

Bull ESCALA

Expandable Storage Plus 2104 Model TS4
Installation Guide

Bull



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Expandable Storage Plus 2104 Model TS4 Installation Guide

Hardware

November 2003

**BULL CEDOC
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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 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)

CAUTION:

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

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 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 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 TS4.

CAUTION:

The 2104 Model TS4 is 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 TS4 will be installed is also designed and certified for customer setup. If the 2104 Model TS4 are not, then they must be installed by a CE. (22)

Inspecting the 2104 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.

3. Verify that the power supply cover caution label is installed on the 2104 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 TS4 power supply. See Figure 4.

CAUTION:

Double Pole/Neutral Fusing. (3)

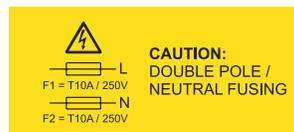


Figure 4. Fusing caution label

5. Verify that the weight label is installed on the 2104 Model TS4. See Figure 5.

CAUTION:

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



Figure 5. 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

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

CAUTION:

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

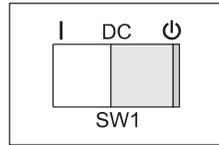


Figure 6. Standby condition label

Checking the grounding of the 2104 Model TS4

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

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 7.

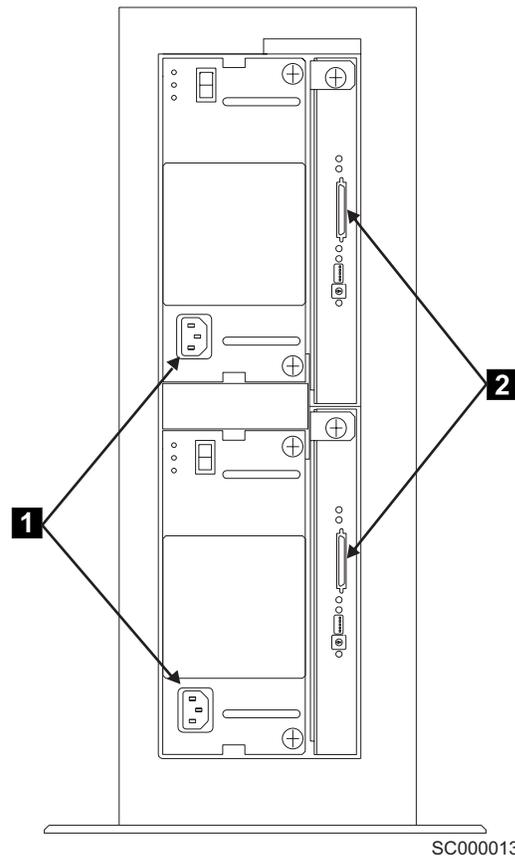


Figure 7. Power cables and SCSI connectors (2104 Model TS4)

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 7 on page xvi.
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 8.

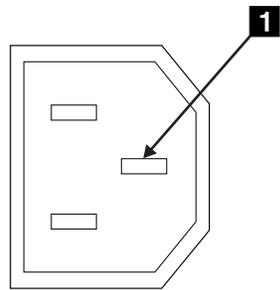


Figure 8. Ground pin (2104 Model TS4)

- 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 xvi through step 6d to complete the grounding check again.

Removing power from the 2104 Model TS4

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 9.

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.

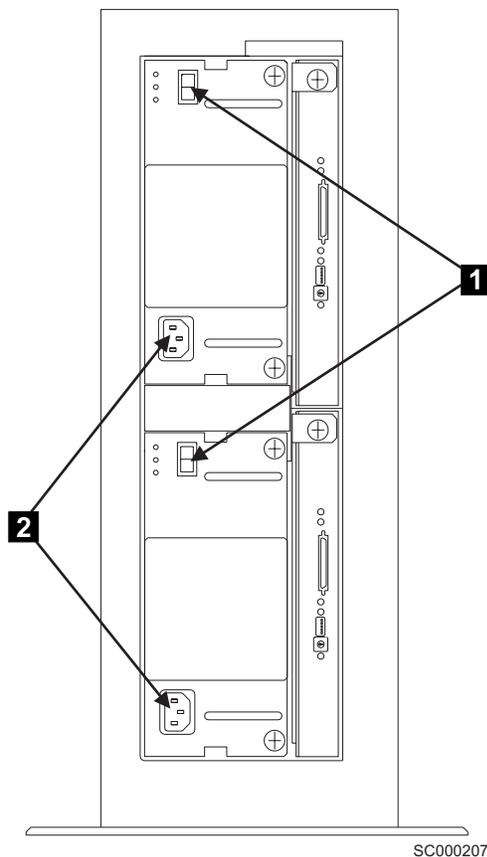


Figure 9. Removing power from a 2104 Model TS4

3. Remove the power cables **2** from the electrical power outlet and from the back of the 2104 Model TS4. See Figure 9.
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)

