to step 7 on page 41.

   YES   Go to "Service request numbers" on page 36.

5. (from step 4)

   a. Run the concurrent diagnostics to the 2104 Model DS4 or Model TS4. For information about how to run concurrent diagnostics, see Concurrent maintenance.

   b. When the concurrent diagnostics are complete, go to step 6.

6. (from steps 4 and 5)

   Did the diagnostics give you an SRN for the 2104 Model DS4 or Model TS4?

   NO   Go to step 7.

   YES   Go to "Service request numbers" on page 36.

7. (from steps 3, 4, and 6)

   Is the Subsystem Check light flashing?

   NO   Go to step 8.

   YES   A device is in Identify mode.

8. (from step 7)

   Is the Subsystem Check light on continuously?

   NO   Go to step 12 on page 42.

   YES   Go to step 9.

9. (from step 8)

   Does a fan-and-power-supply assembly have its CHK light on because its DC On/Standby switch is set to Standby?

   NO   Go to step 10.

   YES

      a. Set the DC On/Standby switch to On.

      b. If you still have a problem, return to step 2 on page 40. Otherwise, go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

10. (from step 9)

    Does any FRU have its Check light on?

    Note: The Check light might be on any of the following parts:
    - A SCSI interface card assembly (CARD FAULT light)
    - A fan-and-power-supply assembly (CHK light)
    - A fan assembly (CHK light)
    - A disk drive module (CHK light)

    NO   In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

       a. SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

       b. Fan-and-power-supply assembly (see "Removing and replacing fan-and-power-supply assemblies" on page 72)

       c. Fan assembly (see "Removing and replacing a fan assembly" on page 75)

       d. Frame assembly (see "Exchanging a frame assembly" on page 81)

YES

    a. If the FRU is a fan-and-power-supply assembly, go to step 11. Otherwise, exchange, for a new FRU, the FRU whose Check light is on.

    b. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

11. (from step 10)

Is the enclosure set up for remote power control (that is, is the Power Control switch of the SCSI interface card assembly set to Off)?

NO

    a. Exchange, for a new one, the fan-and-power-supply whose CHK light is on (see "Removing and replacing fan-and-power-supply assemblies" on page 72).

    b. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

YES

    a. Ensure that:
- The DC On/Standby switch is set to On.
- Both ends of the SCSI cable are correctly connected.
- The Power Control switch of the SCSI interface card assembly is set to Off (see Figure 24 on page 9).
- The host system is switched on.

    b. If the CHK light of the fan-and-power-supply assembly is still on, pull out the fan-and-power-supply to disconnect it from the 2104 Model DS4 and Model TS4, then push it back to reseat its connectors (see "Removing and replacing fan-and-power-supply assemblies" on page 72).

    c. If the CHK light is still on, exchange, in the sequence shown, the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

       1) Fan-and-power-supply assembly whose CHK light is on (see "Removing and replacing fan-and-power-supply assemblies" on page 72)

       2) SCSI interface card (see "Removing and replacing a SCSI interface card assembly" on page 77)

       3) Frame assembly (see "Exchanging a frame assembly" on page 81)

12. (from step 8)

Is the Subsystem Power light on?

NO   Go to "MAP 2020: 2104 Model DS4 or Model TS4-Power" on page 43.

YES   Go to step 13.

13. (from step 12)

Does either fan-and-power-supply assembly have its DC PWR light off when it should be on?

NO   Go to step 14 on page 43.

YES

a. Exchange, for a new assembly, the fan-and-power-supply assembly whose light is off.

b. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

14. (from step 13)

   Are you here because access to all the SCSI devices that are in the 2104 Model DS4 or Model TS4 has been lost?

   NO   No problem has been found on the 2104 Model DS4 or Model TS4. For a final check, go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53.

   YES   Go to "MAP 2340: 2104 Model DS4 and Model TS4-SCSI bus" on page 49.

MAP 2020: 2104 Model DS4 or Model TS4-Power

This MAP helps you to isolate FRUs that are causing a power problem on a 2104 Model DS4 or Model TS4.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

1. (from step 12 in MAP 2010: 2104 Model DS4 or Model TS4-START)

   You are here because the Subsystem Power light is off.

   Are any lights on at the front of the 2104 Model DS4 or Model TS4?

   NO   Go to step 2.

   YES   The Subsystem Power light has failed. In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

   a. SCSI interface card (see "Removing and replacing a SCSI interface card assembly" on page 77)

   b. Frame assembly (see "Exchanging a frame assembly" on page 81)

2. (from step 1)

   Observe the fan-and-power-supply assembly (or assemblies, if two are present).

   Does at least one fan-and-power-supply assembly have its AC PWR light on?

   NO   Check the mainline power source and the power cable.

   YES   Go to step 3.

3. (from step 2)

   Observe the fan-and-power-supply assembly whose AC PWR light is on.

   Is this fan-and-power-supply assembly switched on?

   NO

   a. Set the DC On/Standby switch to On.

   b. If the problem is still not solved, go to MAP 2010: 2104 Model DS4 or Model TS4-START.

   YES   Go to step 4 on page 44.

4. (from step 3)

   Does the fan-and-power-supply assembly have its DC PWR light on?

   NO

       a. Set the DC On/Standby switch to Standby, then to On again.

       b. Go to step 5.

   YES In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

       a. Fan-and-power-supply assembly (see "Removing and replacing fan-and-power-supply assemblies" on page 72).

       b. Frame assembly (see "Exchanging a frame assembly" on page 81).

5. (from step 4)

   Does the fan-and-power-supply assembly have its DC PWR light on now?

   NO Go to step 6.

   YES If the problem is still not solved, go to MAP 2010: 2104 Model DS4 or Model TS4-START.

6. (from step 5)

   Observe the card (see Figure 24 on page 9).

   Note to reviewers:

   What card? Should this be ″observe the machine? Need some input here—this does not make sense to me.

   Is the power control switch set to OFF?

   NO In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

       a. Fan-and-power-supply assembly (see "Removing and replacing fan-and-power-supply assemblies" on page 72)

       b. SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

   YES Go to step 7.

7. (from step 6)

   Observe the SCSI interface card assemblies.

   Does either SCSI interface card have its TERM POWER light on?

   NO Go to step 8.

   YES In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

       a. Fan-and-power-supply assembly (see "Removing and replacing fan-and-power-supply assemblies" on page 72)

       b. SCSI interface card (see "Removing and replacing a SCSI interface card assembly" on page 77)

8. (from step 7)

   Is the host system switched on?

   NO Switch on the host system (see the host system-service information). The 2104 Model DS4 or Model TS4 should switch on when the host system switches on.

If the problem is still not solved, go to MAP 2010: 2104 Model DS4 or Model TS4-START.

YES In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

    a. External SCSI cables

    b. SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

    Note: If the TERM POWER light is still off, you might have a problem with the SCSI attachment that is in the host system (see the using system service information).

MAP 2022: 2104 Model DS4 or Model TS4-Power-on

This MAP helps you to isolate FRUs that are causing a power problem on a 2104 Model DS4 or Model TS4.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running

1. (from step 1 in MAP 2010: 2104 Model DS4 or Model TS4-START)

    a. Remove both fan-and-power-supply assemblies, if two are present. If your 2104 Model DS4 or Model TS4 has only one fan-and-power supply assembly, remove also the fan assembly (see "Removing and replacing fan-and-power-supply assemblies" on page 72 and "Removing and replacing a fan assembly" on page 75).

    b. Remove the SCSI interface card assemblies (see "Removing and replacing a SCSI interface card assembly" on page 77). If your 2104 Model DS4 or Model TS4 has only one SCSI interface card assembly, you do not need to remove the dummy assembly.

    c. Disconnect all the disk drive modules from the backplane. To do this action, open the handle on each module (see "Removing disk drive modules and dummy disk drive modules" on page 61). You do not need to completely remove the disk drive modules.

    d. Go to step 2.

2. (from step 1)

    a. Reinstall a fan-and-power-supply assembly into position 1.

    b. Connect a power cable to the fan-and-power-supply assembly.

    c. Set the DC On/Standby switch of the fan-and-power-supply assembly to On.

    Note: Unless a procedure needs you to switch off the 2104 Model DS4 or Model TS4, leave the 2104 Model DS4 or Model TS4 switched on for the remainder of this MAP.

Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?

NO Go to step 3 on page 46.

YES

        a. In the sequence shown, exchange the following FRUs for new FRUs:

           1) The fan-and-power-supply assembly that you just reinstalled

           2) The frame assembly (see "Exchanging a frame assembly" on page 81)

        b. Go to step 3.

3. (from step 2)

    a. Reinstall the other fan-and-power-supply assembly, or the fan assembly, into position 2.

    b. If you have just reinstalled a fan-and-power-supply assembly into position 2:

        1) Connect a power cable to that assembly.

        2) Set the DC On/Standby switch of the fan-and-power-supply assembly to On.

> **Note:** Unless a procedure needs you to switch off the 2104 Model DS4 or Model TS4, leave the 2104 Model DS4 or Model TS4 switched on for the remainder of this MAP.

Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?

NO   Go to step 4.

YES

        a. In the sequence shown, exchange the following FRUs for new FRUs:

           1) The fan-and-power-supply assembly, or fan assembly, that you have just reinstalled

           2) The frame assembly (see "Exchanging a frame assembly" on page 81)

        b. Go to step 4.

4. (from step 3)

Reinstall a SCSI interface card assembly into position 1.

Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?

NO   If the 2104 Model DS4 or Model TS4 has two SCSI interface cards, go to step 5. Otherwise, go to step 6 on page 47.

YES

        a. Exchange, for a new one, the SCSI interface card assembly that you have just reinstalled.

        b. If the 2104 Model DS4 or Model TS4 has two SCSI interface cards, go to step 5. Otherwise, go to step 6 on page 47.

5. (from step 4)

Reinstall the other SCSI interface card assembly into position 2.

Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?

NO   Go to step6 on page 47.

YES

        a. Exchange, for a new one, the SCSI interface card assembly that you just reinstalled.

b. Go to step 6.

6. Reconnect a disk drive.

   Reconnect a disk drive module by closing its handle (see "Replacing a disk drive module" on page 65).

   Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?

   NO Go to step 7.

   YES

   a. Exchange, for a new one, the disk drive module that you just reconnected.

   b. Go to step 7.

7. (from steps 6 and 8)

   Reconnect the next disk drive module.

   Does the 2104 Model DS4 or Model TS4 emit smoke or is there a burning smell?

   NO Go to step 8.

   YES

   a. Exchange, for a new one, the disk drive module that you just reconnected.

   b. Go to step 8.

8. (from step 7)

   Have you reconnected all the disk drive modules?

   NO Return to step 7.

   YES Go to step 9.

9. (from steps 4 and 8)

   Have you solved the problem?

   NO Remove all power from the 2104 Model DS4 or Model TS4, and call for assistance.

   YES Go to step "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

MAP 2030: 2104 Model DS4 or Model TS4-Power control

This MAP helps you to isolate FRUs that are causing a power problem when power control is active.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running

1. (from step 2 in MAP 2010: 2104 Model DS4 or Model TS4-START, and from step 5 in MAP 2020: 2104 Model DS4 or Model TS4-Power)

   You are here because power is still present at the 2104 Model DS4 or Model TS4 although the host system is switched off.

   Observe the card.

   Is the power control switch set to Off?

   NO If you want the 2104 Model DS4 or Model TS4 to switch to Standby

when the host system is switched off or to Standby, set the 2104 Model DS4 or Model TS4 power control switch to Off. Alternatively, you can manually set the DC On/Standby switch to Standby on each fan-and-power-supply assembly in the 2104 Model DS4 or Model TS4.

YES   Go to step 2.

2. (from step 1)

   Observe a SCSI interface card.

   Is the TERM POWER light on?

   NO   Go to step 4.

   YES

       a. Disconnect the SCSI cable from the SCSI interface card.

       b. Go to step 3.

3. (from step 2)

   Does the TERM POWER light remain on?

   NO   The host system to which the SCSI cable is attached is supplying terminator voltage. Check the host system to isolate the problem.

   YES

       a. Exchange the SCSI interface card assembly for a new one (see "Removing and replacing a SCSI interface card assembly" on page 77).

       b. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

4. (from step 2)

   Does the 2104 Model DS4 or Model TS4 have two fan-and-power-supply assemblies?

   NO

       a. In the sequence shown, exchange the following FRUs for new FRUs:

           1) Fan-and-power-supply assembly (see "Removing and replacing fan-and-power-supply assemblies" on page 72)

           2) SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

       b. Go to step 7 on page 49.

   YES   Go to step 5.

5. (from step 4)

   Do both fan-and-power-supply assemblies have their DC PWR lights on?

   NO   Go to step 6.

   YES   In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

       a. SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

       b. Frame assembly (see "Exchanging a frame assembly" on page 81)

6. (from step 5)

   Does only one fan-and-power-supply assembly have its DC PWR light on?

   NO   Go to step 7 on page 49.

YES

    a. Exchange, for a new one, the fan-and-power-supply assembly whose DC PWR light remains on (see "Removing and replacing fan-and-power-supply assemblies" on page 72).

    b. Go to step 7.

7. (from steps 4 and 6)

   Is the 2104 Model DS4 or Model TS4 still powered on?

   NO   The problem is solved.

   YES   Call for assistance.

MAP 2340: 2104 Model DS4 and Model TS4-SCSI bus

You are here because the host system cannot get access to any SCSI device (disk drive module or enclosure services).

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running

1. (from step 14 in MAP 2010: 2104 Model DS4 or Model TS4-START)

   Observe the SCSI Bus Split switch (see Figure 24 on page 9).

   Is the SCSI Bus Split switch set to off?

   NO   Go to step 12.

   YES   The 2104 Model DS4 or Model TS4 is configured in single SCSI bus mode. Go to step 2.

2. (from step 1)

   Is the 2104 Model DS4 or Model TS4 attached to a second SCSI attachment?

   NO

       a. Ensure that the SCSI address of the SCSI attachment is set to 7.

       b. Go to step 3.

   YES

       a. Ensure that the SCSI address of one SCSI attachment is set to 6.

       b. Ensure that the SCSI address of the second SCSI attachment is set to 5.

       c. Ensure slots 6 and 7 (SCSI addresses 5 and 6) have dummy disk drives.

       d. Go to step 3.

3. (from step 2)

   Does the 2104 Model DS4 or Model TS4 have two SCSI interface card assemblies?

   NO   Go to step 4.

   YES

       a. Remove one of the SCSI interface card assemblies (see "Removing and replacing a SCSI interface card assembly" on page 77).

       b. Go to step 4.

4. (from step 3)

a. Note the positions of all the disk drive modules and dummy disk drive modules so that you can reinstall the modules into their correct slots later.

b. Go to step 5.

5. (from step 4)

a. Remove all the disk drive modules, except for one (see "Removing disk drive modules and dummy disk drive modules" on page 61).

b. Go to step 6.

6. (from steps 5 and 8)

Can the host system access this disk drive module?

NO   Go to step 7.

YES   Go to step 8.

7. (from step 6)

Remove the disk drive module that you just tested, and install a different disk drive module into a different slot.

Note: Because this disk drive module is not in the same slot, its SCSI address is different (see "SCSI addresses" on page 22).

Can the host system access this disk drive module?

NO

a. In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you check whether you can access the disk drive module, to verify the repair.

1) External SCSI cable

2) SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

3) SCSI attachment (see the using system service information)

4) Frame assembly (see "Exchanging a frame assembly" on page 81)

b. If the repair is successful, reinstall all the disk drive modules and, if removed in step 3 on page 49, the SCSI interface card assembly.

c. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

YES

a. In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for *each* FRU exchange, you check whether you can access the disk drive module.

1) The disk drive module that you tested immediately before this one (see "Removing disk drive modules and dummy disk drive modules" on page 61). Install the replacement disk drive module into the original slot.

2) Frame assembly (see "Exchanging a frame assembly" on page 81)

b. Reinstall all the other disk drive modules and, if removed in step 3 on page 49, the SCSI interface card assembly.

c. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

8. (from steps 6 and 9)

Have you reinstalled all the disk drive modules?

NO

    a. Install another disk drive module.

    b. Go to step 9.

YES   Go to step 10.

9. (from step 8)

    Can the host system get access to this disk drive module?

    NO

        a. Exchange the disk drive module for a new one (see "Removing disk drive modules and dummy disk drive modules" on page 61).

        b. Return to step 8 on page 50.

    YES   Return to step 8 on page 50.

10. (from step 8)

    a. If you removed a SCSI interface card assembly in step 3 on page 49, reinstall that assembly.

    b. Go to step 11.

11. (from step 10)

    Can the host system access any disk drive module?

    NO

        a. Exchange, for a new one, the SCSI interface card assembly that you just reinstalled (see "Removing and replacing a SCSI interface card assembly" on page 77).

        b. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

    YES   Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

12. (from step 1)

    The 2104 Model DS4 or Model TS4 is configured in dual SCSI bus mode.

    Are the SCSI addresses of the two SCSI attachments both set to 7?

    NO

        a. Set the SCSI addresses to 7 (see the using system service information).

        b. Go to step 13.

    YES   Go to step 13.

13. (from step 12)

    Have the host systems lost access both to the disk drive modules that are in the SCSI address range 0 through 6, and to the disk drive modules that are in the SCSI address range 8 through 14?

    NO   Go to step 14 on page 52.

    YES   In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for each FRU exchange, you go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53.

        a. SCSI bus bridge card assembly (see "Removing the SCSI bus bridge card assembly" on page 68)

     b. SCSI interface card-1 (see "Removing and replacing a SCSI interface card assembly" on page 77)

     c. Frame assembly (see "Exchanging a frame assembly" on page 81)

14. (from step 13)

 Do the disk drive modules that the host system cannot access have SCSI addresses in the range 0 through 6?

 NO   Go to step 15.

 YES   Go to step 16.

15. (from step 14)

 Ensure all configuration switches 11 to 18 are set to Off. (See "Configuration switches 7 through 18" on page 11.)

 a. Remove all devices, except for one, from slots 8 through 14.

 b. Go to step 17.

16. (from step 14)

 Ensure that all configuration switches 11 to 18 are set to Off. (See "Configuration switches 7 through 18" on page 11.)

 a. Remove all the disk drive modules, except for one, from slots 1 through 7.

 b. Go to step 17.

17. (from steps 15 and 16)

 Can the host system access this disk drive module?

 NO   Go to step 18.

 YES   Go to step 19 on page 53.

18. (from step 17)

 Remove the disk drive module that you just tested, and install a different disk drive module into a different slot.

 Note: Because this disk drive module is not in the same slot, its SCSI address is different. (See "SCSI addresses" on page 22).

 Can the host system access this disk drive module?

 NO

     a. In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for each FRU exchange, you check whether you can access the disk drive module to verify the repair.

        1) External SCSI cable

        2) SCSI interface card assembly (see "Removing and replacing a SCSI interface card assembly" on page 77)

        3) SCSI attachment (see the using system service information)

        4) Frame assembly (see "Exchanging a frame assembly" on page 81)

     b. If the repair is successful, reinstall all the disk drive modules and go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

 YES

     a. In the sequence shown, exchange the following FRUs for new FRUs. Ensure that for each FRU exchange, you check whether you can access the disk drive module.

1) The disk drive module that you tested immediately before this one (see "Removing disk drive modules and dummy disk drive modules" on page 61). Install the replacement disk drive module into the original slot.

2) Frame assembly (see "Exchanging a frame assembly" on page 81)

b. Reinstall all the other disk drive modules.

c. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" to verify the repair.

19. (from step 17)

Have you reinstalled all the disk drive modules?

NO

a. Install another disk drive module.

b. Go to step 17 on page 52.

YES   No fault has been found. You probably solved the problem by reconnecting the disk drive modules.

Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" to verify the repair.

MAP 2410: 2104 Model DS4 or Model TS4-repair verification

Use this MAP to help you verify a repair after a FRU is exchanged for a new one.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running

1. Ensure that the DC On/Standby switch of each fan-and-power-supply assembly is set to On.

   Are all Check lights off?

   NO   Go to MAP 2010: 2104 Model DS4 or Model TS4-START.

   YES   Go to step 2.

2. (from step 1)

   Can the host system get access to all SCSI devices?

   NO   Go to MAP 2010: 2104 Model DS4 or Model TS4-START.

   YES   The repair is complete.

If you are directed to the 2104 Service Guide from MAP of using system, refer to *Diagnostic Information for Multiple Bus Systems*, SA38-0509, section "MAP 0410 Repair Checkout" for system level repair verification.

Chapter 3. Removal and replacement procedures

The instructions in this chapter describe how to remove and replace FRUs from the 2104 Model DS4 or Model TS4.

Each FRU has its own removal procedure. Where a step in a specific procedure represents a complete procedure that is described separately, a reference to that procedure is given. For example:

1. Remove the front cover (see "Removing and replacing the cover" on page 56).
2. Remove all the disk drive modules (see "Removing a disk drive module" on page 61).

Note: Although these instructions relate to the 2104 Model DS4 and Model TS4, some diagrams might not specifically show the model that you are servicing.

Concurrent maintenance

Subject to the configuration of the 2104 Model DS4 or Model TS4, most FRUs can be removed, replaced, and tested while the subsystem and host system are powered on and doing productive work. This ability is called *concurrent maintenance*.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

You can maintain the following FRUs concurrently in a 2104 Model DS4 or Model TS4 subsystem:
- Fan assembly
- Fan-and-power-supply assembly (if two are present)
- Disk drive module
- Dummy disk drive module
- SCSI Interface card assembly (if the subsystem configuration allows)
- Dummy SCSI Interface card assembly
- External SCSI cables (if the subsystem configuration allows)

You cannot maintain the following FRUs concurrently:
- SCSI bus bridge card assembly
- Frame assembly

Removing and replacing the cover

Note: Do not switch off the host system or the 2104 Model TS4 when removing, opening, or closing the cover of the 2104 Model TS4.