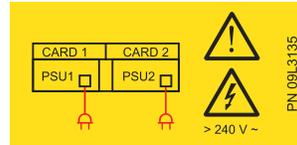


Figure 10. Linecord caution label

CAUTION:

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



Figure 11. Power supply cover caution label

CAUTION:

Double Pole/Neutral Fusing. (3)

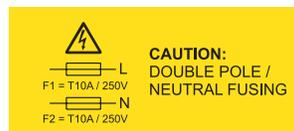


Figure 12. Fusing caution label

CAUTION:

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



Figure 13. 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)

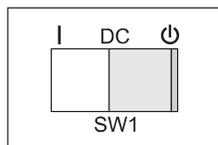


Figure 14. Location of standby condition

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 TS4. 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:

The 2104 Model TS4 is 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 TS4 will be installed is also designed and certified for customer setup. If they are not, then the 2104 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 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 TS4 (hereafter referred to as the 2104 Model TS4).

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

Who should read this document

This document is intended for people who install a 2104 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
- The available Web sites
- Information about how to send your comments

2104 Model DS4 and Model TS4 library

The following documents contain information related to this product:

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

Related documents

The following documents contain information related to this product:

- The operator's guide for your system
- The user's guide for your using system SCSI attachment (for example, your SCSI adapter)
- The site and hardware planning information for your system
- The problem solving guide and reference for your system
- The *7014 Model T00 and T42 Rack Installation and Service Guide*, SA38-0577

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

Installing and testing the 2104 Model TS4

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

These installation instructions describe:

- What to do before you install the 2104 Model TS4
- How to install a 2104 Model TS4
- How to connect the 2104 Model TS4 to a power source
- How to connect the 2104 Model TS4 to the host system
- How to switch on and test the installation

The instructions assume that you have access to:

- Preinstallation planning information for the system
- 2104 Model TS4 configuration information

Before you begin

This section describes the following jobs that should be done and safety items that you should consider before starting to install a 2104 Model TS4:

- Locating the mainline electrical power outlets
- Checking the mainline electrical power outlets
- Choosing a location
- Regulating the operating temperature
- Providing the necessary service clearances

Attention: Read the safety notices before you continue with any of the actions that this book describes.

Locating mainline electrical power outlets

For pluggable equipment, the mainline electrical power outlets must be installed near the equipment and must be easily accessible. Ensure that suitable outlets are available where the 2104 Model TS4 is to be located.

Installation safety notices

You should read and adhere to the following safety notices as you install the 2104 Model TS4.

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)

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)

Checking mainline electrical power outlets

If you are qualified technically, and have the necessary equipment, you should perform the following safety check on each mainline electrical power outlet.

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)

1. Find and switch off the branch circuit circuit breaker (CB).

Note: All measurements are to be made with the power outlet face plate in its normal installed position.

2. Some power outlets are enclosed in metal housings. When making voltage measurements on power outlets of this type, perform the following steps:
 - a. Check for less than 1 volt from the power outlet case to any grounded metal structure in the building, such as a raised floor metal structure, water pipe, building steel, or similar structure.
 - b. Check for less than 1 volt from the power outlet ground pin to a grounded point in the building.

Note: If the power outlet case or face plate is painted, ensure that the probe tip penetrates the paint and makes good electrical contact with the metal.

- c. Check the resistance from the ground pin of the power outlet to the power outlet case. Check the resistance from the ground pin to the building ground. The reading should be less than 1.0 ohm. This reading indicates the presence of a continuous grounding conductor.
3. If any of the three checks made in step 2 is not correct, remove the power from the branch circuit and make the necessary corrections to the wiring; then recheck the power outlet.

Note: Do not use a digital multimeter to measure grounding resistance.

4. Check for infinite resistance between the ground pin of the power outlet and each of the phase pins. This check is for a wiring short circuit to ground or a wiring reversal.

CAUTION:

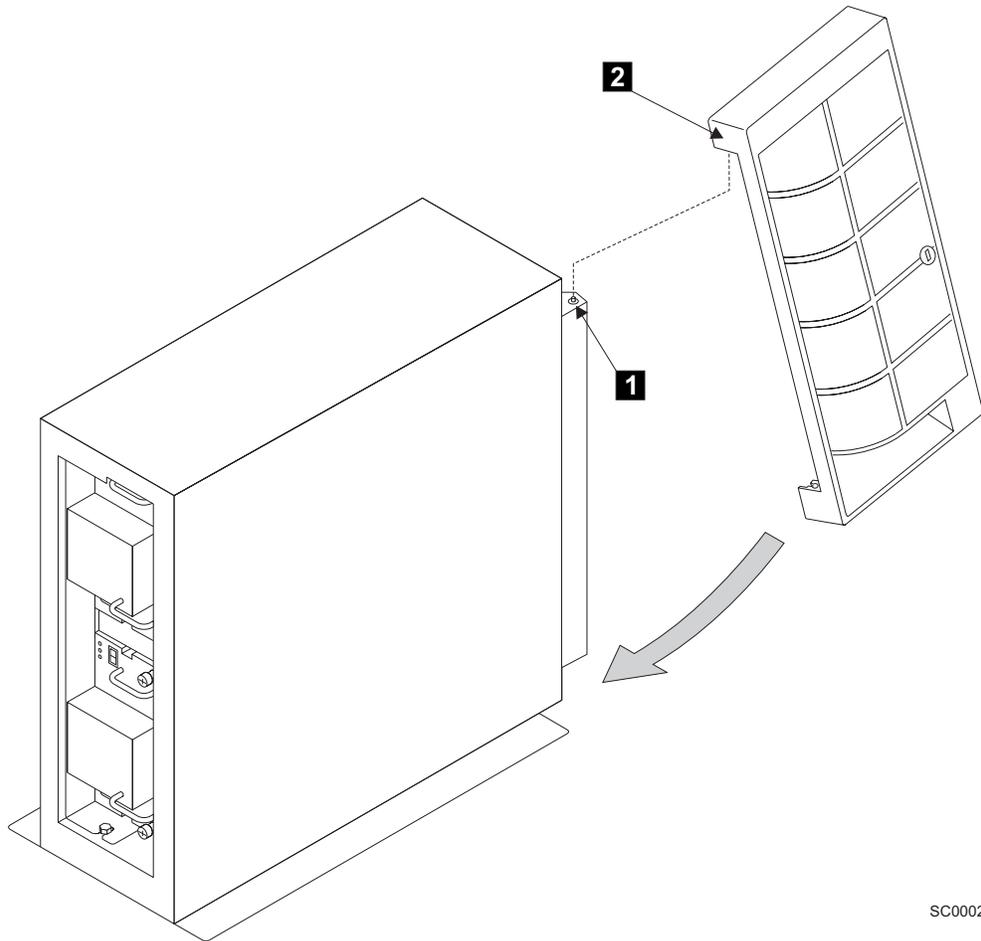
If the reading is not infinity, do not proceed. Make the necessary corrections to the wiring before you continue. Do not switch on the branch circuit CB until you satisfactorily complete the previous steps. (15)

5. Check for infinite resistance between phase pins. This check is for a wiring short circuit.
6. Switch on the branch circuit CB. Measure for the appropriate voltages between phases. If no voltage is present on the power-outlet case or grounded pin, the power outlet is safe to touch.
7. With an appropriate meter, verify that the voltage at the power outlet is correct.
8. Verify that the grounding impedance is correct by using an appropriately-approved ground impedance tester.

Note: Do not use the 120-volt convenience outlets inside the system to power the tester.

Installing the cover

Before you use the 2104 Model TS4, you should first install its cover as Figure 15 shows.



SC000283

Figure 15. Installing the cover, part 1

1. Locate the upper chassis hinge pin **1** and the pivot hole **2** in the cover.
2. Tilt the top of the cover towards the chassis and lower it so that the chassis hinge pin **1** slides into the pivot hole **2** in the cover.

3. Push the bottom of the cover in, so that the lower cover hinge **3** snaps onto the lower chassis hinge pin **4**, as Figure 16 shows.