The 2104 Model DS4 does not have covers. The 2104 Model TS4 has only a front cover.

Perform the following steps to open and, if required, remove the cover:

1. Ask the customer for the key to the cover.
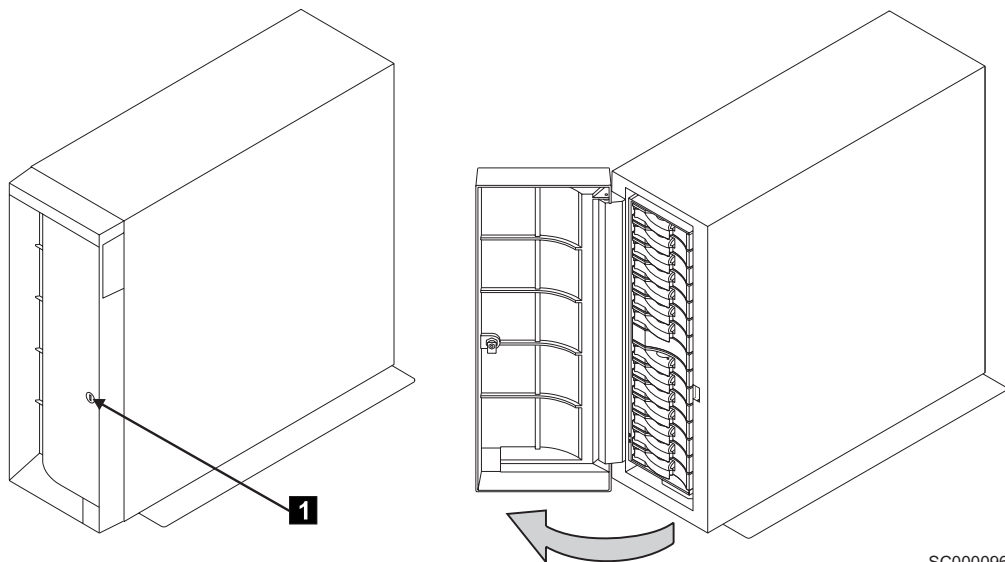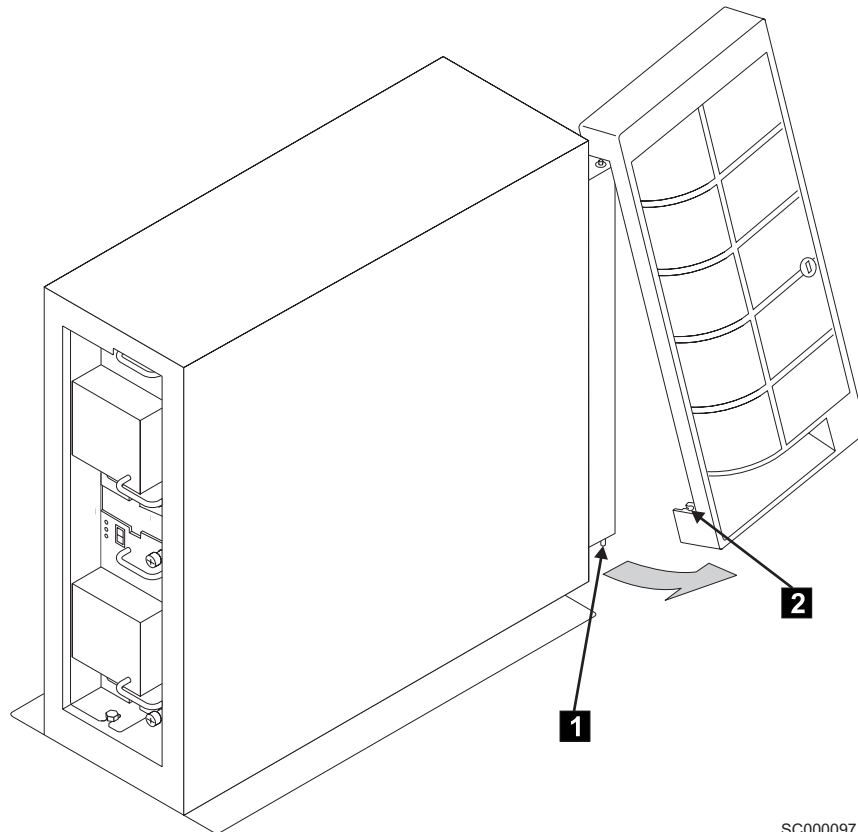2. Insert the key into the lock **1**, and turn the key counterclockwise, as Figure 41 shows.

SC000096

Figure 41. Opening the front cover of a 2104 Model TS4

3. The cover pivots on its left side, and is held closed by clips. Pull strongly on the right side of the cover to release it from the clips.
4. If you want to remove the cover, refer to Figure 42 on page 57.

SC000097

Figure 42. Removing the front cover of a 2104 Model TS4 (1)

5. Ensure that the cover is unlocked and open.

6. Grasp the bottom of the cover and pull it outward to release the lower cover hinge **2** from the hinge pin **1** .

7. Lift the cover to disengage the pivot hole **2** from the upper hinge pin **1** , as Figure 43 on page 58 shows.
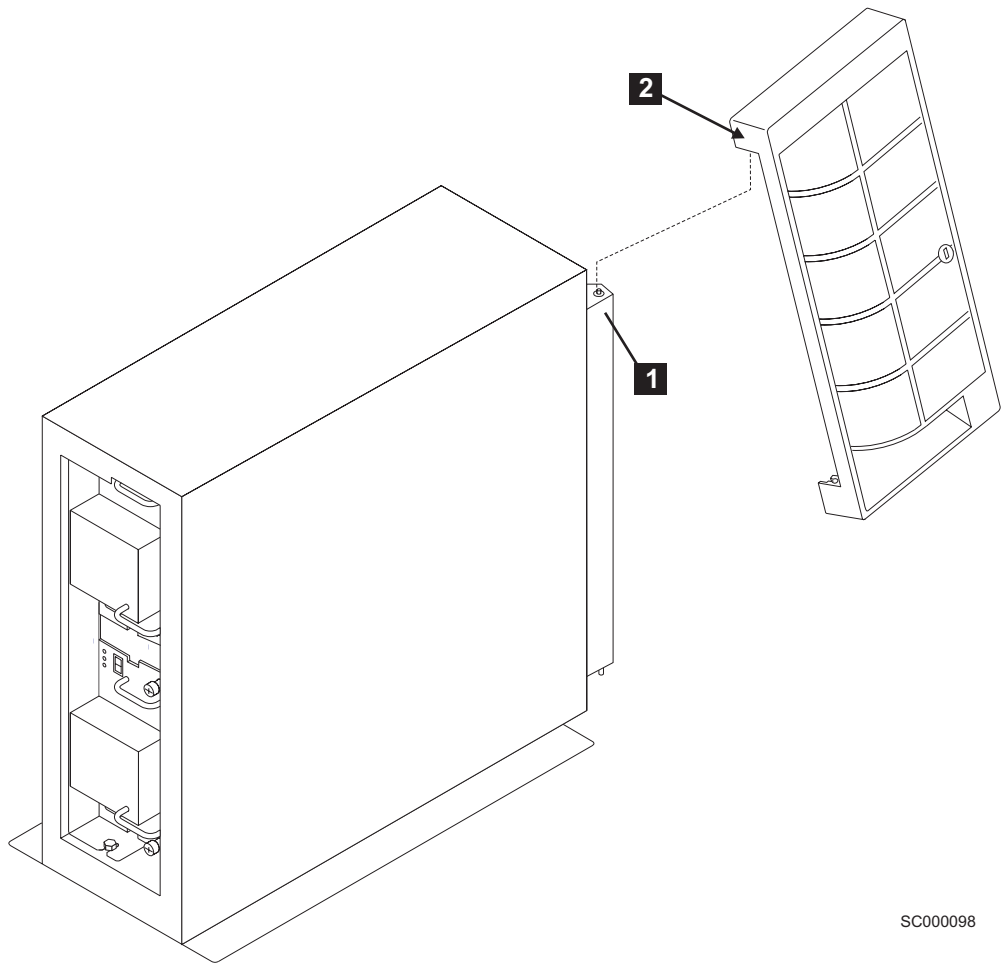
SC000098

Figure 43. Removing the front cover of a 2104 Model TS4 (2)

8. Replace parts in the reverse sequence.

    Note: Before you install the cover, ensure that the lock is in the unlocked
    position. Otherwise, the front cover might become damaged.

Removing and replacing power to the 2104 Model DS4 or Model TS4

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

Removing and replacing power to a 2104 Model DS4

Perform the following steps to remove and replace power to 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, as Figure 44 shows.
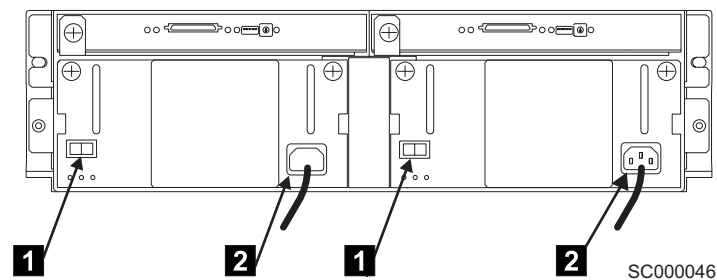

Figure 44. Removing the power from a 2104 Model DS4

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.

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)**

3. Remove the power cables **2** from the back of the 2104 Model DS4.

4. To return power to the 2104 Model DS4, perform the following steps:

   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 "Drive autostart switch-1" on page 9 and "Drive autostart switch-2" on page 9.

Removing and replacing power to a 2104 Model TS4

Perform the following steps to remove and replace power to a 2104 Model TS4.

1. Verify with the customer that all operations between the 2104 Model TS4 and the host system have been stopped.

2. At the back of the 2104 Model TS4, set the dc on/standby switch **1** of each fan-and-power-supply assembly to Standby, as Figure 45 shows.
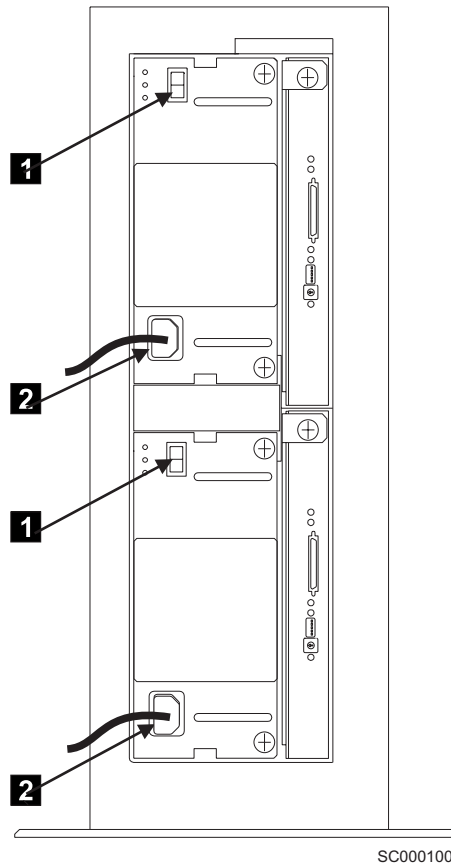

SC000100

Figure 45. Removing power from a 2104 Model TS4

Notes:

a. Some 2104 Model TS4s 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.

3. Remove the power cables **2** from the electrical power outlet and from the back of the 2104 Model TS4.

4. To return power to the 2104 Model TS4:

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 TS4. For more information, see "Drive autostart switch-1" on page 9 and "Drive autostart switch-2" on page 9.

Removing disk drive modules and dummy disk drive modules

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees counterclockwise.

Note: A disk drive module is one FRU. Always exchange it as a complete FRU.

Removing a disk drive module

Perform the following steps to remove and replace disk drive modules and dummy disk drive modules in a 2104 Model DS4 or Model TS4.

Attention:

- Disk drive modules are electrostatic-discharge (ESD) sensitive. Use the tools and procedures defined by your organization to protect such parts. See also "Electrostatic discharge (ESD)" on page xiv.
- Disk drive modules are fragile. Handle them with care, and keep them well away from strong magnetic fields.
- Any slot that does not have a 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. If a slot remains empty, overheating might occur.

Note: Do not switch off the host system or the 2104 Model DS4 or Model TS4 when you remove disk drive modules or dummy disk drive modules.

Follow these instructions to remove a disk drive module or a dummy disk drive module:

1. If you are removing a disk drive module from a 2104 Model TS4, open the front cover (see "Removing and replacing the cover" on page 56), if not already done.
2. If you are removing a dummy disk drive module, go to step 3. Otherwise, go to step 6 on page 62.
3. Using the finger slot that is provided at the top of the module, remove the dummy disk drive module, as Figure 46 on page 62.
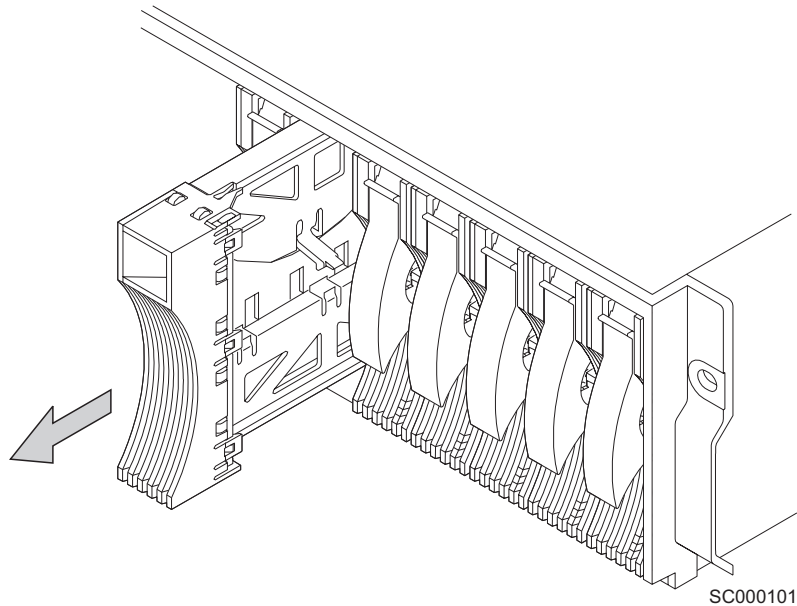
SC000101

Figure 46. Removing a dummy disk drive module from a 2104 Model DS4

4. Lay the dummy disk drive module on its side in a safe place.

5. Go to "Replacing a disk drive module" on page 65, and install a disk drive module.

6. Ensure that the host system is not using the disk drive module that you are going to remove.

7. Find the disk drive module that you are going to remove (see "SCSI addresses" on page 22).

8. If the 2104 Model DS4 or Model TS4 is powered on, use the SCSI Device Identification and Removal service aid to set the disk drive module to **Remove** (see System service aids in Appendix A, "Additional information for RISC systems"). The Check light of the disk drive module that you are going to remove comes on and remains on.

   Note: If the failing disk drive module is affecting the SCSI bus operation, the service aid might not work correctly.

9. On the disk drive module whose check light is on (see step 8), press the blue latch **1**, and lift the handle **2** fully. This action pulls the module partially out of its slot as Figure 47 on page 63 shows.
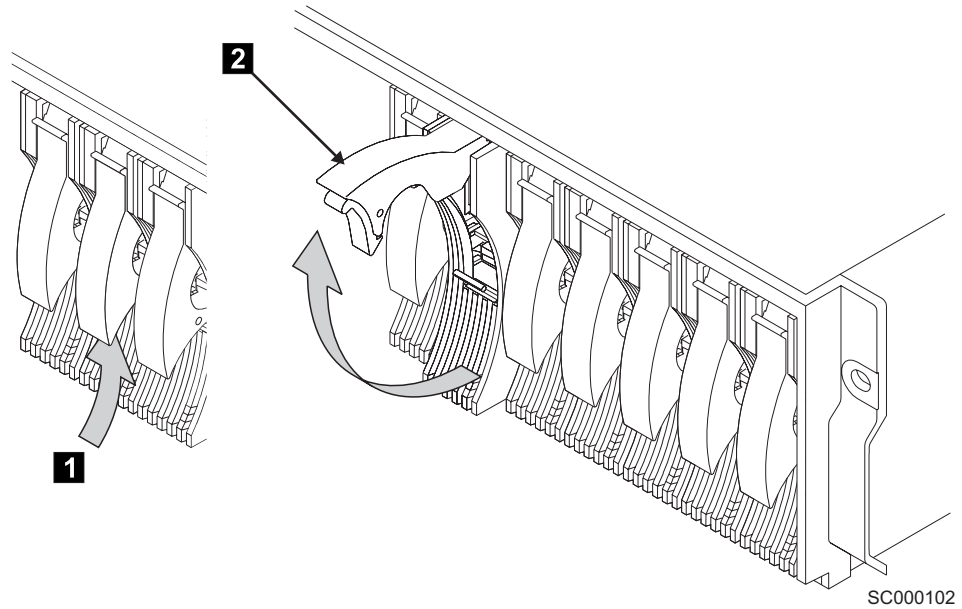
SC000102

Figure 47. Opening the handle of a disk drive module

10. Wait for approximately 20 seconds to allow the disk drive module to stop.
11. Grip the handle, and carefully pull out the disk drive module, as Figure 48 shows. As the disk drive module comes out, put one hand under its base to prevent it from falling.
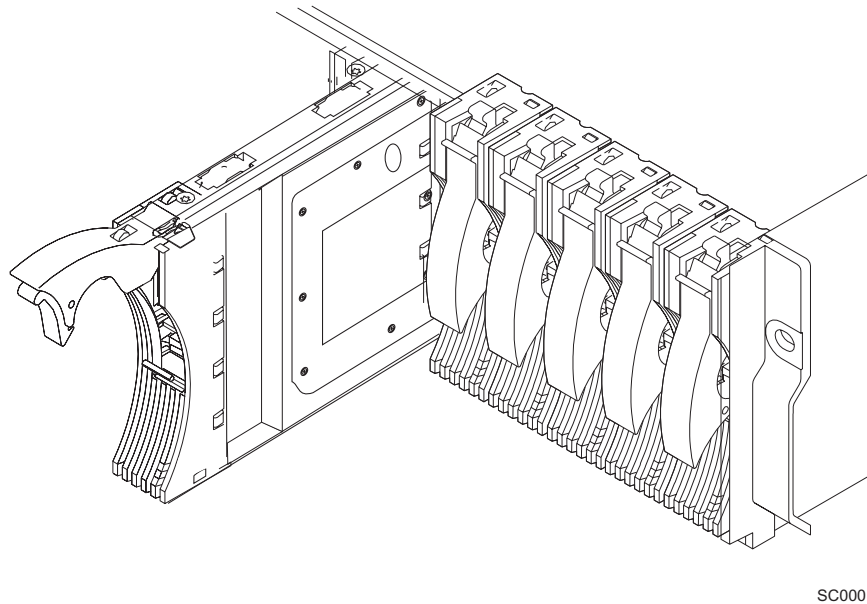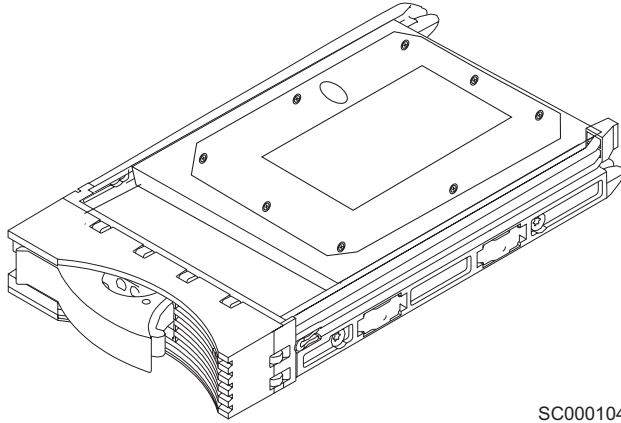

SC000103

Figure 48. Removing a disk drive module

12. Lay down the disk drive module as shown in Figure 49 on page 64. In this position, the module rests on four supports (not visible in Figure 49 on page 64).

SC000104

Figure 49. Placing a disk drive module into a safe position

13. Go to "Replacing a disk drive module" on page 65, and install a disk drive module or a dummy disk drive module, as required.

Replacing a disk drive module

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees.

Attention:
- Disk drive modules are electrostatic-discharge (ESD) sensitive. Use the tools and procedures defined by your organization to protect such parts. See also "Electrostatic discharge (ESD)" on page xiv.
- Disk drive modules are fragile. Handle them with care, and keep them well away from strong magnetic fields.
- Any slot that does not have a disk drive module installed must contain a dummy disk drive module. The dummy module ensures that the correct airflow is maintained around the disk drive modules in the other slots. If a slot remains empty, overheating might occur.

Note: Do not switch off the host system or the 2104 Model DS4 or Model TS4 when you replace modules.

Perform the following steps to replace a module:
1. If you are installing a module into a 2104 Model TS4, open the front cover (see "Removing and replacing the cover" on page 56), if not already done.
2. If you are installing a dummy disk drive module into an empty slot, go to step 3.

   If you are installing a disk drive module into an empty slot, go to step 6 on page 66.