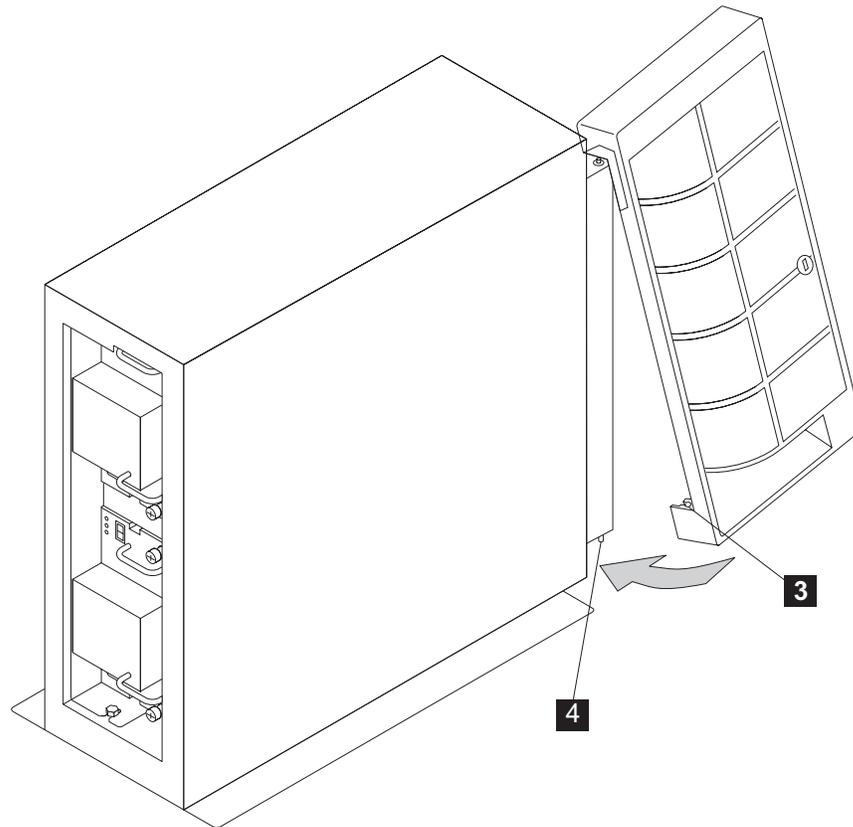


Figure 16. Installing the cover, part 2

4. Verify that the cover pivots freely.
5. Close and lock the cover.

Selecting a location

Ensure that the place where you are going to install the 2104 Model TS4 meets the following conditions:

1. The necessary service clearances (see Figure 17) are provided around the 2104 Model TS4.
2. The 2104 Model TS4 can easily be moved into a position that provides the necessary service clearances (see Figure 17).

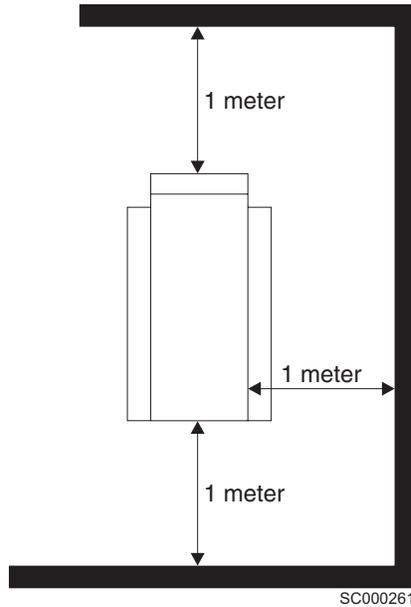


Figure 17. Service clearances

CAUTION:

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



Figure 18. 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:

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)

3. Move the 2104 Model TS4 into its operational position.
4. Maintain the operating temperature at 22°C (72°F) or lower.

Installing the switch cover plate

Note: Switch configuration is only valid on the SCSI interface card-1, which is on the left side (left side from the rear view). The configuration on the SCSI interface card-2, which is on the right side, is ignored. The switch cover plate is on card-2 so that it can be masked. See Figure 19 on page 8. You must place the SCSI interface card in the left side from the rear view in a single SCSI interface card configuration. See JBOD 1 in Figure 19 on page 8.