   If you are installing a disk drive module into a slot that already contains a disk drive module or a dummy disk drive module, remove that module (see "Removing a disk drive module" on page 61), then go to step 6 on page 66.
3. Insert the dummy disk drive module into the slot and push it fully home, as Figure 50 shows.
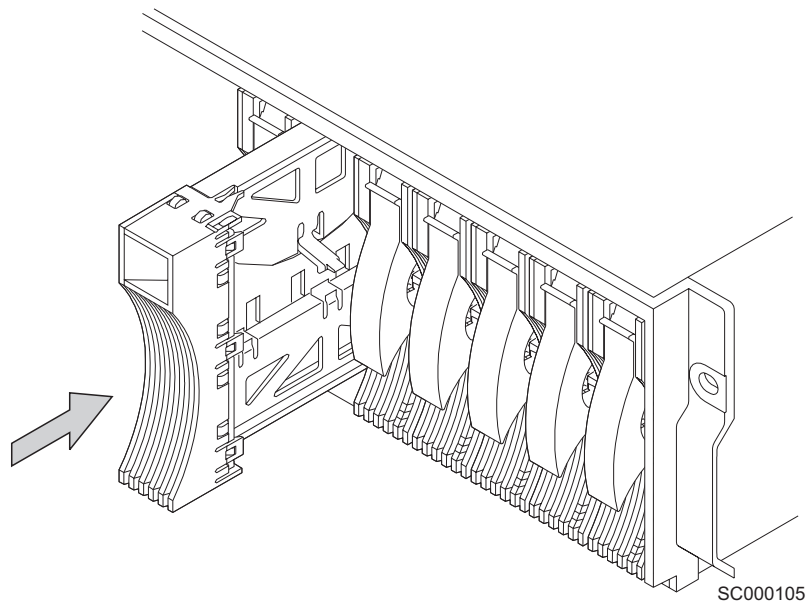

SC000105

Figure 50. Installing a dummy disk drive module on a 2104 Model DS4.

4. Verify that the dummy disk drive module that you just installed is aligned with the sides of the 2104 Model DS4 or Model TS4, and that no gap exists between this module and the modules that are next to it. Verify also that the front edge of this module aligns with the front edges of the modules that are next to it. If the dummy disk drive module is not correctly aligned, remove it and then reinstall it.

5. Repeat this procedure for other dummy disk drive modules, or go to step 6 to install disk drive modules.

6. If the 2104 Model DS4 or Model TS4 is powered on, use the SCSI Device Identification and Removal service aid to set the slot to **Insert** (see System service aids in Appendix A, "Additional information for RISC systems"). The check light at the back of the slot (on the backplane) comes on.

7. Ensure that the handle ▊1 is fully open on the disk drive module that you are going to install, as Figure 51 shows.
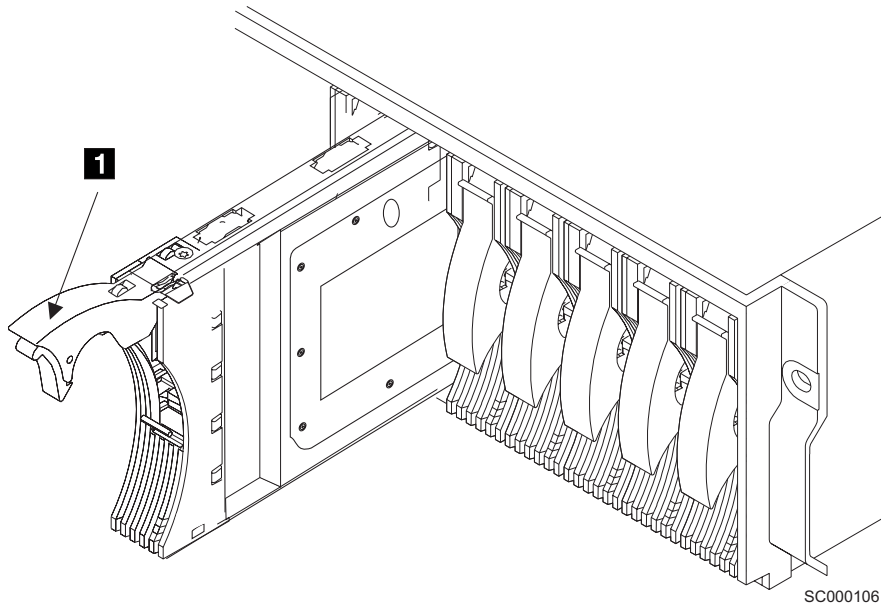

SC000106

Figure 51. Installing a disk drive module in a 2104 Model DS4

8. With one hand supporting the base of the module and the other hand holding the handle, insert the module, and push it into the slot whose Check light is on (see step 6). When the handle touches the front of the 2104 Model DS4 or Model TS4, the module stops. The module is not yet fully home.

9. While continuing to push the disk drive module into the slot, slowly close the handle ▊1 until it stops with a click. This action pushes the module fully home, as Figure 52 on page 67 shows.
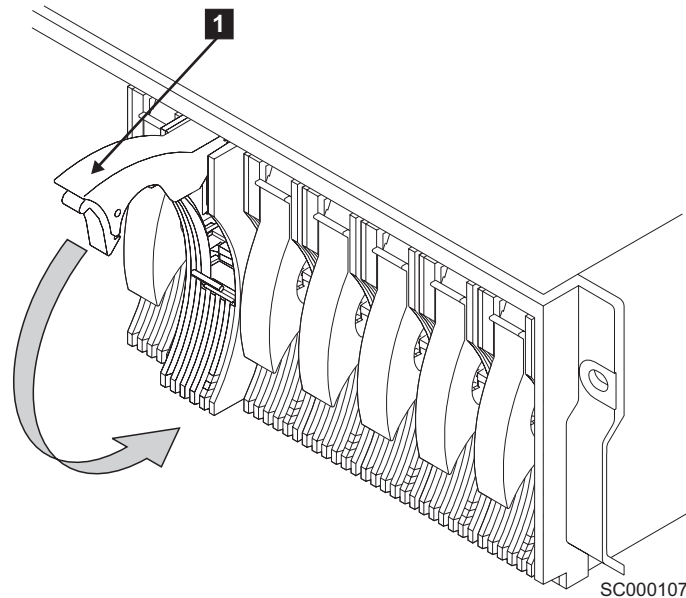
Figure 52. Closing the handle of a disk drive module

10. Verify that the disk drive module that you just installed is aligned with the sides of the 2104 Model DS4 or Model TS4, 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 then reinstall it.

11. Replace other parts in the reverse sequence.

12. If you installed the disk drive module under concurrent maintenance (see "Concurrent maintenance" on page 55), configure the new disk drive module to your host system. For more information, see Appendix A, "Additional information for RISC systems".

    If you installed the disk drive module while the host system was switched off, switch on the host system when you are ready to do so. When you switch on the host system, the disk drive module is automatically configured.

13. Using the method that is provided on your host system, check the level of microcode that is present on the disk drive module that you just installed. Additional information about the latest levels of disk drive microcode is given on the Web support page (see Web sites in Appendix A, "Additional information for RISC systems"). If you need to download the latest microcode, see Download microcode to a disk drive or SCSI interface card in Appendix A, "Additional information for RISC systems".

14. If the 2104 Model DS4 and Model TS4 is attached to a RISC system, go to step 15. Otherwise, go to step 16.

15. The disk drive that you just installed is configured with new hdisk numbers. If you want to change those numbers, go to Configuring a disk drive module to the host system in Appendix A, "Additional information for RISC systems". Otherwise, go to step 16.

16. If you came to this section from a step in MAP, return to that step, and continue with the MAP. Otherwise, go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Removing the SCSI bus bridge card assembly

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees.

Attention: Before you remove the SCSI bus bridge card assembly, switch off the host systems.

Perform the following steps to remove the SCSI bus bridge card assembly from a 2104 Model DS4.

1. Ensure that the host systems are switched off.
2. Remove the two modules that are directly on each side of the SCSI bus bridge card assembly (see "Removing a disk drive module" on page 61).
3. Squeeze each of the four lugs on the cover **1** , then remove the cover as Figure 53 shows.

SC000108
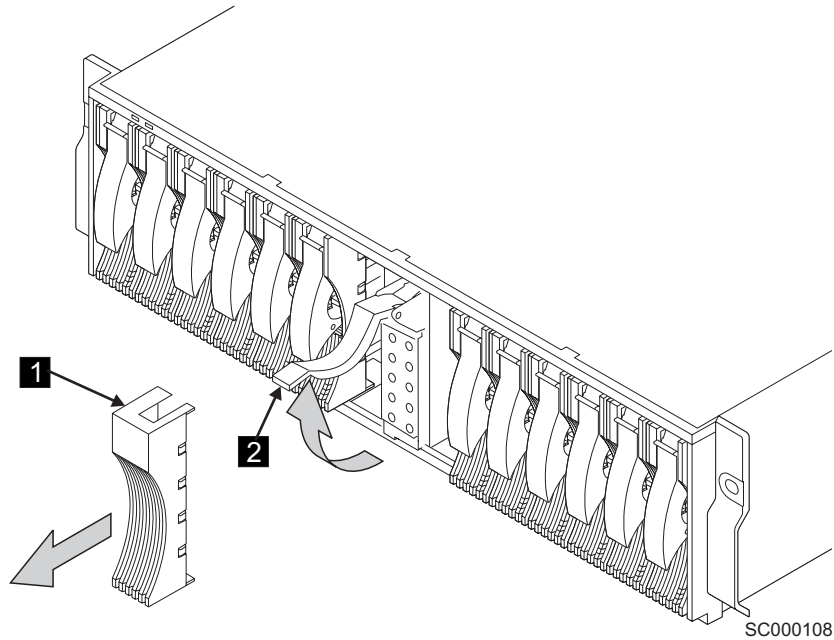
Figure 53. Removing the SCSI bridge card assembly cover

4. Lift the handle **2** of the SCSI bridge card assembly fully.

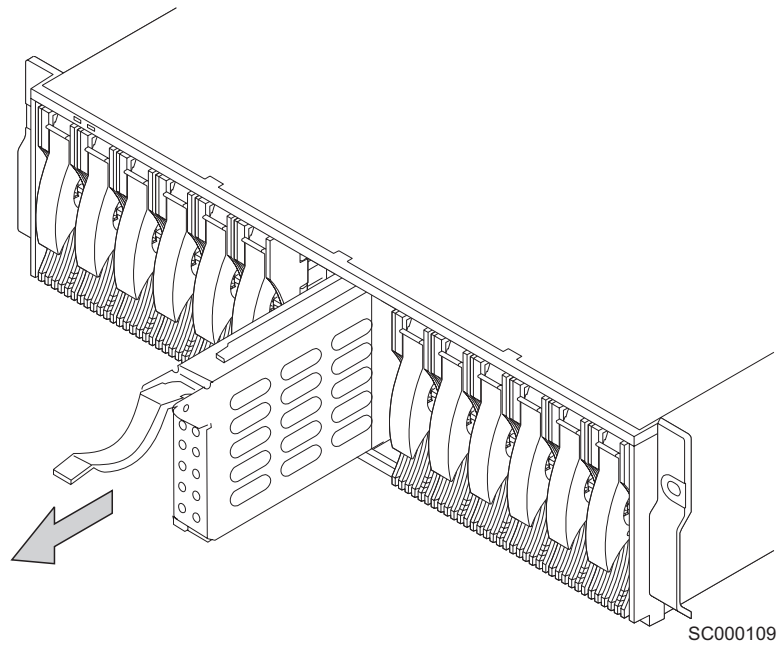5. Grasp the assembly, and pull it out from the 2104 Model DS4 or Model TS4, as Figure 54 shows.

SC000109

Figure 54. Removing the SCSI bridge card assembly

Installing the SCSI bus bridge card assembly

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees.

Perform the following steps to install the SCSI bus bridge card assembly in a 2104 Model DS4.

1. Ensure that the handle **1** of the SCSI bus bridge card assembly is fully open, as Figure 55 shows.
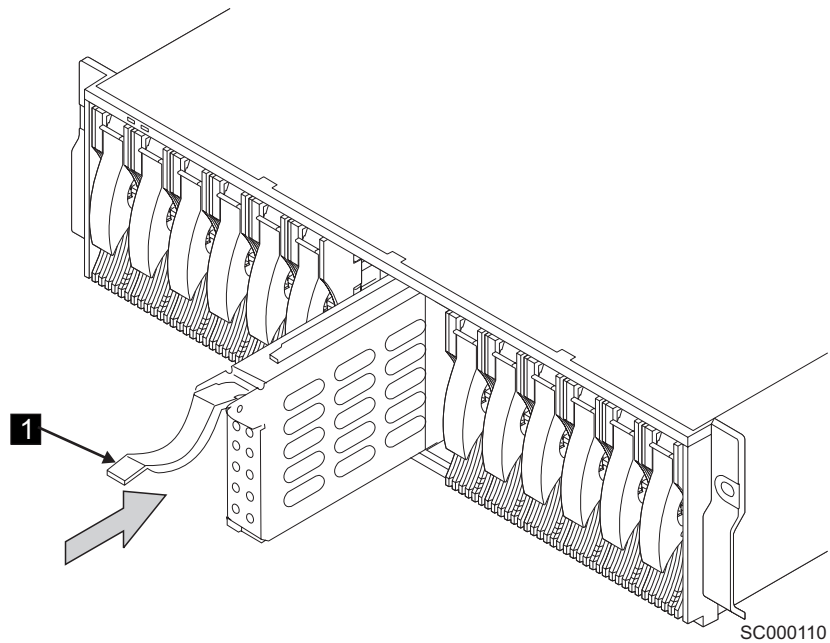
Figure 55. Installing the SCSI bridge card assembly

2. Insert the SCSI bus bridge card assembly, and push it into the slot. When the handle touches the front of the 2104 Model DS4 or Model TS4, the assembly stops. The assembly is not yet fully home.

3. Close the handle **1** until it stops with a click. This action pushes the SCSI bus bridge card assembly fully home, as Figure 56 shows.
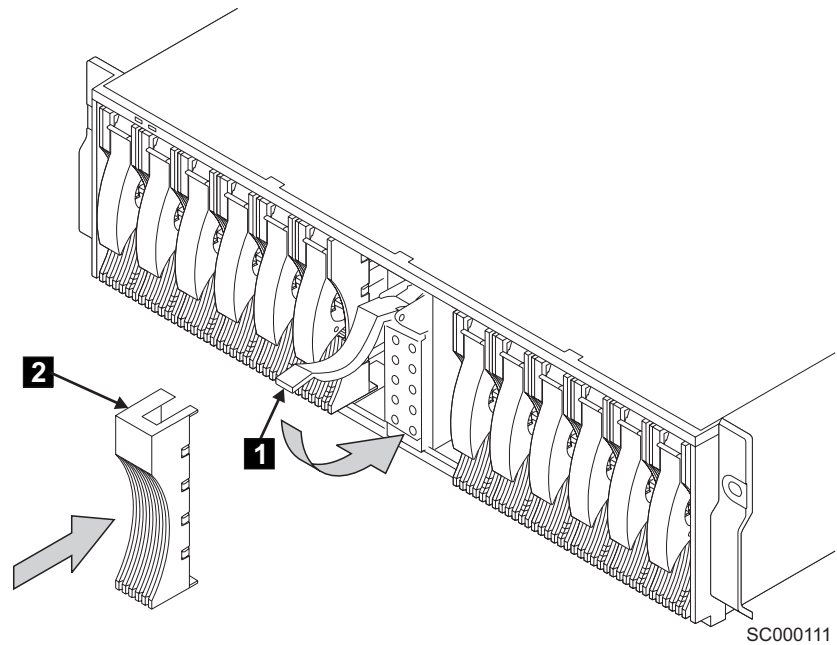

Figure 56. Closing the handle and installing the cover

4. Install the cover **2**. Squeeze each of the four lugs to lock the cover in position.
5. Reinstall the disk drive modules that you removed earlier (see "Replacing a disk drive module" on page 65).

Removing and replacing fan-and-power-supply assemblies

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees.

Notes:

1. Do not switch off the host system or the 2104 Model DS4 or Model TS4 when removing or installing power supply assemblies.

2. You can install a fan-and-power-supply assembly in either position at the back of the 2104 Model DS4 or Model TS4. You can easily distinguish it from a fan assembly because it has a dc on/standby switch and a power connector.

3. The chk light is valid only when the dc on/standby switch is set to on. The light is always on when the dc on/standby switch is set to standby.

If you are exchanging the fan-and-power-supply assembly of a unit that has one fan-and-power-supply assembly and a fan assembly, perform the following steps:

1. Remove the fan assembly (see "Removing and replacing a fan assembly" on page 75).

2. Install the replacement fan-and-power-supply assembly into the slot that contained the fan assembly.

3. Remove the failing fan-and-power-supply assembly.

4. Install the fan assembly into the slot that contained the failing fan-and-power-supply assembly.

5. At the back of the 2104 Model DS4 or Model TS4, set the dc on/standby switch **1** to standby on the fan-and-power-supply assembly that you are removing, as Figure 57 shows.
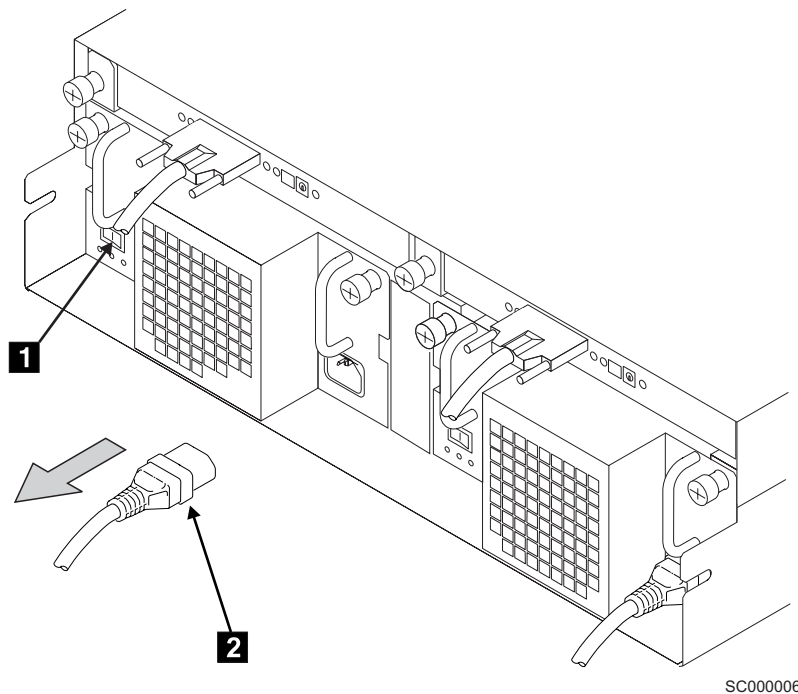

SC000006

Figure 57. Switching off and disconnecting a fan-and-power-supply assembly

> **Notes:**
> a. You might hear the speed of the other fan increase.

b. Although you have set the dc on/standby switch to standby, the amber CHK light on the fan-and-power-supply assembly might come on or flash. This condition is not a problem. Continue with the next step.

6. Unplug the power cable **2** from the fan-and-power-supply assembly that you are removing.

   Note: The fan-and-power-supply lights might stay on for a short time. Wait until they are all off before you go to the next step.

7. Unscrew the two thumbscrews **1** on the fan-and-power-supply assembly, as Figure 58 shows.
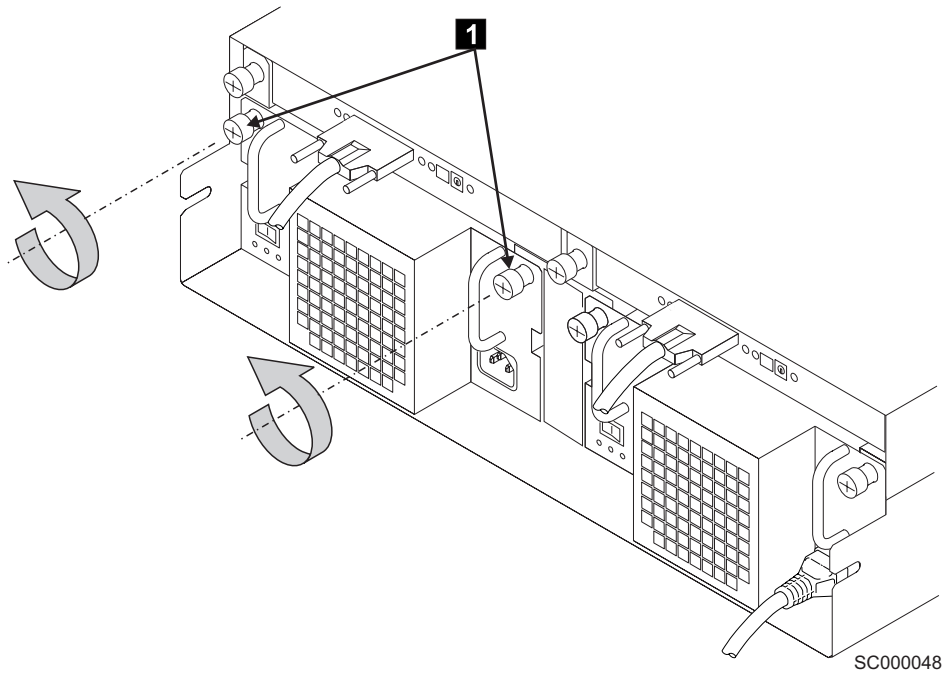

SC000048

Figure 58. Unscrewing the thumbscrews

8. Remove the fan-and-power-supply assembly, as Figure 59 on page 74 shows.

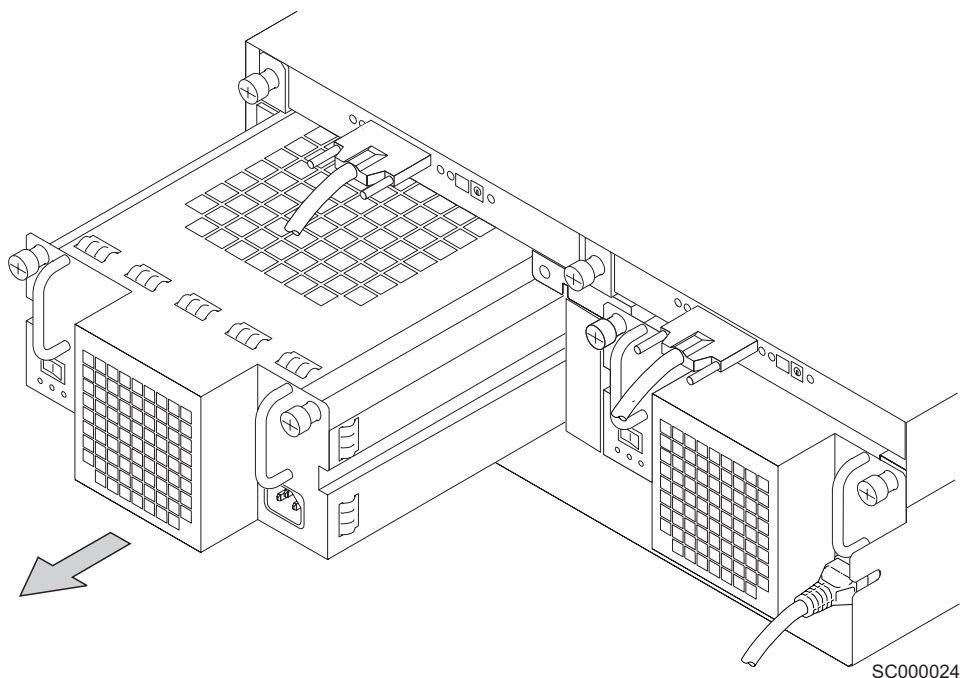   The fan-and-power-supply assembly is a complete FRU. Do not try to repair or exchange any part of it.

Figure 59. Removing a fan-and-power-supply assembly

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)

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

9. Replace parts in the reverse sequence.

   Notes:

   a. When you insert the fan-and-power-supply assembly, you might hear the speed of the other fan decrease.

   b. Remember to set the dc on/standby switch to on after you reinstall the fan-and-power-supply assembly. If the dc on/standby switch is already set to on when you reinstall the fan-and-power-supply assembly, the CHK light might come on. If it does, set the dc on/standby switch to standby, then to on.

10. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Removing and replacing a fan assembly

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees.

Notes:

1. Do not switch off the host system or the 2104 Model DS4 or Model TS4 when removing or installing a fan assembly.

2. You can install a fan assembly in either position at the back of the 2104 Model DS4 or Model TS4. You can easily distinguish it from the fan-and-power-supply assembly, because it has no DC On/Standby switch or power connector.

Perform the following steps to remove and replace a fan assembly:

1. At the back of the 2104 Model DS4 or Model TS4, unscrew the thumbscrews **1** of the fan assembly, as Figure 60 shows.
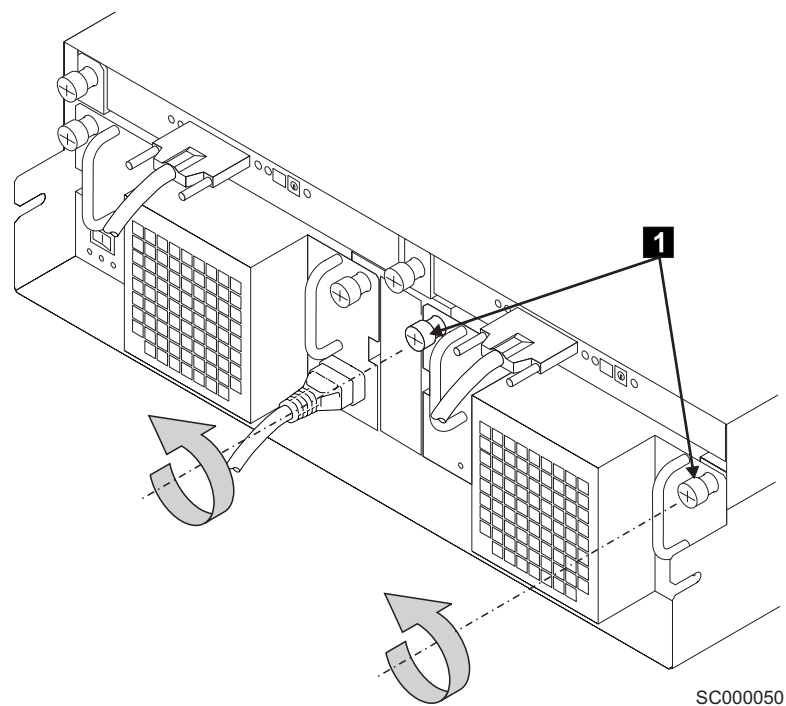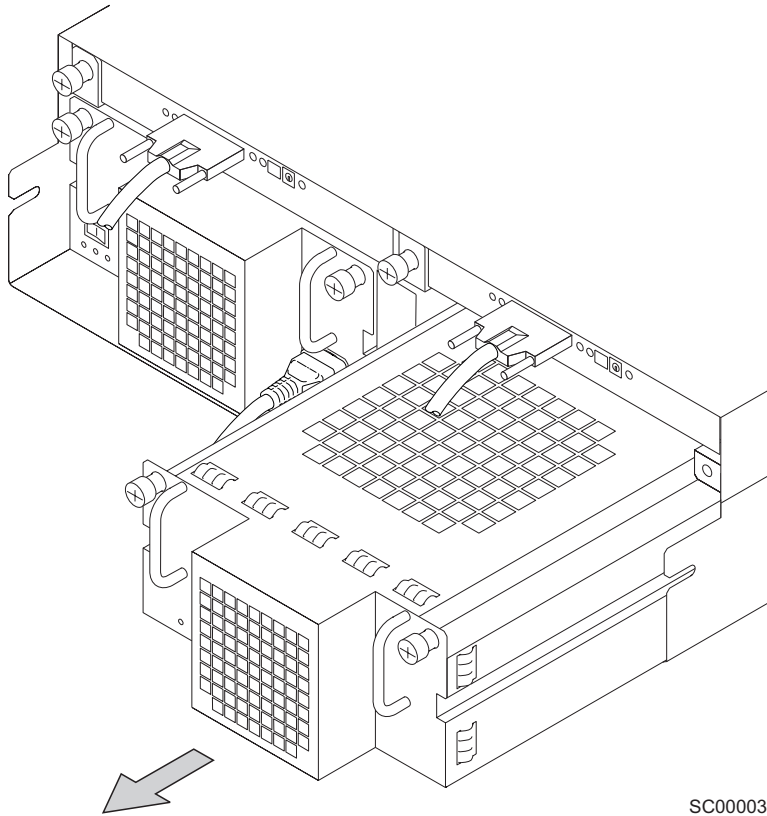

SC000050

Figure 60. Unscrewing the thumbscrews

2. Pull out the assembly, as Figure 61 on page 76 shows.

SC000031

Figure 61. Removing a fan assembly

> **Note:** You might hear the speed of the other fan increase.

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

> **Note:** The fan assembly is a complete FRU. Do not try to repair or exchange any part of it.

3. Replace parts in the reverse sequence.

> **Note:** When you insert the fan assembly, you might hear the speed of the other fan decrease.

4. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Removing and replacing a SCSI interface card assembly

The diagrams in these instructions show a 2104 Model DS4. The procedure for a 2104 Model TS4 is the same, except that everything is turned 90 degrees.

Attention: The SCSI interface card is electrostatic-discharge (ESD) sensitive. Use the tools and procedures defined by your organization to protect such parts. See also "Electrostatic discharge (ESD)" on page xiv.

Note: Do not switch off the host system or the 2104 Model DS4 or Model TS4 when removing or installing the SCSI interface card assembly.

Perform the following steps to remove and replace a SCSI interface card assembly:

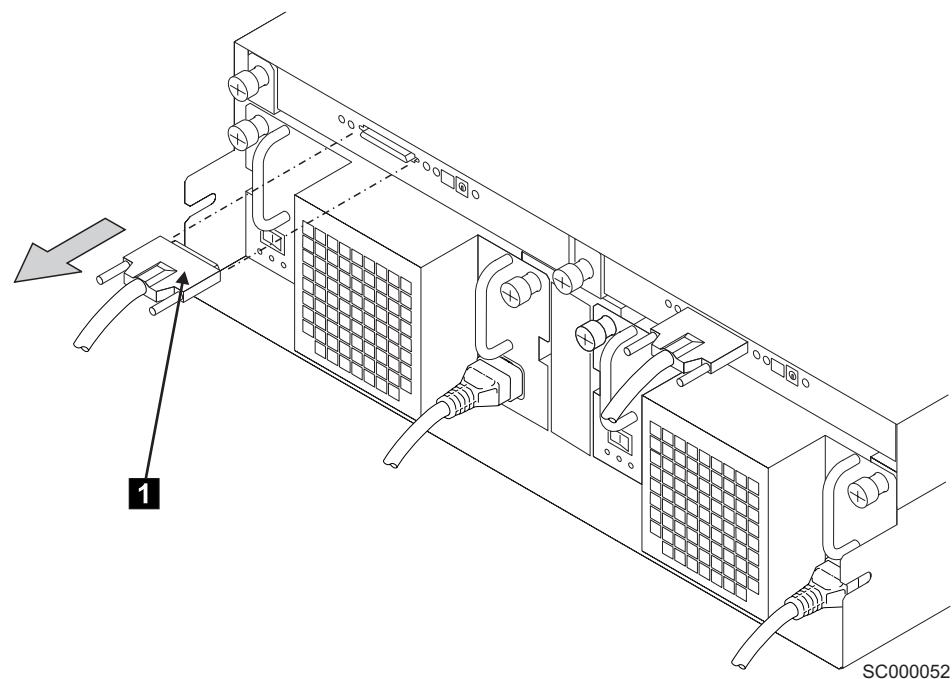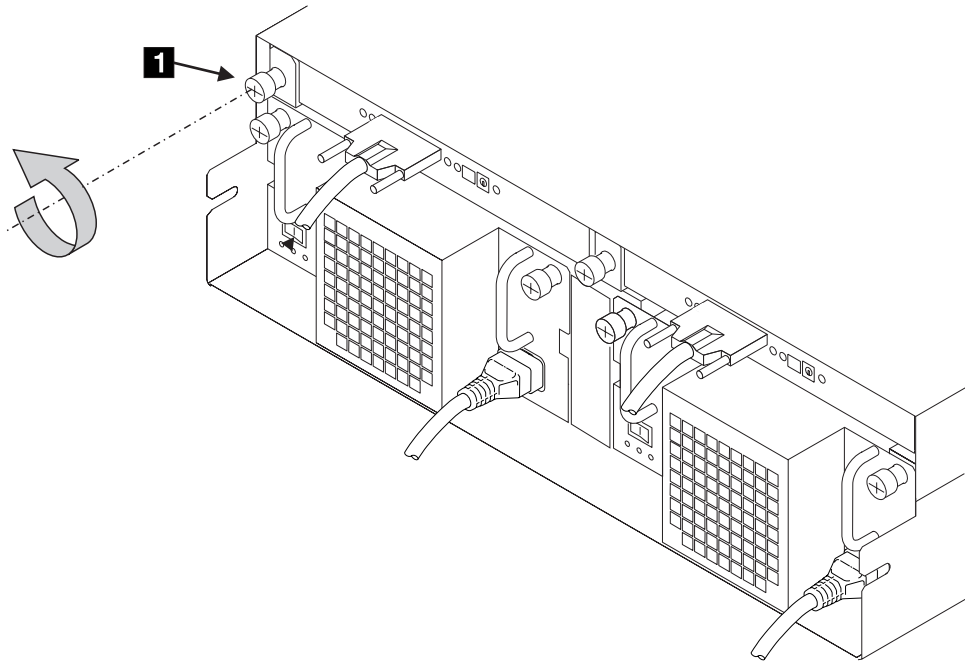1. Disconnect the SCSI cable **1** (if present), as Figure 62 shows.

Figure 62. Disconnecting the SCSI cable

> **Note:** If the 2104 Model DS4 or Model TS4 is switched on, it might switch off when you perform this action (see "Power control switch" on page 10).
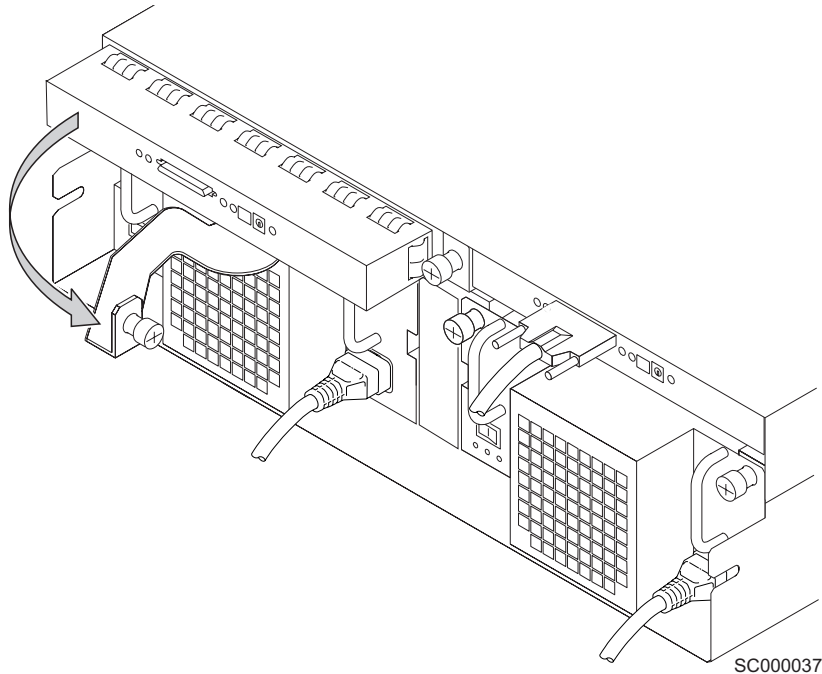
2. Unscrew the thumbscrew **1** , as Figure 63 shows.

SC000134

Figure 63. Unscrewing the thumbscrew

3. Open the lever **1** fully. This action unplugs the card assembly from the backplane, as Figure 64 shows.

SC000037

Figure 64. Opening the lever

4. Pull the SCSI interface card assembly out from the 2104 Model DS4 or Model TS4, as figure Figure 65 shows.
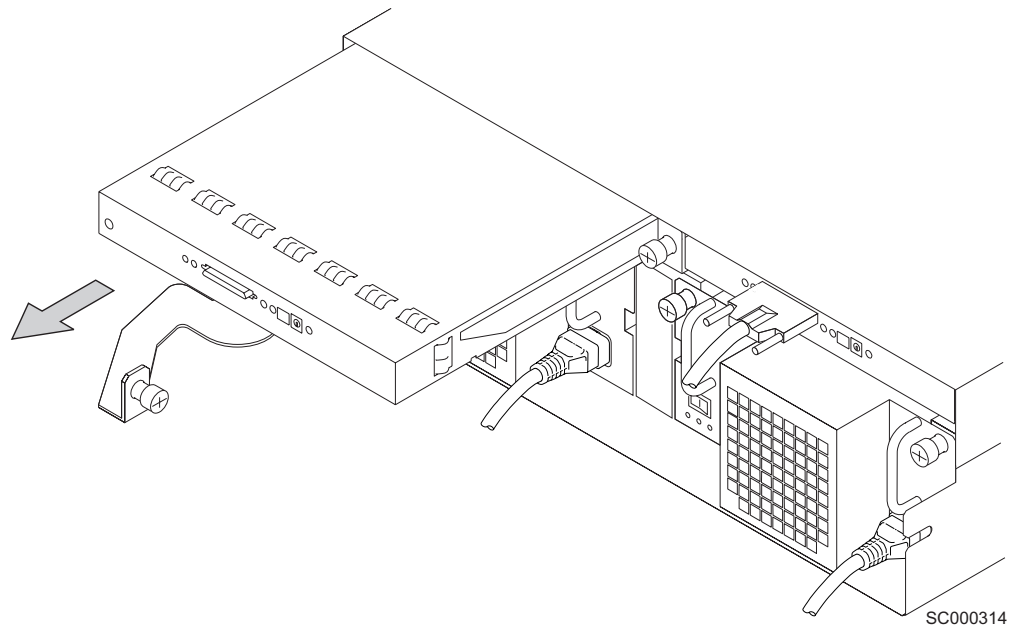

SC000314

Figure 65. Removing the SCSI interface card assembly

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

5. Replace the card:
   - If you are replacing the left SCSI interface card, when viewed from the rear, please remove the switch cover plate from new SCSI interface card assembly and ensure that its switch settings match those of the original SCSI interface card assembly. To remove the switch cover plate, please pull the latch and slide to the right.
   - If you are replacing the right SCSI interface card, when viewed from the rear, do not remove the switch cover plate on the new SCSI interface card assembly. The switch settings on this SCSI interface card are ignored.

6. Replace parts in the reverse sequence.

   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)

   Notes:

   a. When you reconnect the SCSI cable, ensure that its connector is correctly aligned with the connector of the SCSI interface card assembly. Otherwise, you might bend the pins. Engage the connectors carefully.

   b. If the 2104 Model DS4 or Model TS4 is switched off, it might switch on when you reinstall the SCSI cable (see "Power control switch" on page 10).

7. Using the method that is provided on your host system, check the level of microcode that is present on the SCSI interface card that you have just installed. Additional information about the latest levels of SCSI interface card

microcode is given on the Web support page (see Appendix A, "Additional information for RISC systems"). If you need to download the latest microcode, see "Microcode maintenance" on page 25.

8. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Exchanging a frame assembly

Notes:

1. Use this procedure only if you are exchanging the frame of the 2104 Model DS4 or Model TS4. If you are removing a complete 2104 Model DS4 from the rack (for example, to locate it elsewhere), go to "Removing a 2104 Model DS4 from a rack" on page 92.

2. You will need another person to help you remove the frame from the rack.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

Perform the following steps to exchange a frame assembly:

1. Verify with the customer that all operations between the 2104 Model DS4 or Model TS4 and the host system have been stopped.

2. Remove power from the 2104 Model DS4 or Model TS4 (see "Removing and replacing power to the 2104 Model DS4 or Model TS4" on page 59).

3. For the 2104 Model TS4, open the front cover (see "Removing and replacing the cover" on page 56).

4. Carefully make a note of the locations of the disk drive modules and (if present) dummy disk drive modules that are in the 2104 Model DS4 or Model TS4. This action ensures that you reinstall the modules into their original slots. It is recommended that you attach identifying labels to the modules.

5. Remove all the disk drive modules and dummy disk drive modules (see "Removing a disk drive module" on page 61).

6. Remove the SCSI bus bridge card assembly (see "Removing the SCSI bus bridge card assembly" on page 68).

7. Remove the fan-and-power-supply assemblies, or fan assembly and fan-and-power-supply assembly, from the back of the 2104 Model DS4 or Model TS4 (see "Removing and replacing fan-and-power-supply assemblies" on page 72 and, if required, "Removing and replacing a fan assembly" on page 75).

8. Note which SCSI cable (if present) is connected to each particular SCSI interface card.

9. Disconnect the external SCSI cables (if present) from the SCSI interface cards.

   Attention: In the new frame assembly, each SCSI interface card assembly must occupy the position that it occupied in the original frame assembly.

10. Note the positions of the SCSI interface card assemblies before you remove them. Attach labels, if necessary.

11. Remove the SCSI interface card assemblies (see "Removing and replacing a SCSI interface card assembly" on page 77).

12. If you are replacing the frame assembly of a 2104 Model DS4, go to "Exchanging the frame assembly of a 2104 Model DS4" on page 83.

    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)

If you are replacing the frame assembly of a 2104 Model TS4, go to
"Exchanging the frame assembly of a 2104 Model TS4" on page 88.