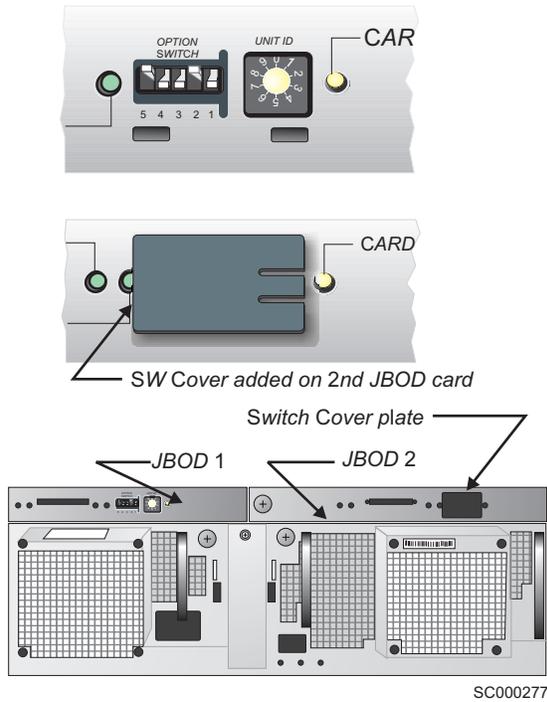
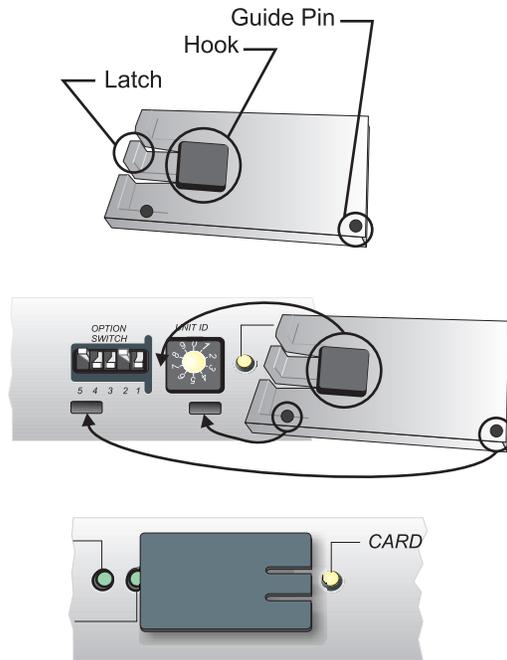


Figure 19. Installing the switch cover plate onto the panel of the SCSI Interface card-2 (second JBOD interface card) box

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

Note: If the switch cover plate is already installed, you do not need to perform step 1 through step 3 on page 9.

1. Locate the hook, latch, and pins. See Figure 20 on page 9.



SC000275

Figure 20. Switch cover plate

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

Setting the options

The option switch settings determine how the disk drives behave at startup. Depending on the switch settings the disk drive motors will start up when you issue a start motor command or through a timed delay sequence.

1. Refer to your 2104 Model TS4 configuration information for details on how to set the options.
2. Use a small screwdriver to rotate the Box ID rotary switch (see Figure 21 on page 10) to the ID you have chosen for this 2104 Model TS4 disk enclosure.

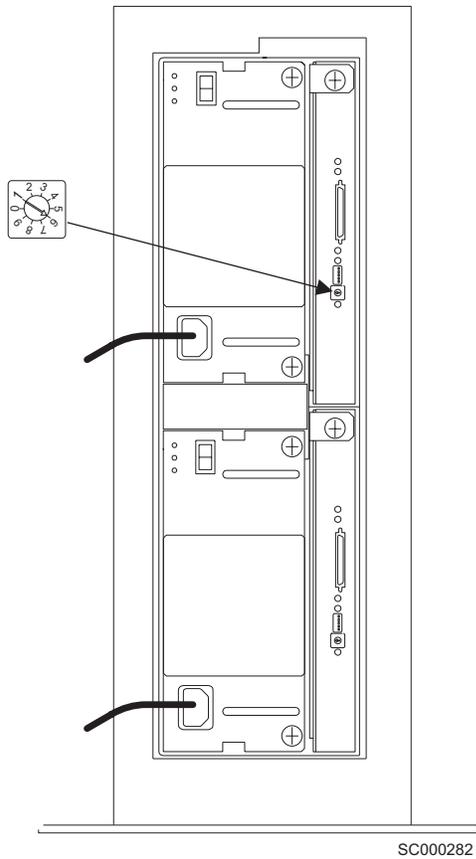


Figure 21. Setting the box ID

3. Find the sheet of labels supplied with your 2104 Model TS4. These are numbered 0 through 9. Select the one that represents your setting of the Box ID rotary switch. Attach it to the front of the 2104 Model TS4.