Exchanging the frame assembly of a 2104 Model DS4

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:
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)**

Perform the following steps to exchange the frame of a 2104 Model DS4:

1. Remove the two front mounting screws **1**, as Figure 66 shows.
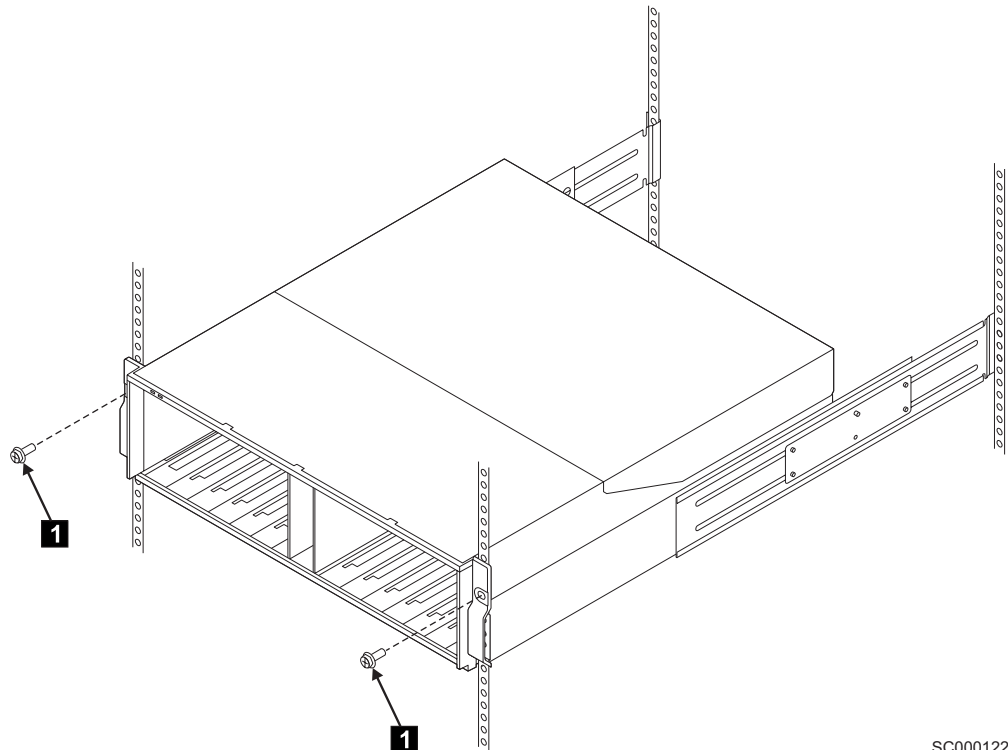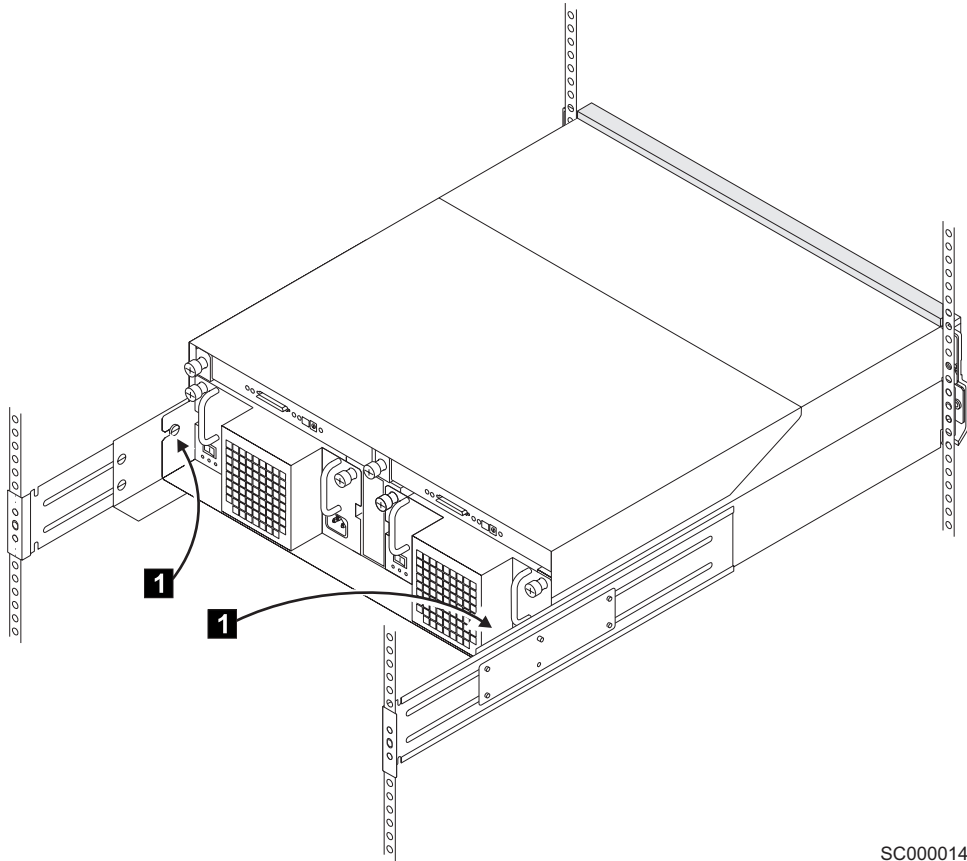

SC000122
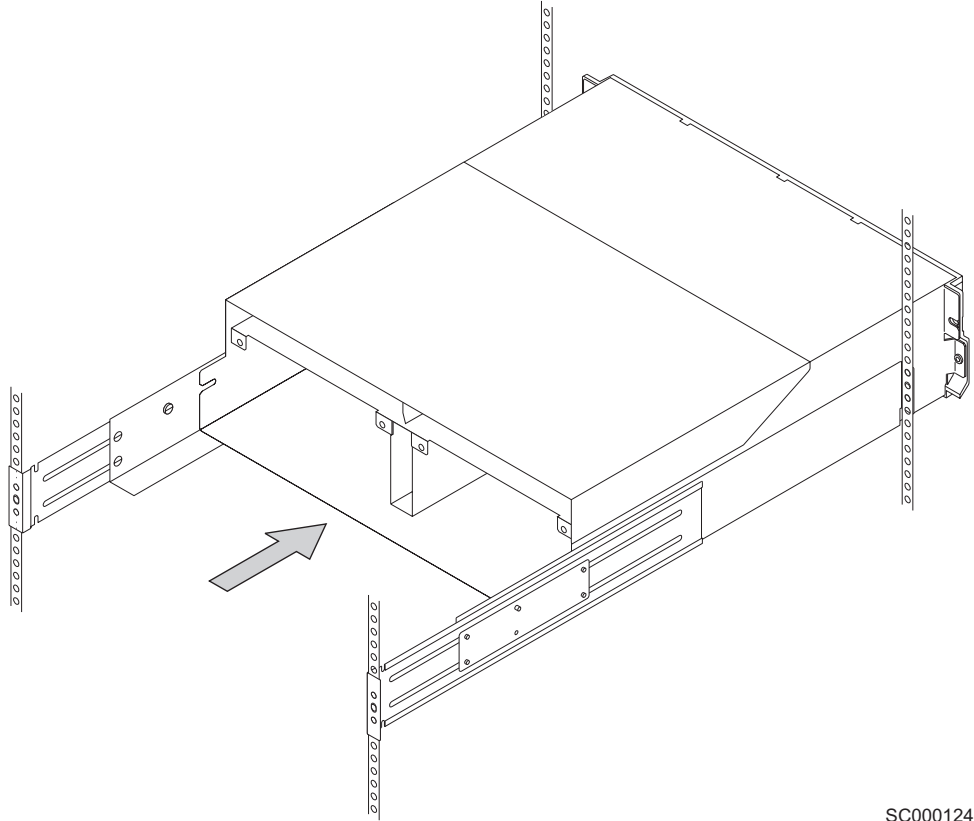
Figure 66. Removing the front mounting screws

2. At the back of the 2104 Model DS4, loosen the two back mounting screws ▆1▆ , as Figure 67 shows.

SC000014

Figure 67. Loosening the back mounting screws

3. Push the frame assembly forward approximately 5 cm (2 in.), as Figure 68 shows.
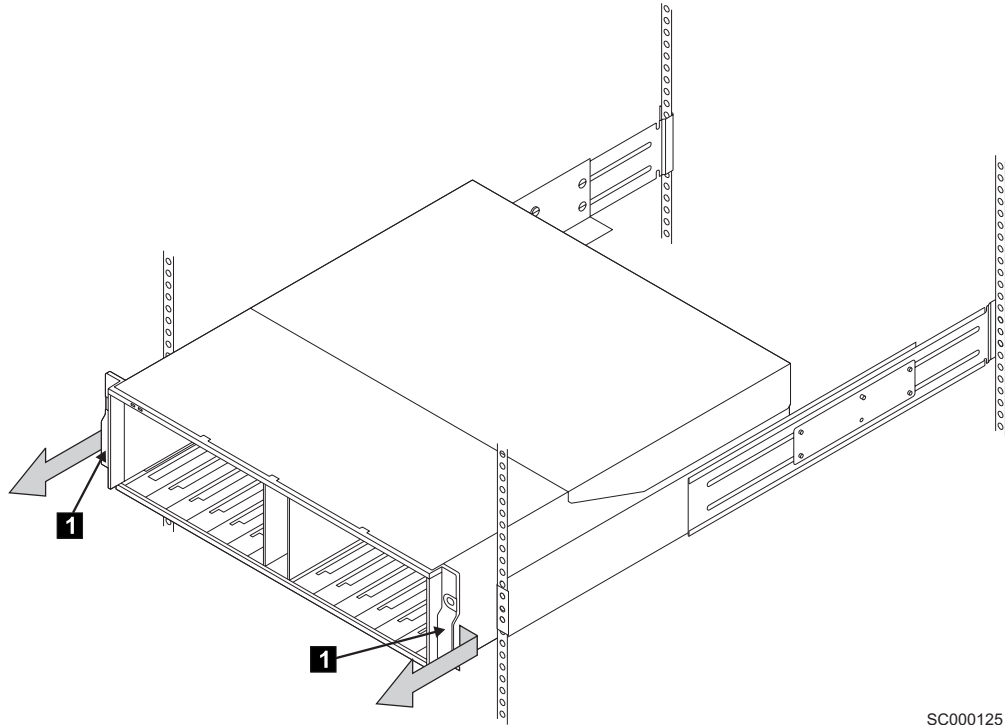

SC000124

Figure 68. Pushing the frame assembly forward

Attention: Do not push the frame assembly too far forward.

4. Go to the front of the rack.

SC000125

Figure 69. Removing the frame assembly from the rack

5. With aid from another person, pull the frame assembly forward and remove it from the rack, as Figure 69 shows.

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

Refer to manuals   32 Kg (70.5 lbs)

SC000220

Figure 70. 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.

≥ 18 Kg (37 lbs)   ≥ 32 Kg (70.5 lbs)

SC000334

   Attention: When you remove the frame assembly from the rack, ensure that you pull the metal brackets **1** that are behind the plastic bezel. Do not pull the bezel: it will break.

6. Replace parts in the reverse sequence.

   Notes:

   a. Ensure that, in the replacement frame assembly, each SCSI interface card assembly occupies the position that it occupied in the original frame assembly.

   b. If you have installed a replacement frame assembly, attach the blank self-adhesive serial-number label that is supplied with the frame assembly. The new label must cover the original label (see "Labels" on page 19).

   c. Write the serial number of the original frame assembly onto the blank label.

   d. Destroy the serial number on the original frame assembly.

7. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Exchanging the frame assembly of a 2104 Model TS4

Perform the following steps to exchange the frame of a 2104 Model TS4:

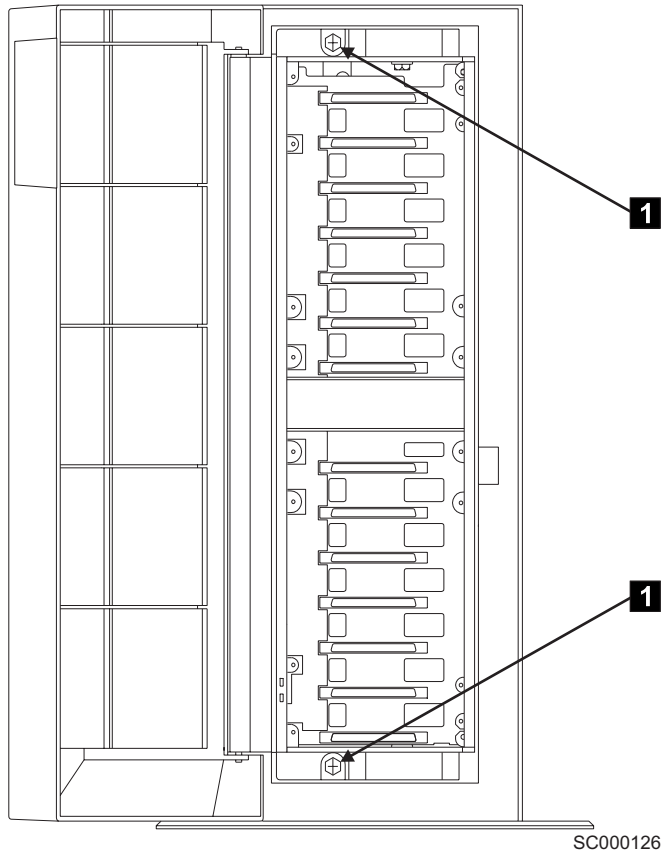1. Remove the two front mounting screws **1** from the frame assembly, as Figure 71 shows.

SC000126

Figure 71. Removing the frame from a 2104 Model TS4 (1)

2. At the back of the 2104 Model TS4, loosen the two back mounting screws **1** , as Figure 72 shows.
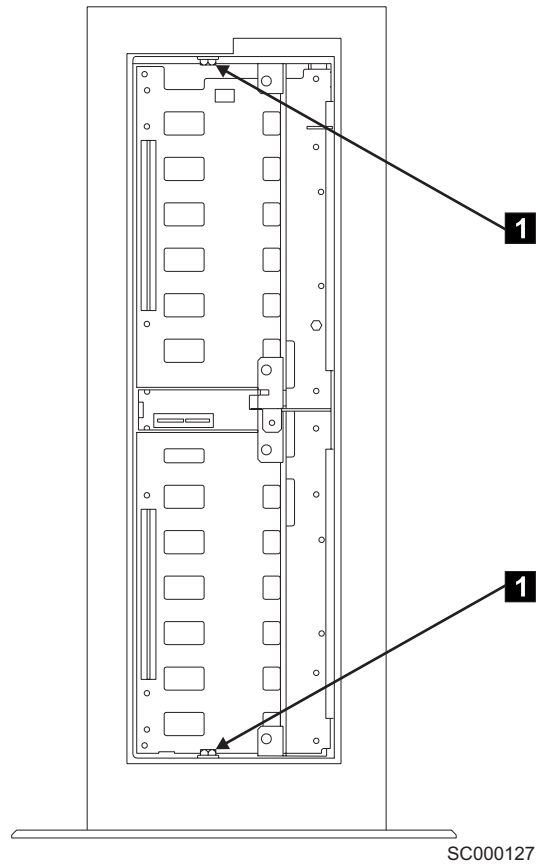

SC000127

Figure 72. Removing the frame from a 2104 Model TS4 (2)

3. Push the frame assembly forward approximately 5 cm (2 in.).

   Attention: Do not push the frame assembly too far forward.

4. Go to the front of the 2104 Model TS4.

5. With aid from another person, pull the frame assembly forward and remove it from the deskside unit.

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

32 - 55 Kg (70.5 - 121.2 lbs)

SC000219

Figure 73. 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.

> 18 Kg (37 lbs)   > 32 Kg (70.5 lbs)

SC000325

Figure 74. Use safe lifting practices.

Attention: When you remove the frame assembly from the deskside unit, ensure that you pull the metal brackets that are behind the plastic bezel (see Figure 69 on page 86). Do not pull the bezel, it will break.

6. Replace parts in the reverse sequence.

   Notes:

   a. Ensure that, in the replacement frame assembly, each SCSI interface card assembly occupies the position that it occupied in the original frame assembly.

   b. If you have installed a replacement frame assembly, attach the blank self-adhesive serial-number label that is supplied with the frame assembly. The new label must cover the original label (see "Labels" on page 19).

   c. Write the serial number of the original frame assembly onto the blank label.

   d. Destroy the serial number on the original frame assembly.

7. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Removing a 2104 Model DS4 from a rack

Notes:

1. Use this procedure only if you are removing a complete 2104 Model DS4 from the rack (for example, to locate it elsewhere). If you are exchanging the frame of the 2104 Model DS4, go to "Exchanging a frame assembly" on page 81.

2. You will need another person to help you remove the 2104 Model DS4 from the rack.

Attention: Do not remove power from the host system or 2104 Model DS4 or Model TS4 unless you are told to in the instructions that you are following. Power cables and external SCSI cables that connect the 2104 Model DS4 or Model TS4 to the host system can be disconnected while that system is running.

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

1. If not already done:

   a. Verify with the customer that all operations between the 2104 Model DS4 and the host system have been stopped.

   b. If applicable, unconfigure the 2104 Model DS4 from the host system. For more information, see Appendix A, "Additional information for RISC systems".

   c. Make a note of the positions of the external SCSI cables that are connected at the back of the 2104 Model DS4.

   d. Disconnect the external SCSI cables from the back of the 2104 Model DS4.

   e. Remove all power from the 2104 Model DS4 (see "Removing and replacing power to the 2104 Model DS4 or Model TS4" on page 59).

2. You are now going to remove all the disk drive modules and (if present) the dummy disk drive modules from the 2104 Model DS4. If the 2104 Model DS4 is to be used later with its disk drive modules configured as they are now, carefully make a note of the locations of the disk drive modules and dummy disk drive modules before you start to remove them. This action ensures that you reinstall the modules into their original slots. It is recommended that you attach identifying labels to the modules.

   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:
   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:
A 2104 Model DS4 weighs over 32 Kg (70.5 lbs). Refer to manuals. (4)

Refer to manuals   32 Kg (70.5 lbs)

SC000220

Figure 75. 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.

≥ 18 Kg (37 lbs)   ≥ 32 Kg (70.5 lbs)

SC000334

3. Remove all the disk drive modules (see "Removing disk drive modules and dummy disk drive modules" on page 61).

4. Remove the two front mounting screws **1**, as Figure 76 shows.
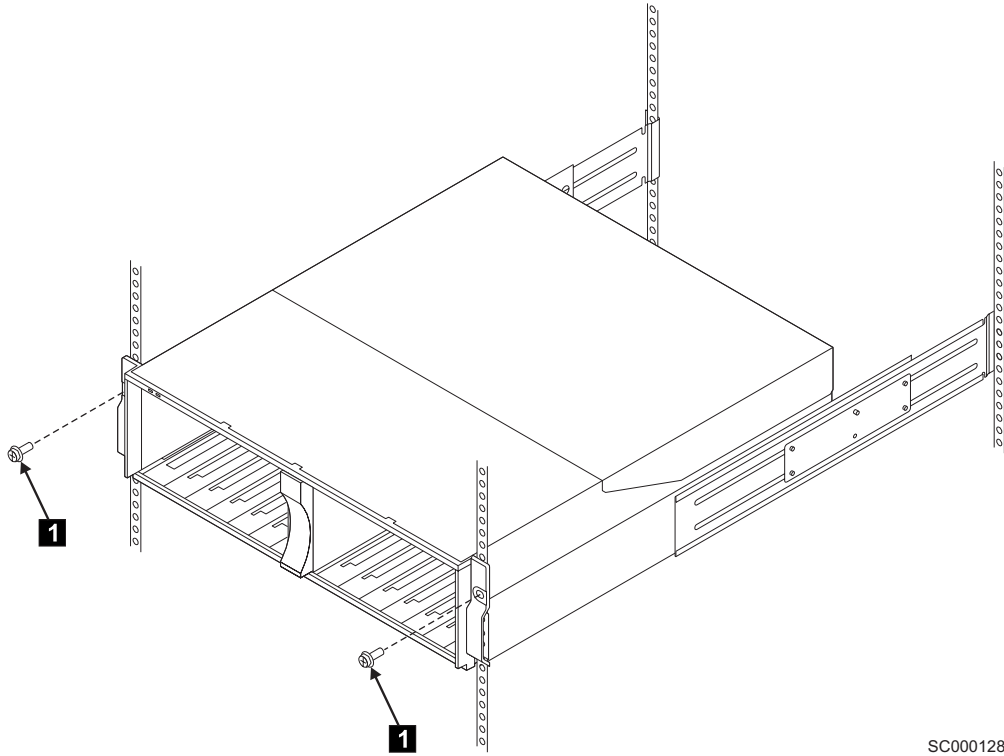
Figure 76. Removing the front mounting screws

5. At the back of the 2104 Model DS4, loosen the two back mounting screws **1** , as Figure 77 shows.
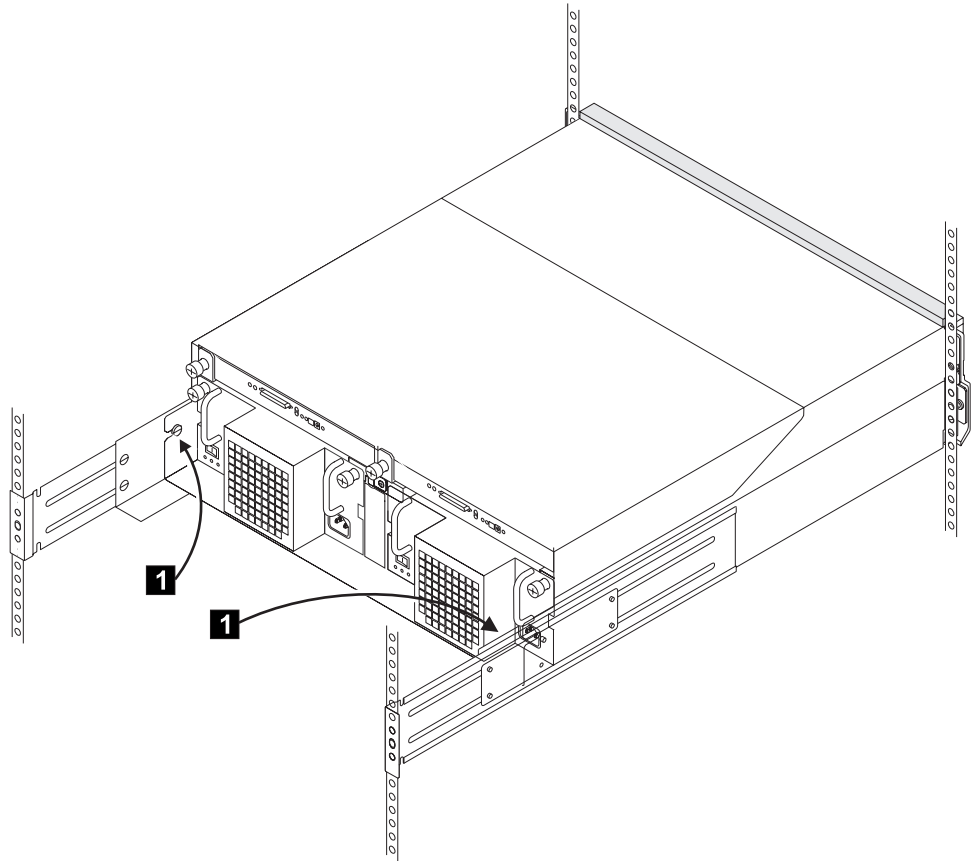
SC000002