Note: You should set the Box ID switch and attach the Box ID label when running the Linux operating system. Your Linux operating system might or might not display the Box ID in its system messages. The Box ID is used when running the standalone AIX Diagnostics CD.

- Figure 22 shows the option switches. When the drive autostart switch-1 **1** is set to off, and the drive autostart switch-2 **2** is set to on, the disk drive motors do not start until you issue a **START MOTOR** command. The timing sequence of the disk motor startup is under the control of the host system software.

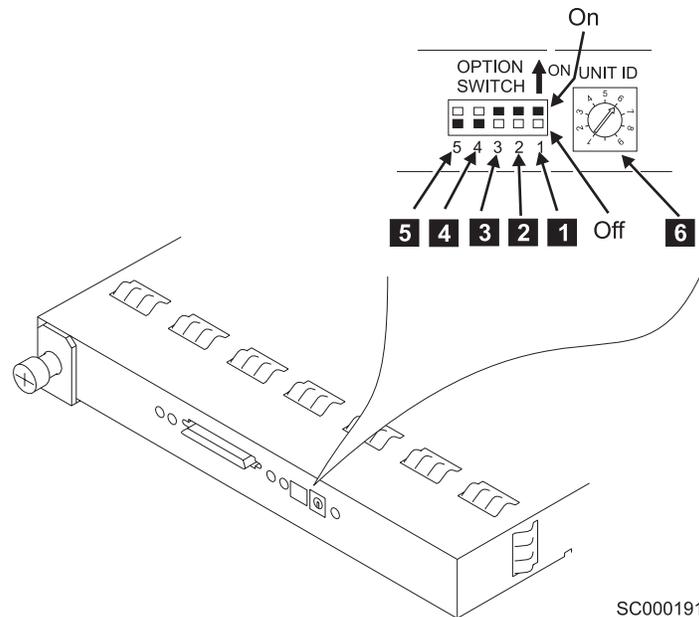


Figure 22. Setting the option switches

When the drive autostart switch-1 **1** is set to on, and the drive autostart switch-2 **2** is set to off, the disk drives are set to delay motor start mode. The disk motor startup delay time is different for each disk drive, and is usually computed by multiplying its SCSI ID by 12 seconds. For example, the disk drive motor of a disk drive with a SCSI ID equal to 2 will start 24 (2 x 12) seconds after power is applied to the 2104 Model TS4.

When the drive autostart switch-1 **1** is set to off, and the drive autostart switch-2 **2** is set to off, the disk drives are set to normal start mode. The disk drive motors will start when power is applied to the 2104 Model TS4.

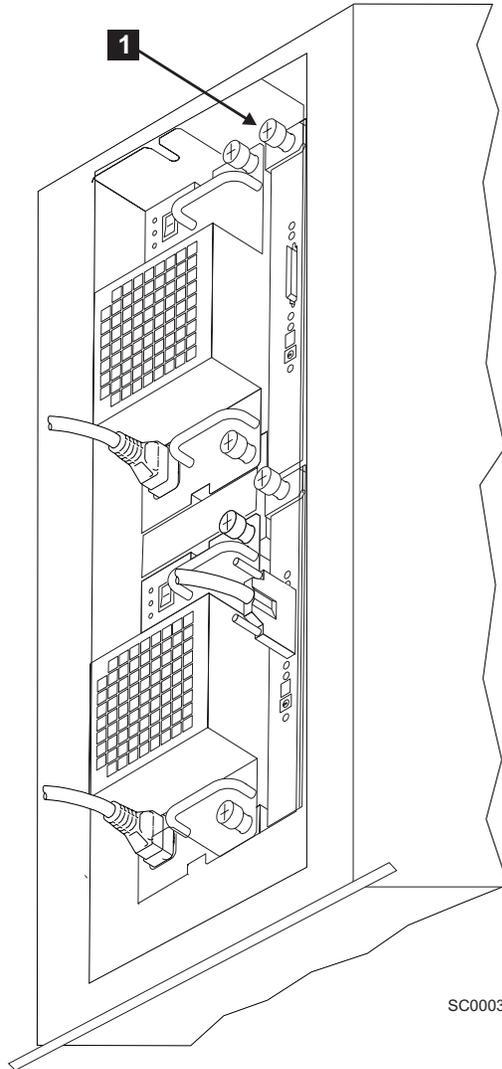
The effect of both this switch and the drive autostart switch-2 **2** being set to on is undefined.

- To set autostart switch-2 **2** see step 4 for an explanation about the drive autostart switch-1 **1**.
- Ensure that the enable enclosure services switch **3** and the select enclosure services switch **4** are both set to on to allow ANSI SCSI-3 Enclosure Services (SES) to operate.

Note: This applies to both AIX and Linux users. Your Linux operating system might not support SES but the SES functions are used when running the standalone AIX Diagnostics CD.

- When the power control switch **5** is set to off, the 2104 Model TS4 automatically switches off or on when the host system is switched off or on. When this switch is set to on, the 2104 Model TS4 is powered on or off by the dc on/standby switch on a fan-and-power-supply assembly.
- You already set the Box ID switch **6** in step 2 on page 9.

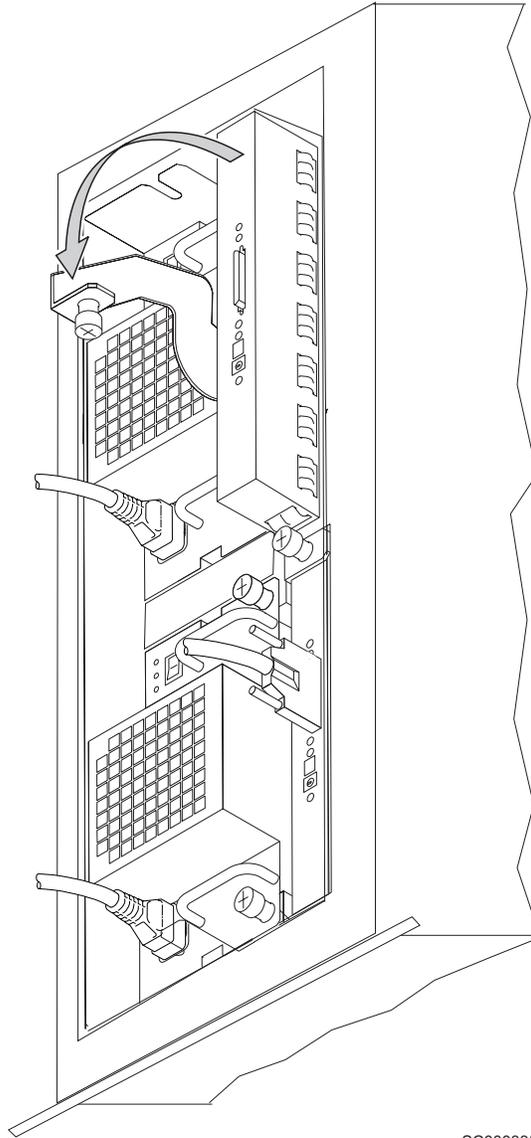
9. Remove the SCSI interface card assembly-1. Check and, if necessary, change the settings of the internal switches of SCSI interface card-1 (left side from the rear view). You do not need to set internal switches of SCSI interface card-2 (right side) because they are ignored.
 - a. Unscrew the thumbscrew **1**, as Figure 23 shows.



SC000338

Figure 23. Unscrewing the thumbscrew

- b. Pull the lever out to unplug the SCSI interface card assembly-1 from the 2104 Model TS4, as Figure 24 shows.