Figure 77. Loosening the back mounting screws

6. Push the 2104 Model DS4 forward approximately 5 cm (2 in.), as Figure 78 shows.
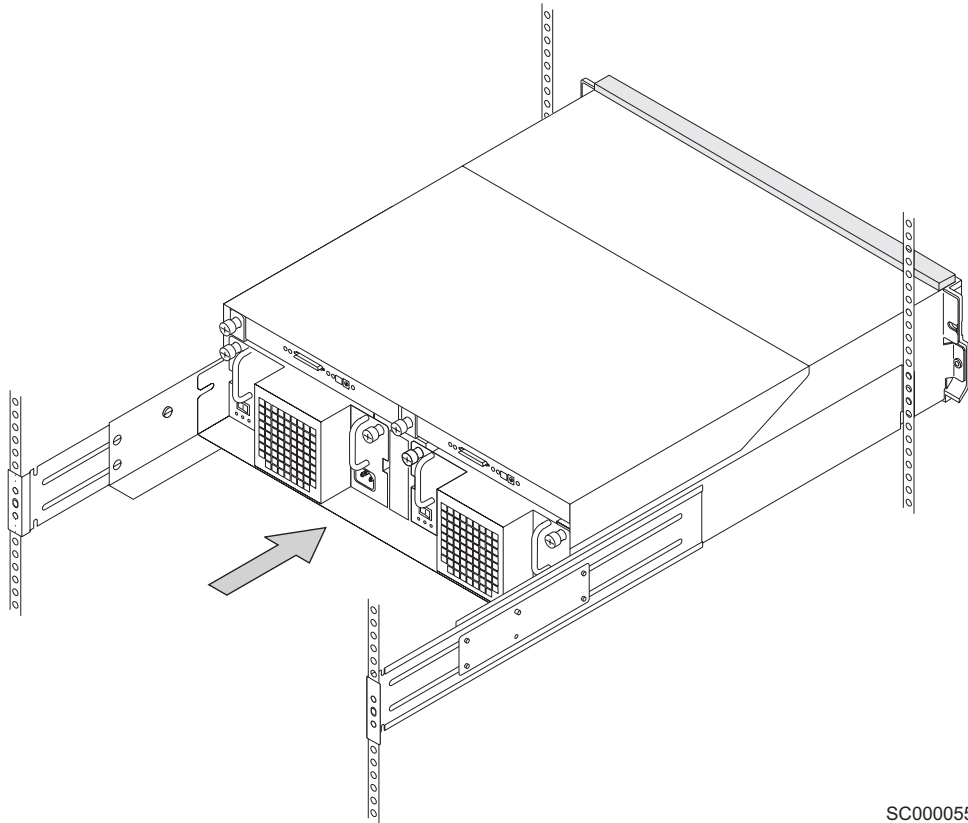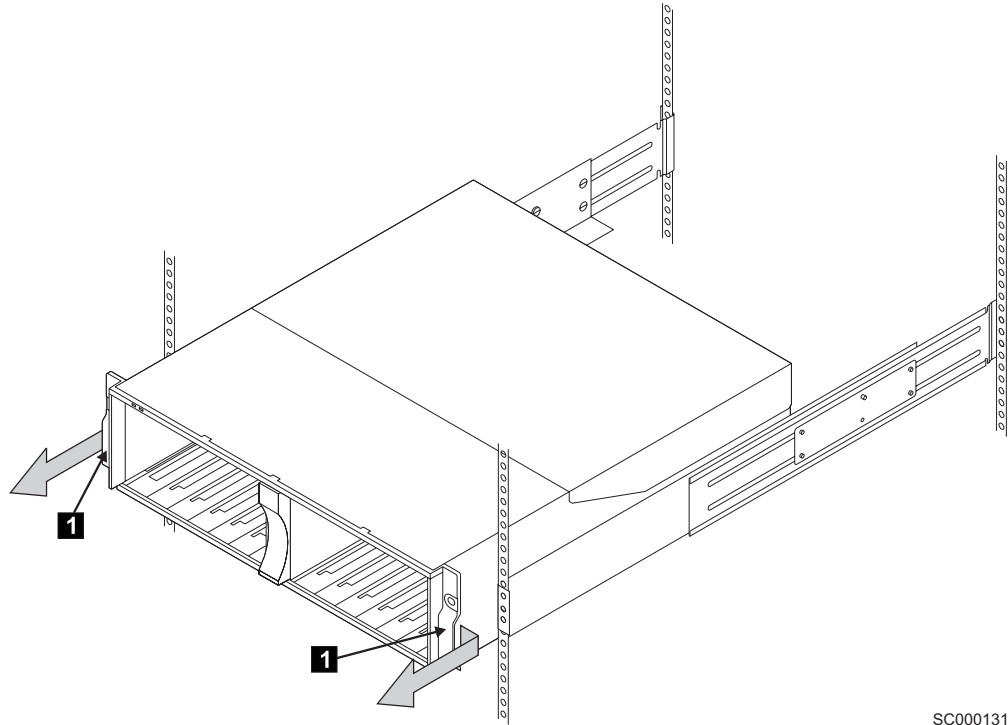

SC000055

Figure 78. Pushing the 2104 Model DS4 forward

Attention: Do not push the 2104 Model DS4 too far forward.

7. Go to the front of the rack, as Figure 79 shows.

SC000131

Figure 79. Removing the 2104 Model DS4 from the rack

8. With aid from another person, pull the 2104 Model DS4 and Model TS4 forward and remove it from the rack.

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

Refer to manuals   32 Kg (70.5 lbs)

SC000220

Figure 80. 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.

> 18 Kg (37 lbs)   > 32 Kg (70.5 lbs)

SC000334

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)

Attention: When you remove the 2104 Model DS4 from the rack, ensure that you pull the metal brackets **1** , as Figure 79 on page 97 shows, that are behind the plastic bezel. Do not pull the bezel; it will break.
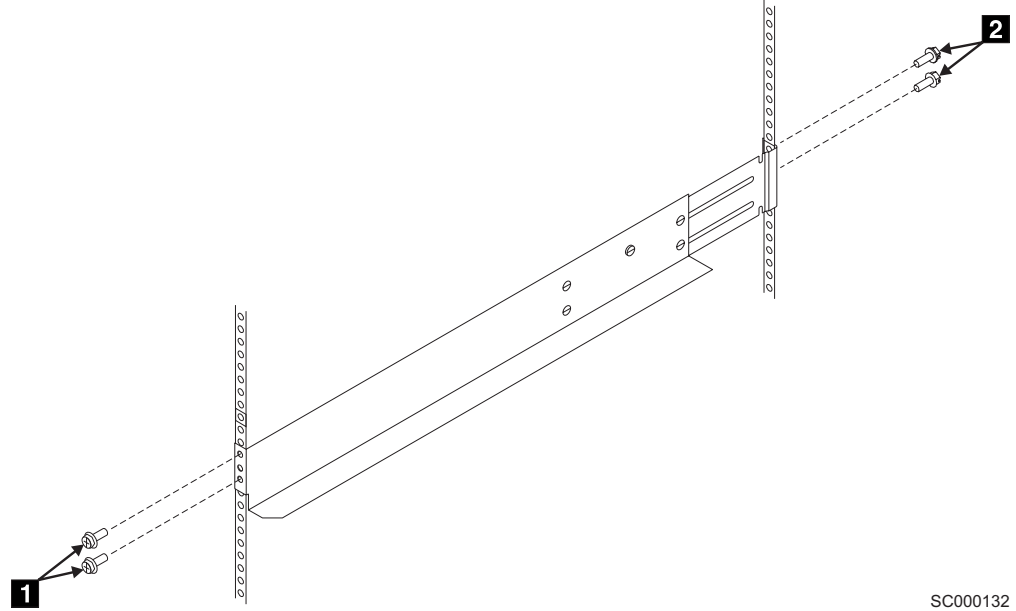
9. Reinstall the 2104 Model DS4 in the reverse sequence.

10. Go to "MAP 2410: 2104 Model DS4 or Model TS4-repair verification" on page 53 to verify the repair.

Removing and replacing support rails

Perform the following steps to remove and replace support rails:

1. To remove the support rails, remove the screws **1** and **2**, then remove the rails, as Figure 81 shows.

SC000132

Figure 81. Removing the support rails from the rack

2. If you need to reinstall the support rails (for example, because you are relocating the 2104 Model DS4), or you need to install replacement rails, go to step 3.

3. The 2104 Model DS4 is three EIA[1] units high. Using the preinstallation planning information, or other information supplied by the customer, determine where you are going to locate the 2104 Model DS4 in the rack.

4. 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 subsystems.

5. For each support rail, perform the following steps while referring to Figure 82:
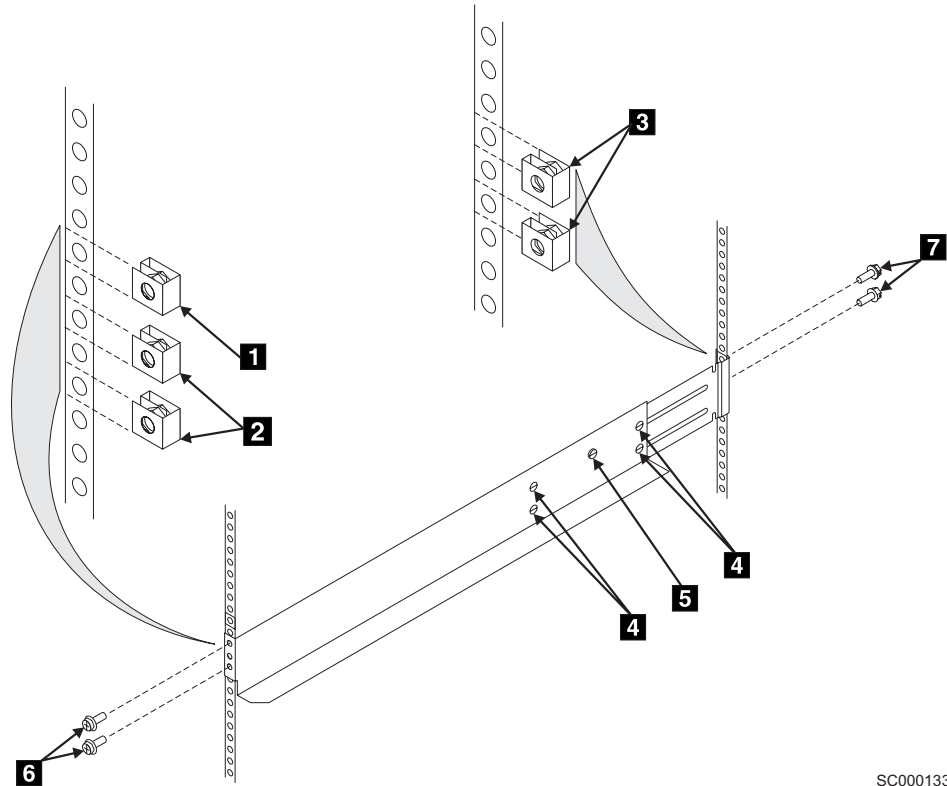
Figure 82. Installing the support rails into a rack

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

b. Count two holes upward from the upper nut clip and attach a nut clip **1**.

c. At the back of the rack, install two nut clips **3** at the selected holes.

d. If necessary, loosen the four adjustment screws **4** and the back mounting screw **5** 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 **6** 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**.

---

1. Electronics Industries Association.

i. Insert the rail screws **7** 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, relocate it as necessary.

l. Fully tighten the front and back rail screws.

m. Fully tighten the four adjustment screws **4** . Do not tighten the back mounting screw **5** . The screw must be loose to allow the installation of the 2104 Model DS4.

Chapter 4. Parts catalog

This parts catalog gives part numbers for the parts and FRUs of the 2104 Model DS4 and 2104 Model TS4.

Conventions

AR   in the units column of the parts list denotes that the quantity used is as required.

Assembly 1: 2104 Model DS4
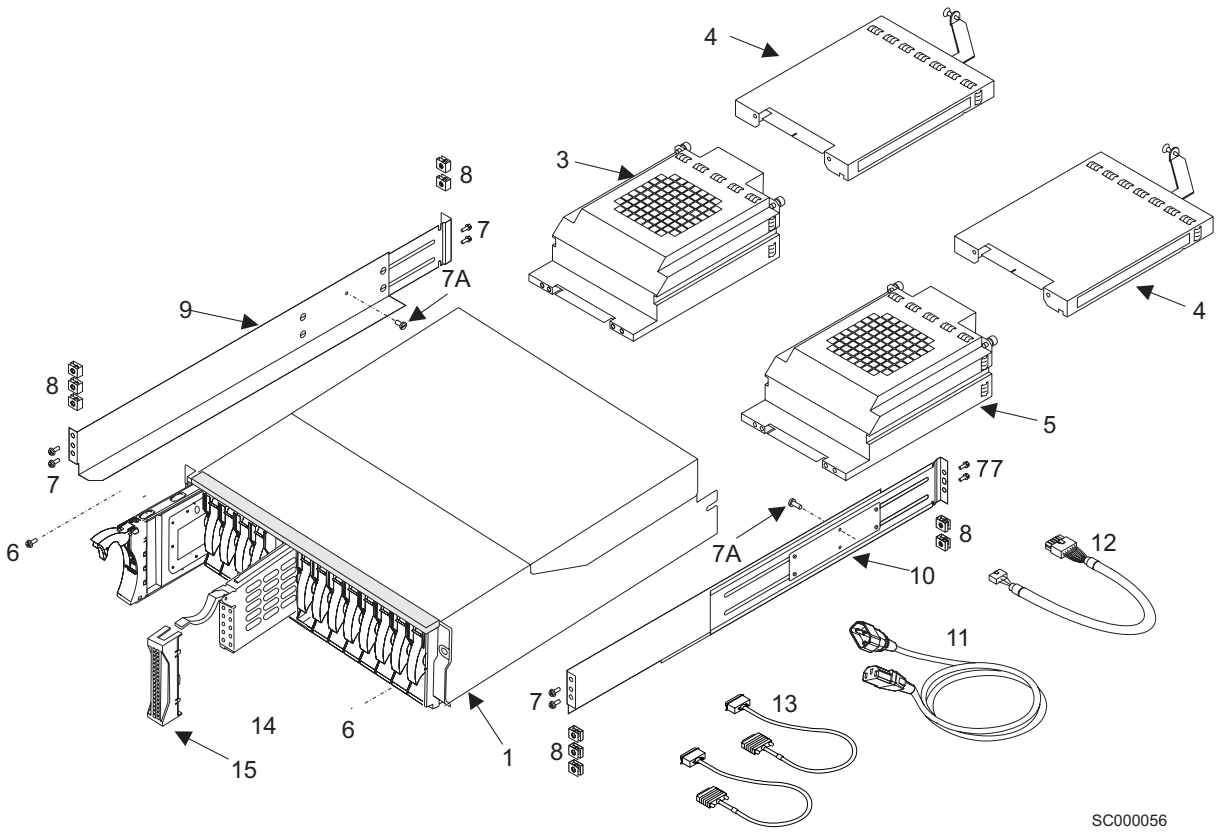
SC000056

Asm–Index	Part Number	Units	Description
1–1	97P1501	1	Frame assembly (FRU kit, including foam baffle and labels)
–2	55P4120	AR	36 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–2	55P4075	AR	36 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–2	55P4124	AR	73 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–2	55P4080	AR	73 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–2	55P4128	AR	146 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–2	55P4085	AR	146 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–2	55P4100	AR	36 GB, 3.5-inch, SCSI disk drive module (15 000 rpm)
–2	55P4105	AR	73 GB, 3.5-inch, SCSI disk drive module (15 000 rpm)
–2	37L0198	AR	Dummy disk drive module
–3	97P1515	AR	Fan-and-power-supply assembly, 220 V ac (for 2104s that have two fan-and-power-supply assemblies)
–3	97P1518	AR	Fan-and-power-supply assembly, –48 V dc (for 2104s that have two fan-and-power-supply assemblies)
–3	97P1564	AR	Fan assembly (for 2104s that have one fan-and-power-supply assembly)
–4	97P1508	AR	SCSI interface card assembly
–4	97P1510	AR	Dummy SCSI interface card assembly
–5	97P1515	1	Fan-and-power-supply assembly, 220 V ac (for 2104s that have two fan-and-power-supply assemblies)
–5	97P1518	1	Fan-and-power-supply assembly, –48V dc (for 2104s that have two fan-and-power-supply assemblies)
–6	12J5289	2	Front mounting screw
–7	12J5289	8	Rail mounting screw
–7A	54G2882	2	Back mounting screw
–8	00N8709	10	Nut clip
–9	37L0042	1	Support rail, left, for full-height rack
–10	37L0043	1	Support rail, right, for full-height rack
–11	36L8886	AR	AC Power cable, to PDU
–12	11L0399	AR	DC Power cable
–13	09L3299	AR	External SCSI copper cable, 1.0 m (3.3 ft)
–13	09L3301	AR	External SCSI copper cable, 3.0 m (9.8 ft
–13	09L3303	AR	External SCSI copper cable, 5.0 m (16.4 ft)
–13	09L3305	AR	External SCSI copper cable, 10.0 m (32.8 ft)
–13	09L3307	AR	External SCSI copper cable, 20.0 m (65.6 ft
–14	97P1511	1	SCSI bus bridge card assembly
–15	07K7052	1	Bezel, SCSI bus bridge card assembly (detail part of 97P1511)
–16	55P3131	1	Switch cover plate (detail part of 97P1508)

7

6

2A

5

4

2

3A

2

3

1

2A

10

11
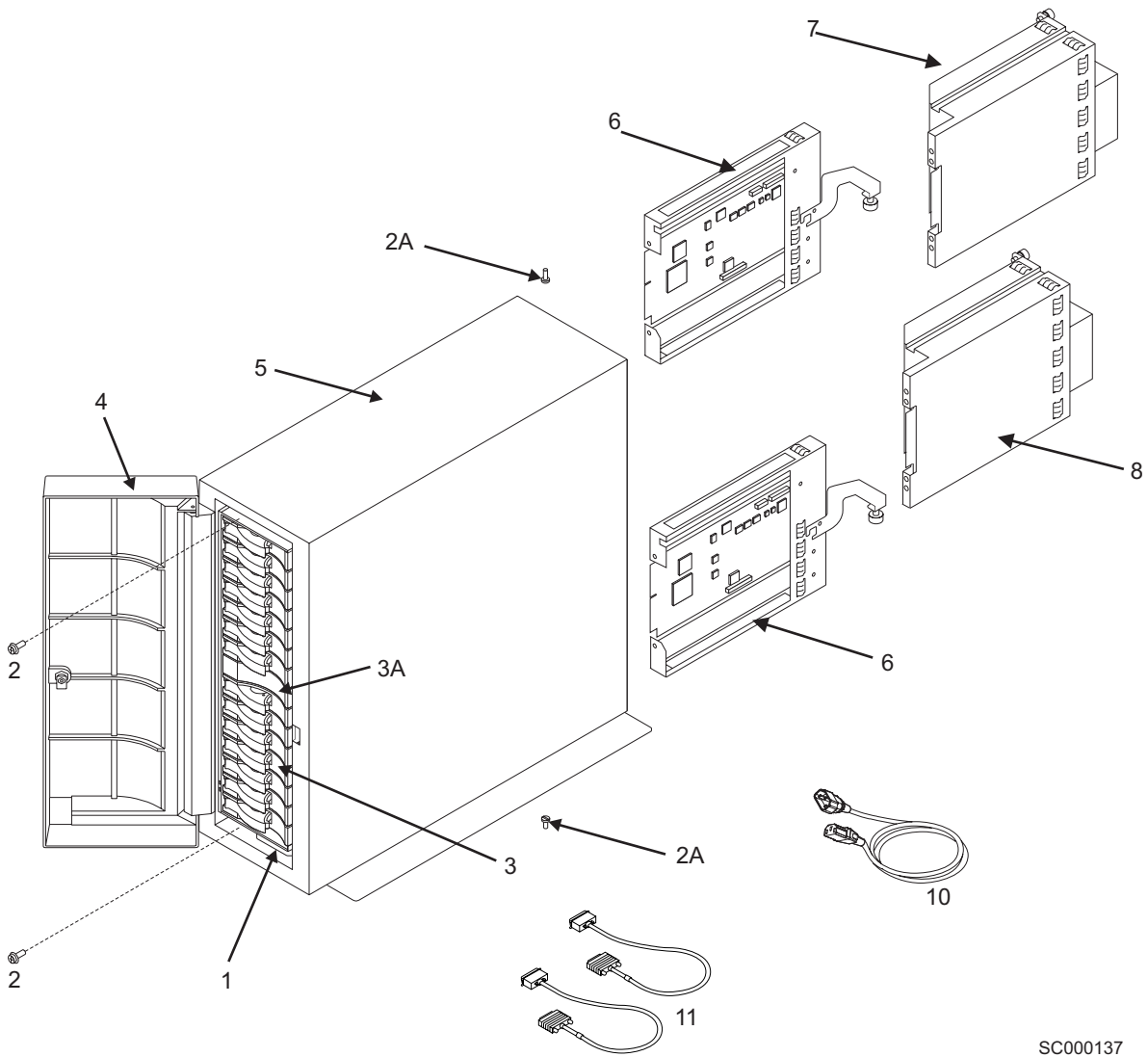
SC000137

Asm– Index	Part Number	Units	Description
2–1	97P1501	1	Frame assembly (FRU kit, including foam baffle and labels)
–2	12J5289	2	Front mounting screw
–2A	54G2882	2	Back mounting screw
–3	55P4120	AR	36 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–3	55P4075	AR	36 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–3	55P4124	AR	73 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–3	55P4080	AR	73 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–3	55P4128	AR	146 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–3	55P4085	AR	146 GB, 3.5-inch, SCSI disk drive module (10 000 rpm)
–3	55P4100	AR	36 GB, 3.5-inch, SCSI disk drive module (15 000 rpm)
–3	55P4105	AR	73 GB, 3.5-inch, SCSI disk drive module (15 000 rpm)
–3	37L0198	AR	Dummy disk drive module
–3A	97P1511	1	SCSI bus bridge card assembly
–3B	07K7052	1	Bezel, SCSI bus bridge card assembly (detail part of 97P1511)
–4	97P1566	1	Front cover assembly
–5	09L3378	1	Complete set of covers
			Note: Covers are available only as a complete set, which consists of:
			•Top cover
			•Left-hand side cover
			•Right-hand side cover
			•Frame assembly
			•Foot
–6	97P1508	AR	SCSI interface card assembly
–6	97P1510	AR	Dummy SCSI interface card assembly
–6A	55P3131	1	Switch cover plate (detail part of 97P1508)
–7	97P1515	1	Fan-and-power-supply assembly, 220 V ac (for 2104s that have two fan-and-power-supply assemblies)
–8	97P1515	AR	Fan-and-power-supply assembly, 220 V ac (for 2104s that have two fan-and-power-supply assemblies)
–8	97P1564	AR	Fan assembly (for 2104s that have one fan-and-power-supply assembly)
–10	VARIOUS	2	Power cable. See "Country or region power cables" on page 108.
–11	09L3299	AR	External SCSI copper cable, 1.0 m (3.3 ft)
–11	09L3301	AR	External SCSI copper cable, 3.0 m (9.8 ft
–11	09L3303	AR	External SCSI copper cable, 5.0 m (16.4 ft)
–11	09L3305	AR	External SCSI copper cable, 10.0 m (32.8 ft)
–11	09L3307	AR	External SCSI copper cable, 20.0 m (65.6 ft)

Country or region power cables

Part Number	Description	Country or Region
6952301	Power Cord 125V, 10A, 1.8 m (6 ft)	U.S./Chicago
13F9997	Power Cord 250V, 10A, 2.8 m (9 ft)	Denmark
14F0087	Power Cord 250V, 10A, 2.8 m (9 ft)	Israel
14F0051	Power Cord 250V, 10A, 2.8 m (9 ft)	Switzerland
13F9940	Power Cord 250V, 10A, 2.8 m (9 ft)	Australia, New Zealand
36L8880	Power Cord 250V, 10A, 2.8 m (9 ft)	Uruguay, Argentina, Paraguay
6952300	Power Cord 125V, 10A, 2.8 m (9 ft) (Group 1)	United States, Canada, Celestica, Antigua, St. Lucia, St. Vincent, Dominica, Grenadines, Grenada, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Cayman Islands, Colombia, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, Peru, Suriname, Trinidad, Venezuela, Brazil, Japan, Korea, Nicaragua, Philippines, Taiwan, Vietnam, Albania, Eritrea, Saudi Arabia
13F9979	Power Cord 250V, 10A, 2.8 m (9 ft) (Group 2)	Afghanistan, Netherlands Antilles, China, French Polynesia, Guinea, Indonesia, Armenia, Latvia, Angola, Austria, Belgium, Luxembourg, Belarus, Bosnia, Botswana, Bulgaria, Camaroon, Central Africa Republic, Czech Republic, Congo, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Kazakhstan, Kyrgyzstan, Lebanon, Liberia, Macedonia, Mali, Mauritania, Moldavia, Morocco, Mozambique, Netherlands, Norway, Poland, Portugal, Romania, Rwanda, Sao Tome and Principe, Senegal, Serbia, Slovenia, Slovakia, Spain, Sudan, Swaziland, Sweden, Syria, Arab Republic, Tunisia, Turkey, Ukraine, Russia, Uzbekistan, Zaire, Zimbabwe, Burundi, Cape Verde Islands, Estonia, Lesotho, Liechtenstein, Republic of Djibouti

Part Number	Description	Country or Region
14F0033	Power Cord 250V, 10A, 2.8 m (9 ft) (Group 3)	Abu Dhabi, Brunei, Fiji, Hong Kong S.A.R.of China, Macao S.A.R. of China, Malaysia, Singapore, Bahrain, Cyprus, Gambia, Ghana, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Nepal, North Yemen, Nigeria, Oman, Qatar, Sierra Leone, Tanzania, Uganda, United Arab Emirates, United Kingdom, Zambia.
14F0015	Power Cord 250V, 10A, 2.8 m (9 ft) (Group 4)	Bangladesh, Myanmar, Sri Lanka, Pakistan, South Africa, India
14F0069	Power Cord 250V, 10A, 2.8 m (9 ft) (Group 5)	Chile, Ethiopia, Italy, Libya, Malta, Somalia.
1838574	Power Cord 250V, 10A, 2.8 m (9 ft) (Group 6)	Thailand
02K0546	Power Cord 250V, 6A, 2.8 m (9 ft)	Taiwan

Appendix A. Additional information for RISC systems

This appendix provides information that is specific to the 2104 Model DS4 or Model TS4 that is attached to RISC systems.

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 DS4 or Model TS4s are attached.

System service aids

Service aids are available on the host system to help you service the 2104 Model DS4 or Model TS4. The following service aids are described in this chapter.

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

Identifying a 2104 Model DS4 or Model TS4 and the disk drive modules

There are separate ways to identify a 2104 Model DS4 or Model TS4 and the disk drive modules installed in it depending on the operating system.

Note: Refer to the 2104 Model DS4 or Model TS4 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.

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

AIX

When running AIX, you can identify an Expandable Storage Plus 2104 Model DS4 or Model TS4 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.

See "Location Codes" in the operator guide for your system for general information about location codes.

Linux

When running Linux, you can identify an Expandable Storage Plus 2104 Model DS4 or Model TS4 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 or Model TS4 to an AIX host system

Use the **cfgmgr** command to configure or reconfigure a 2104 Model DS4 or Model TS4 to an AIX host system.

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

Unconfiguring a 2104 Model DS4 or Model TS4 from an AIX host system

To remove a 2104 Model DS4 or Model TS4 from an AIX host system, type the following command:

rmdev -l [enclosurenumber] -d

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 or Model TS4 in a Linux for pSeries environment

In general, Linux for pSeries systems are automatically configured during initial start up or restart. See the Linux 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 site:

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
```

SCSI adapters

You can attach the 2104 Model DS4 or Model TS4 running AIX to the following types of SCSI adapters:

- PCI Dual-Channel Ultra3 SCSI Adapter (type 4-Y, feature 6203)
- PCI 4-Channel Ultra3 SCSI RAID Adapter (type 4-X, feature 2498)
- PCI-X Dual Channel Ultra320 SCSI Adapter (type 5702, feature 5712)
- PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type 5703, feature 5703)
- PCI Dual Channel Ultra2 SCSI Adapter (type 4-R, feature 6205)

See also Appendix B, "Cable configurations", on page 121 for information about configurations with the following adapters.

The 2104 running Linux for pSeries can be attached to any of the following types of SCSI adapters:

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

Location code format

Location codes identify the locations of adapters and devices in the host system and their attached subsystems and devices. These codes are displayed by the service aids, and when the diagnostic programs isolate a problem. For information about the location codes that the host system uses, see the Operator Guide for the host system.

This section shows the location codes for the 2104 Model DS4 and Model TS4.

```
A B - C D - E F - G H
                            └──── Always 0

                       └──────── SCSI address of the device


                  └───────────── Adapter connector number.

              └───────────────── Always 0


         └──────────────────────── Adapter position (number of the slot containing
                                    the SCSI adapter on the using-system I/O bus)

      └─────────────────────────── Using-system I/O bus identifier

   └──────────────────────────────── Always 0

└──────────────────────────────────── System Unit Identifier
```
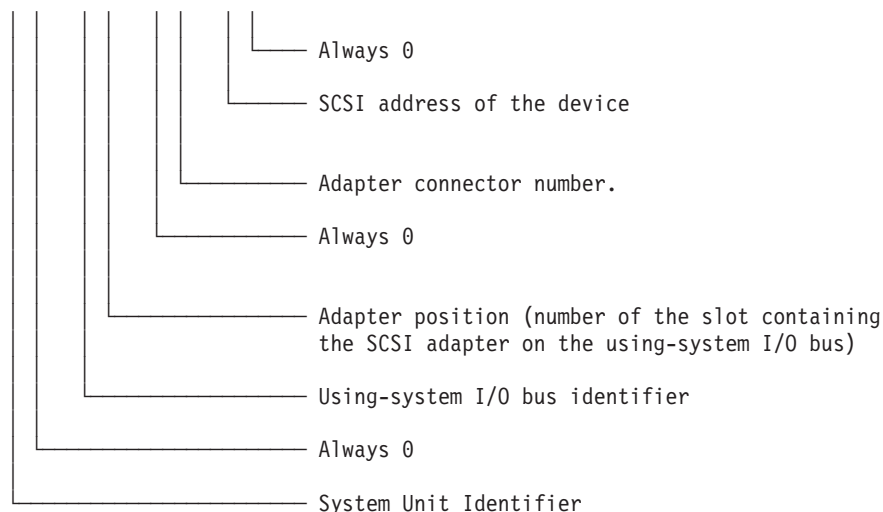
Note: When running Linux for pSeries, there are no system unique location codes but physical location codes might appear in the Linux for pSeries error logs.

Linux tools

Use the **lscfg** command to list all the resources that are available at start up. This information is also saved at each start up and you can use it to identify any missing resources.

To determine if any devices or adapters are missing, compare the list of found resources and partition assignments to the customer's known configuration. Record the location of any missing devices. You can also compare this list of found resources to a prior version of the device tree as the following example shows.

Every time that the partition is restarted, the update device tree command is run and the device tree is stored in the /var/lib/lsvpd/ directory in a file with the file name device tree YYYY-MM-DDHH:MM:SS, where YYYY is the year, MM is the month, DD is the day, and HH, MM, and SS are the hour, minute and second, respectively of the date of creation.

Type the following command at the command line:

```
cd /var/lib/lsvpd/
```

then type the following command:

```
lscfg -vpd device-tree-2003-03-31-12:26:31
```

This command displays the device tree that was created on 03/31/2003 at 12:26:31.

Additional system service aids information

Service aids are available on the using system to help you service the 2104 Model DS4 or Model TS4 if the 2104 Model DS4 or Model TS4 is configured to the using system that is running AIX or a stand-alone AIX diagnostics from a CD. This section briefly describes some of those aids, and tells you how to use them. More details are given in the service information for the using system.

The service aids that are described here are:
- Format Media
- Certify Media
- SCSI Device Identification and Removal
- Download Microcode

For Linux for pSeries systems, service aids are available only for stand-alone diagnostics.

Format Media

Attention: The Format Media service aid destroys all data on the disk.

To run this service aid, perform the following steps:
1. Install the disk drive module (if not already installed) into the 2104 Model DS4 or Model TS4.
2. Ensure that power is present in the 2104 Model DS4 or Model TS4.
3. Go to the host system, select **Diagnostic Operating Instructions**, and follow the instructions to select the Function Selection menu.
4. Select **Task Selection**.
5. Select **Format Media**, and follow the instructions given.

   Note: You cannot start the Format Media service aid if I/O operations are running on the disk drive.

   Attention: Formatting the wrong disk drive might destroy valuable data.

   If you are not sure about the location code for the disk drive module that you want to format, see "Location code format" on page 114 for an explanation of the codes.

The Format Media service aid can take up to 15 minutes to run. If it completes successfully, run the Certify Media service aid before using the disk drive module.

Certify Media

The Certify Media service aid checks the disk for defective sectors. Before you run the Certify Media, ensure that the diagnostics can run in System Verification mode without errors to the disk drive module.

To run this service aid, perform the following steps:
1. Go to the host system, select **Diagnostic Operating Instructions**, and follow the instructions to select the Function Selection menu.
2. Select **Task Selection**.
3. Select **Certify Media**, and follow the instructions given.

The Certify service aid takes approximately 10 minutes to run.

SCSI device identification and removal

Perform the following steps to run the SCSI device identification and removal service aid:

1. Go to the using system, select **Diagnostic Operating Instructions**, and follow the instructions to select the **Function Selection** menu.
2. Select **Task Selection**.
3. Select **Hot Plug Task**.
4. Determine if the 2104 Model DS4 or Model TS4 is connected to a RAID adapter.

   - If connected to a RAID adapter:

     a. Select **RAID Hot Plug Devices**.

     b. Select the resource from the displayed list in **RAID Hot Plug Devices**.

     c. A menu displays. Select the state physical disk should be set to:
        - Normal
        - Identify
        - Remove

   - If connected to a non-RAID adapter:

     a. Select **SCSI Hot Swap Manager**.

     b. A menu displays; choose an option.

        List Hot Swap Enclosure Devices
        This selection lists the SCSI hot-swap slots and their contents.

        Identify a Device Attached to a SCSI Hot Swap Enclosure Device
        This selection sets the **Identify** indication.

        Attach a Device to an SCSI Hot Swap Enclosure Device
        This selection sets the **Add** indication and prepares the slot for insertion of a device.

        Replace/Remove a Device Attached to an SCSI Hot Swap Enclosure Device
        This selection sets the Remove indication and prepares the device for removal.

        Configure Added/Replaced Devices
        This selection runs the configuration manager on the parent adapter where devices have been added or replaced.

Download microcode to a disk drive or SCSI interface card

The procedure for downloading microcode is similar for disk drives and for SCSI interface cards. For some configurations, additional actions are needed for SCSI interface cards (see also "Microcode maintenance" on page 25).

Downloading to disk drives
Perform the following steps to download the microcode to the disk drives:

1. Go to the host system, select **Diagnostic Operating Instructions**, and follow the instructions to select the Function Selection menu.
2. Select **Task Selection**.
3. Select the **Download Microcode**.
4. Select **Device**, and follow the instructions given.

Downloading to SCSI interface cards
Perform the actions given in Table 10.

Table 10. How to download microcode to a SCSI interface card

Configuration	Action
One SCSI interface card.	Download as described in Downloading to disk drives.
Two SCSI interface cards. Both are connected to SCSI attachments with dual bus mode.	1. Download to one SCSI interface card as described in Downloading to disk drives. 2. Download to the other SCSI interface card as described in Downloading to disk drives.
Two SCSI interface cards. Both are connected to SCSI attachments (AIX version above 4.3.3).	Download as described in Downloading to disk drives.

If you want to check whether the microcode downloaded successfully, select from the AIX Diagnostics Functions, **Display Hardware Vital Product Data** to display the existing microcode level (ROS Level and ID).

Software and microcode errors

Some failures might be caused by software errors or by microcode errors. If you think you have a software or microcode error:

1. Ensure that your system software, adapter microcode, disk drive microcode, and enclosure microcode are all at the latest levels. Information about the latest levels of software and microcode is given on the Web support page (see "Web sites" on page xxxviii).

Make a note of all failure indicators: for example, the contents of error logs, or physical symptoms.
Run the **snap -g** command to collect system configuration data, and to dump data.

For AIX versions below 4.2, g

Go to the using system service aids and select **Display Vital Product Data** to display the VPD of the failing system. Make a note of the VPD for all the SCSI adapters and disk drives.

2. Report the problem to your support center. The center can tell you whether you have a known problem, and can, if necessary, provide you with a correction for the software or microcode.

Diagnostics information

Note: If you were sent here from other instructions, return to those instructions when you finish running the diagnostics.

Concurrent diagnostics

When the instructions tell you to run concurrent diagnostics, run diagnostics (*not Advanced Diagnostics*) in System Verification mode (see the using-system Installation and Service Guide).

Nonconcurrent diagnostics

When the instructions tell you to run nonconcurrent diagnostics, run Advanced Diagnostics in System Verification mode (see the using system Installation and Service Guide).

Problems corrected

Run Advanced Diagnostics in System Verification mode only to the device that you just repaired. You can then enter information to prevent the generation of another SRN for the problem that you just solved. If you do not enter that information, the errors that were previously logged for your problem might generate another SRN.

Configuring a disk drive module to the host system

If you just installed a new disk drive module and want to change the hdisk number, perform the following steps:

1. Remove the new hdisk number by typing the command:

   ```
   rmdev -l [hdisknumber] -d
   ```

   where [hdisknumber] is the hdisk number that you want to remove (for example, hdisk12).

2. Remove the definition of the *original* hdisk by typing the command:

   ```
   rmdev -l [hdisknumber] -d
   ```

   where [hdisknumber] is the hdisk number of the original disk drive module (for example, hdisk7).

3. Run the **cfgmgr** command.

Appendix B. Cable configurations

This appendix shows examples of cable configurations for the 2104 Model DS4 and Model TS4. Some of the configurations are valid for all the adapters that the 2104 Model DS4 and 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.

AIX versions

These configurations support AIX versions 5.1 and 5.2. These versions of AIX require PTFs, which are available on the support Web page:

https://techsupport.services.ibm.com/server/support?view=pSeries/

Adapter microcode

Adapter microcode is available on the following Web site:

techsupport.services.ibm.com/server/mdownload/

Valid configurations

Only point-to-point connections are allowed between the SCSI interface cards in a 2104 Model DS4 or Model TS4 and the SCSI adapter card or integrated SCSI port in a host system.

You can attach a 2104 Model DS4 or Model TS4 with only one SCSI interface card to one SCSI adapter or integrated SCSI port. You can attach a 2104 Model DS4 or Model TS4 with two SCSI interface cards to two SCSI adapters or integrated SCSI ports.

When you use the internal connector on the adapter card, do not use the corresponding external connector to connect to a 2104 Model DS4 or Model TS4.

You can configure a 2104 Model DS4 or Model TS4 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 or Model TS4 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 or Model TS4:
*   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.

An RS/6000 or IBM @server pSeries computer that is running Linux for pSeries uses the following SCSI adapter to connect to the 2104:

- 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, which consists of one external and one internal connector, is connected to a separate SCSI channel.

- 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.

Summary of valid configurations

Table 11 shows a summary of valid configurations and SCSI ID assignments.

Table 11. 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 121 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, 2, and 5.
Dual bus SCSI bus 1	1	7	7	0, 1, 2, 3, 4, 5, 6 See Note 3.	15	See "Valid configurations" on page 121 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 121 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 AIX 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.

   The adapters or integrated ports must not share access to the disk drive modules. Applies to AIX systems only

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.

5. Dual adapters on a single bus are not supported on Linux for pSeries systems or applications.

Single-bus mode configurations

For a single-bus mode configuration, you must set the SCSI bus split switch on the card of a 2104 Model DS4 or Model TS4 to off.

You can connect each 2104 Model DS4 or Model TS4 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, you can connect it to up to four 2104 Model DS4 or Model TS4s.

For High Availability Cluster Multi-Processing (HACMP) configurations, you can connect the two SCSI interface cards in a 2104 Model DS4 or Model TS4 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, feature code 5812).

For non-HACMP configurations, you can connect the SCSI interface cards in a 2104 Model DS4 or Model TS4 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, feature code 5712). The adapters must be in two different host systems. They must not share access to the disk drives in the 2104 Model DS4 or Model TS4.

One adapter in one host system connected to one 2104 Model DS4 or Model TS4

Figure 83 shows one adapter in one host system connected to one 2104 Model DS4 or Model TS4 (single-bus mode).

2104 Subsystem   Using System
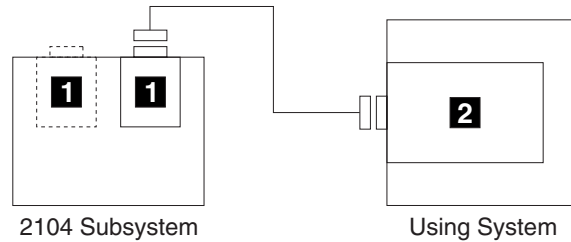
Figure 83. One adapter in one host system connected to one 2104 Model DS4 or Model TS4 (single-bus mode)

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 or Model TS4 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) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following adapters to connect to the 2104 Model DS4 or Model TS4. • 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 2104 Model DS4 or Model TS4 can be connected to an integrated SCSI port instead of to one of these adapters.

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 must be different from the addresses of the installed disk drive modules.

Two adapters in one host system connected to two 2104 Model DS4 or Model TS4s

Figure 84 shows two adapters in one host system connected to two 2104 Model DS4 or Model TS4s (single-bus mode).
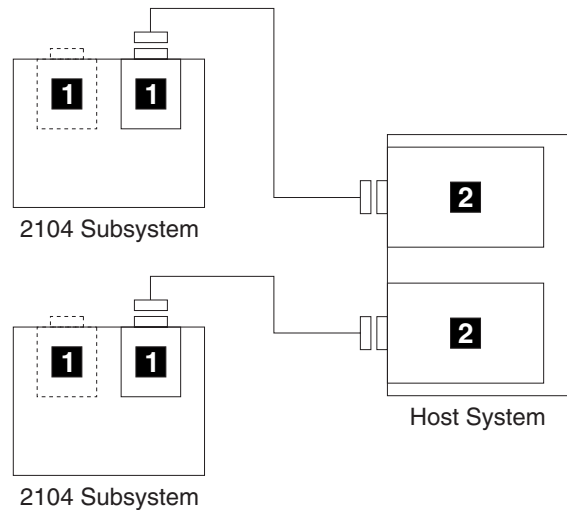
Figure 84. Two adapters in one host system connected to two 2104 Model DS4 or Model TS4s (single-bus mode)

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 or Model TS4 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) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following adapters to connect to the 2104 Model DS4 or Model TS4. • 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 2104 Model DS4 or Model TS4 can be connected to an integrated SCSI port instead of to one of these adapters.

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 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 DS4 or Model TS4s

Figure 85 shows one adapter in each of two host systems connected to two 2104 Model DS4 or Model TS4s (single-bus mode).
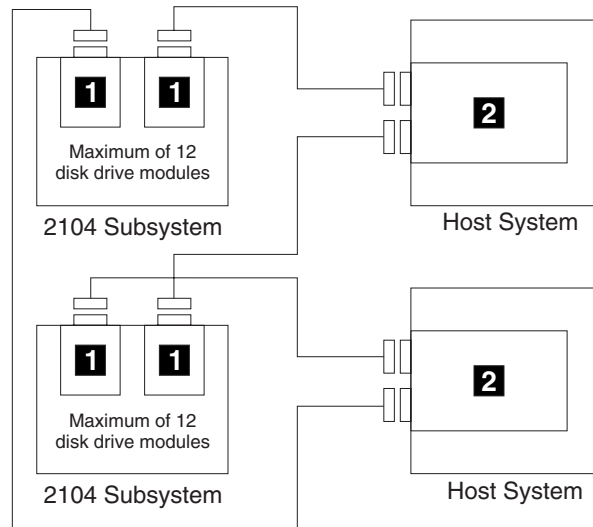
Figure 85. One adapter in each of two host systems connected to two 2104 Model DS4 or Model TS4s (single-bus mode)

Important: This configuration is not supported on the Linux operating system.

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)

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 must be different from the addresses of the installed disk drive modules. When a second adapter is connected to a 2104 Model DS4 or Model TS4, 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 or Model TS4.

In each 2104 Model DS4 or Model TS4, slots 6 and 7 (SCSI addresses 5 and 6) must contain dummy disk drive modules. Each 2104 Model DS4 or Model TS4 can contain no more than 12 disk drive modules.

One adapter in one host system connected to two 2104 Model DS4 or Model TS4s

Figure 86 shows one adapter in one host system connected to two 2104 Model DS4 or Model TS4s (single-bus mode).
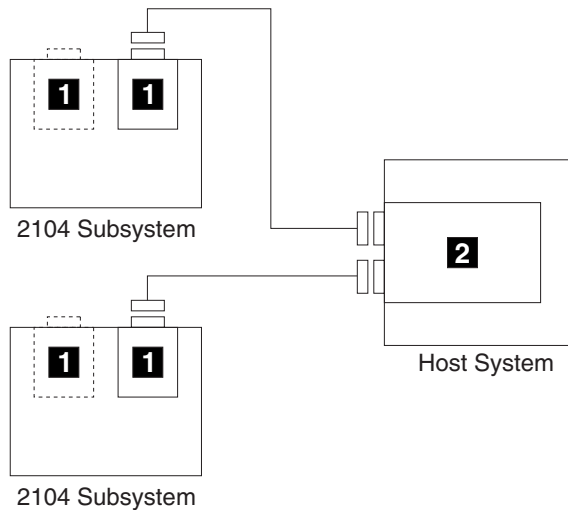
*Figure 86. One adapter in one host system connected to two 2104 Model DS4 or Model TS4s (single-bus mode)*

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 or Model TS4 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 5712) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4 or Model TS4. • 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 2104 Model DS4 or Model TS4 can be connected to an integrated SCSI port instead of to one of these adapters.

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 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 DS4 or Model TS4s and an internal RAID array

Figure 87 shows one adapter, one host system with internal RAID array, and two 2104 Model DS4 or Model TS4s (single-bus mode).
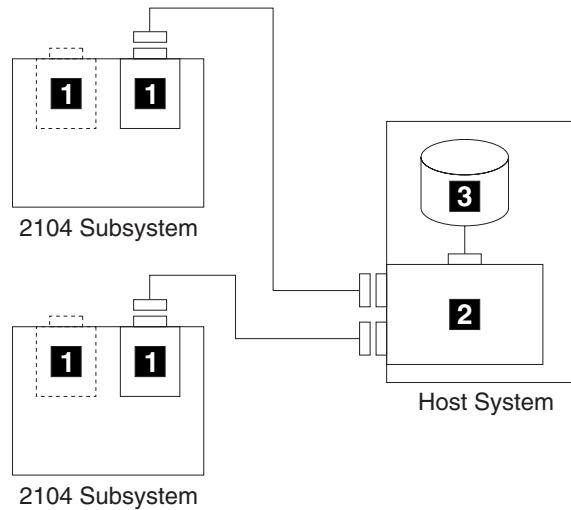
Figure 87. One adapter, one host system with internal RAID array, and two 2104 Model DS4 or Model TS4s (single-bus mode)

1	SCSI interface card. **Note:** The second SCSI interface card that is in the 2104 Model DS4 or Model TS4 is optional.
2	SCSI adapter: • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4 or Model TS4: • 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 or 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 or Model TS4

Figure 88 shows one adapter in each of two host systems connected to one 2104 Model DS4 or Model TS4 (single-bus mode).
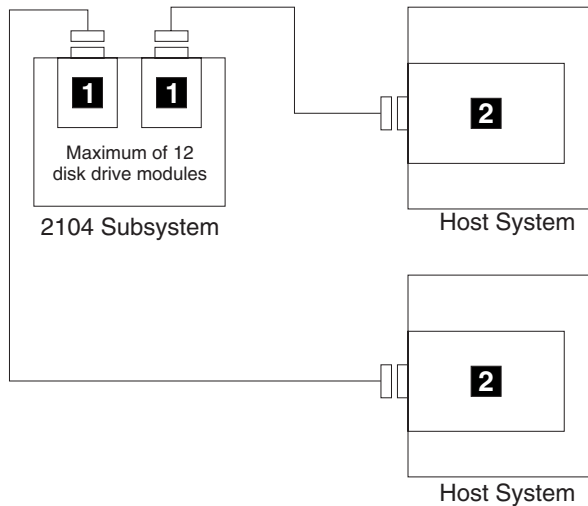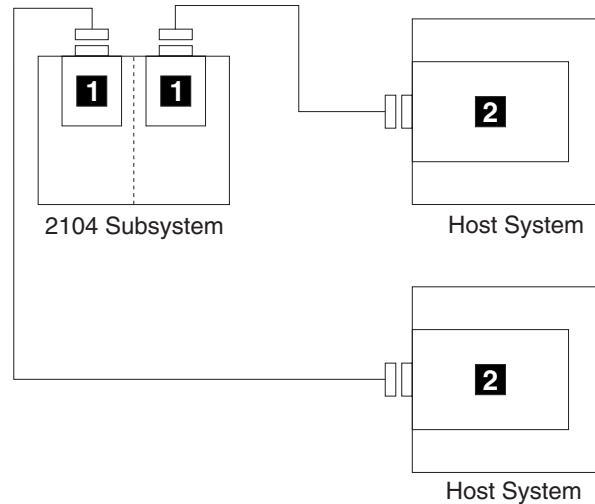

Figure 88. One adapter in each of two host systems connected to one 2104 Model DS4 or Model TS4 (single-bus mode)

Important: This configuration is not supported on the Linux operating system.

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 or Model TS4 cannot be shared.

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 must be different from the addresses of the installed disk drive modules. When a second adapter is connected to a 2104 Model DS4 or Model TS4, 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 or Model TS4, slots 6 and 7 (SCSI addresses 5 and 6) must contain dummy disk drive modules.

3. Each 2104 Model DS4 or Model TS4 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 or Model TS4 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 DS4 or Model TS4.

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 or Model TS4

Figure 89 shows two adapters in one non-HACMP host system connected to one 2104 Model TS4 (dual-bus mode).
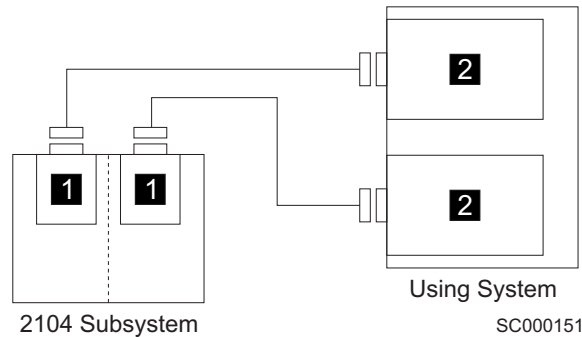
*Figure 89. Two adapters in one non-HACMP host system connected to one 2104 Model DS4 or Model TS4 (dual-bus mode)*

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) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4 or Model TS4. • 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:** Connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters.

Notes:

1. The SCSI addresses of the adapters that are connected to the 2104 Model DS4 or Model TS4 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 DS4 or Model TS4s

Figure 90 shows three adapters in two non-HACMP host systems connected to two 2104 Model DS4 or Model TS4s (dual-bus mode).
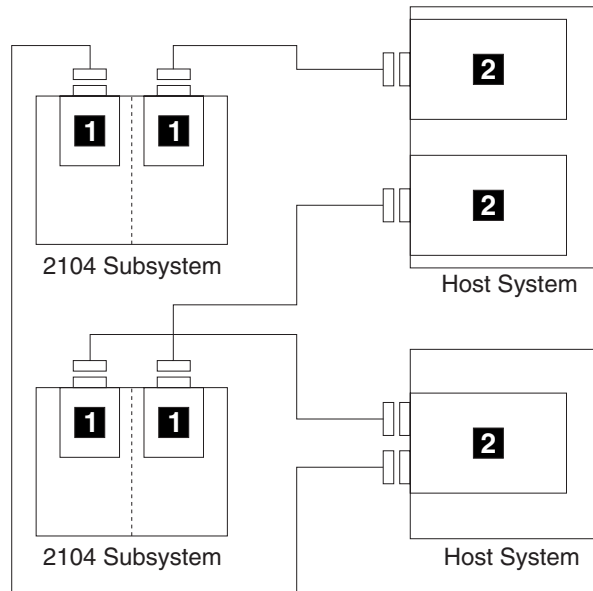
Figure 90. Three adapters in two non-HACMP host systems connected to two 2104 Model DS4 or Model TS4s (dual-bus mode)

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) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4 or Model TS4. • 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 connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters.

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 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 or Model TS4, 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 or Model TS4 and an internal RAID array

Figure 91 shows one adapter in one non-HACMP host system connected to one 2104 Model DS4 or Model TS4 and an internal RAID array (dual-bus mode).
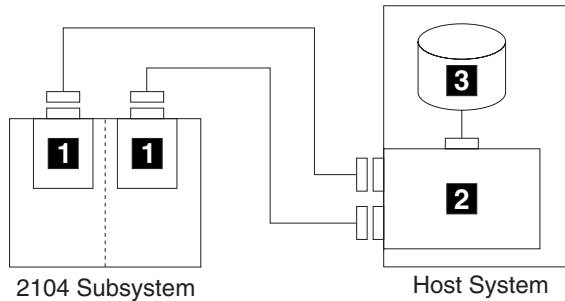
Figure 91. One adapter in one non-HACMP host system connected to one 2104 Model DS4 or Model TS4 and an internal RAID array (dual-bus mode)

1	SCSI interface card.
2	SCSI adapter: • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4 or Model TS4. • 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 or Model TS4 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 or Model TS4s

Figure 92 shows one adapter in each of two non-HACMP host systems connected to one 2104 Model DS4 or Model TS4s (dual-bus mode).

Figure 92. One adapter in each of two non-HACMP host systems connected to one 2104 Model DS4 or Model TS4s (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) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model DS4 or Model TS4. • 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:** Connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters.

Note: The SCSI address of the adapter that is connected to the 2104 Model DS4 or Model TS4 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 or Model TS4, 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 DS4 or Model TS4s

Figure 93 shows one RAID adapter in each of two non-HACMP host systems connected to two 2104 Model DS4 or Model TS4s (dual-bus mode).
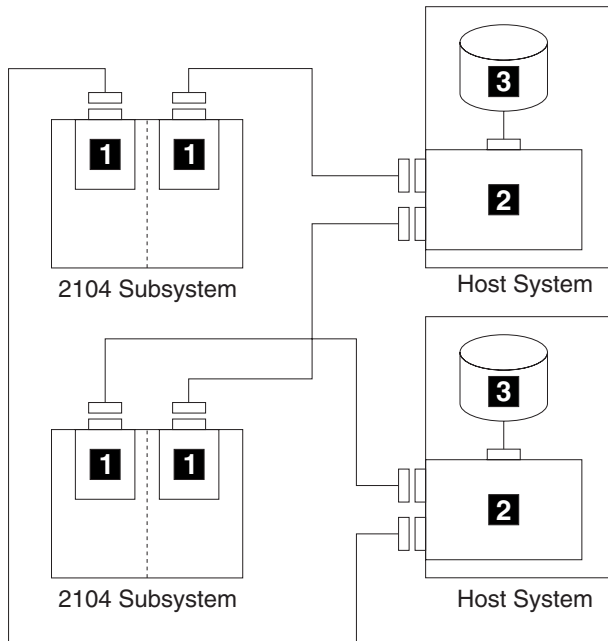
Figure 93. One RAID adapter in each of two non-HACMP host systems connected to two 2104 Model DS4 or Model TS4s (dual-bus mode)

1	SCSI interface card.
2	SCSI RAID adapter: • PCI 4-Channel Ultra3 SCSI RAID Adapter (type number 4-X, feature code 2498) • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703) **Important:** An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the or . • 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 or Model TS4 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 or Model TS4

Figure 94 shows two adapters in one host system connected to one 2104 Model DS4 or Model TS4 (single-bus mode).
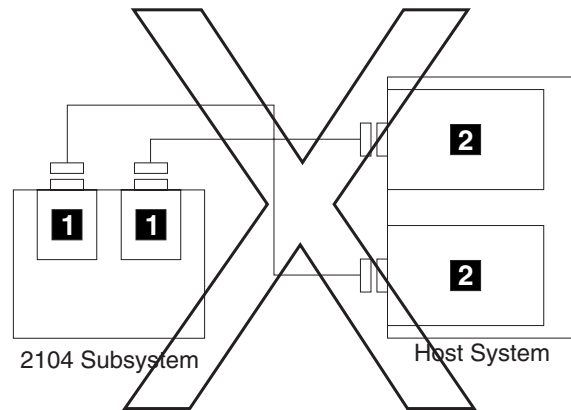
Figure 94. Two adapters in one host system connected to one 2104 Model DS4 or Model TS4 (single-bus mode). This configuration is invalid.

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 or Model TS4 is configured in single-bus mode, but is valid when the 2104 Model DS4 or Model TS4 is configured in dual-bus mode. See page 132.

One adapter in one host system connected to two 2104 Model DS4 or Model TS4s through the SCSI interface cards

Figure 95 shows one adapter in one host system connected to two 2104 Model DS4 or Model TS4s through the SCSI Interface cards.
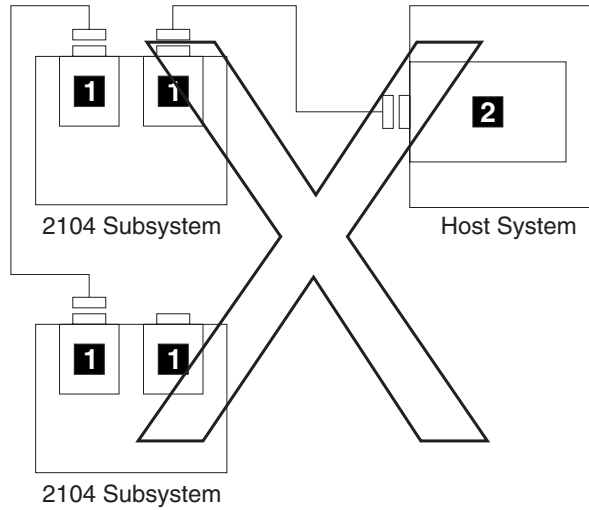
Figure 95. One adapter in one host system connected to two 2104 Model DS4 or Model TS4s through the SCSI Interface cards. This configuration is invalid.

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 DS4 or Model TS4s through a Y-cable (1)

Figure 96 shows one adapter in one host system connected to two 2104 Model DS4 or Model TS4s through a Y-cable (1).
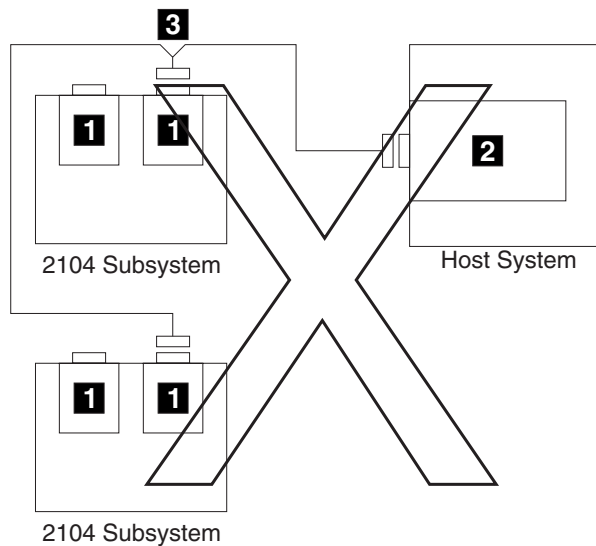
Figure 96. One adapter in one host system connected to two 2104 Model DS4 or Model TS4s through a Y-cable (1). This configuration is invalid.

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 or Model TS4.

One adapter in one host system connected to two 2104 Model DS4 or Model TS4s through a Y-cable (2)

Figure 97 shows one adapter in one host system connected to two 2104 Model DS4 or Model TS4s through a Y-cable (2).
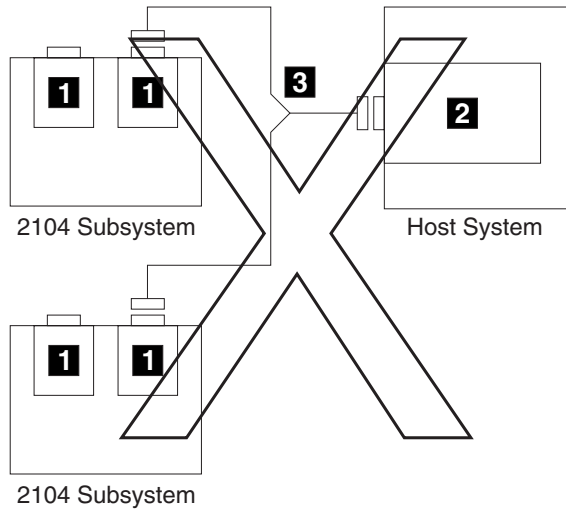
Figure 97. One adapter in one host system connected to two 2104 Model DS4 or Model TS4s through a Y-cable (2). This configuration is invalid.

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 or

One dual-channel non-RAID adapter in one host system connected to two 2104 Model DS4 or Model TS4s and internal disk drives

Figure 98 shows one dual-channel non-RAID adapter in one host system connected to two 2104 Model DS4 or Model TS4s and internal disk drives.
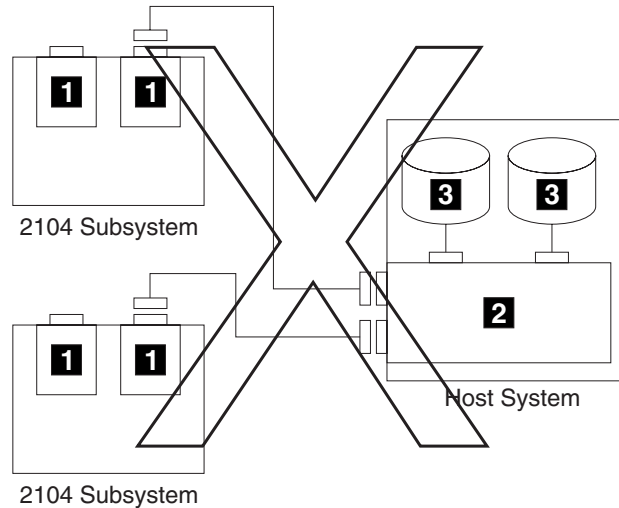
Figure 98. One dual-channel non-RAID adapter in one host system connected to two 2104 Model DS4 or Model TS4s and internal disk drives. This configuration is invalid.

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 DS4 or Model TS4s

Figure 99 shows one RAID adapter in each of two host systems connected to two 2104 Model DS4 or Model TS4s. This configuration is invalid.
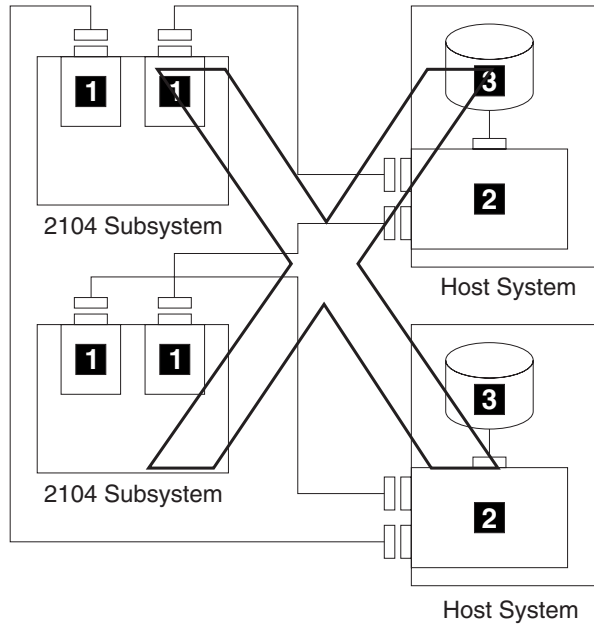
Figure 99. One RAID adapter in each of two host systems connected to two 2104 Model DS4 or Model TS4s. This configuration is invalid.

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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