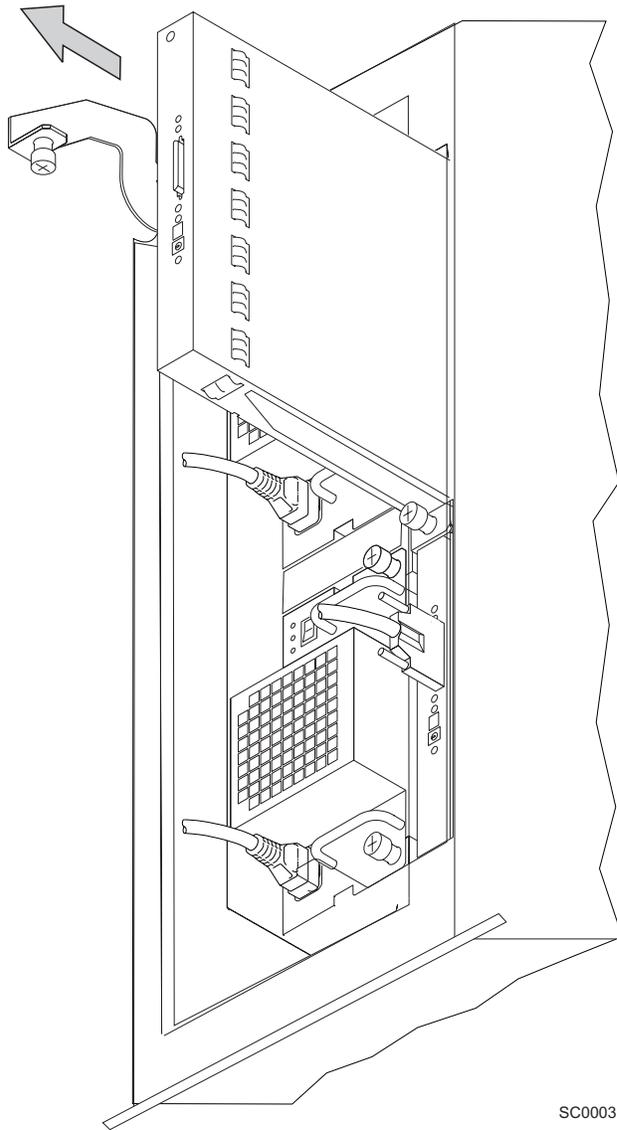


SC000335

Figure 24. Opening the lever on the card assembly

CAUTION:
Do not insert hands or tools into the space that contained the card assembly. (27)

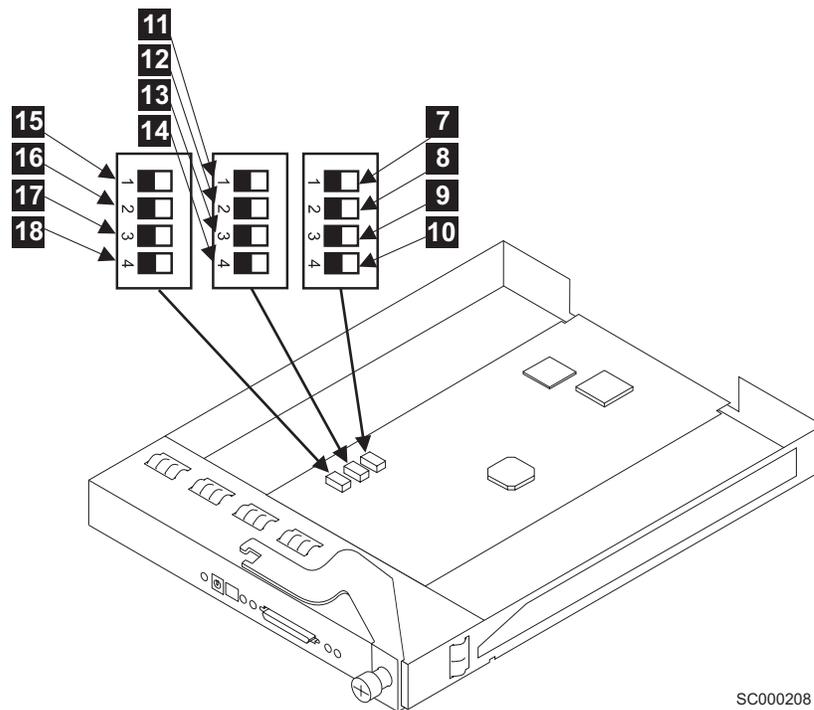
- c. Pull the SCSI interface card assembly-1 out from the 2104 Model TS4, as Figure 25 shows.



SC000339

Figure 25. Removing the card assembly

10. Figure 26 shows other switches on the SCSI interface card.



SC000208

Figure 26. Card assembly switches

11. The SCSI bus split control **7** controls the SCSI bus mode. When the switch is off, the enclosure is configured as a single SCSI bus. When this switch is on, the enclosure is configured as a dual or split SCSI bus.
12. Verify that switch **8** and **9** (reserved) are off.
13. Verify that the disable ID 6 handling switch **10** is off. The SCSI ID 6 is automatically disabled and removed from the system when the following conditions are met:
 - The switch is off.
 - Two SCSI interface cards are installed with single-bus configuration.
 - Two hosts are connected to the 2104 Model TS4 and both are on.

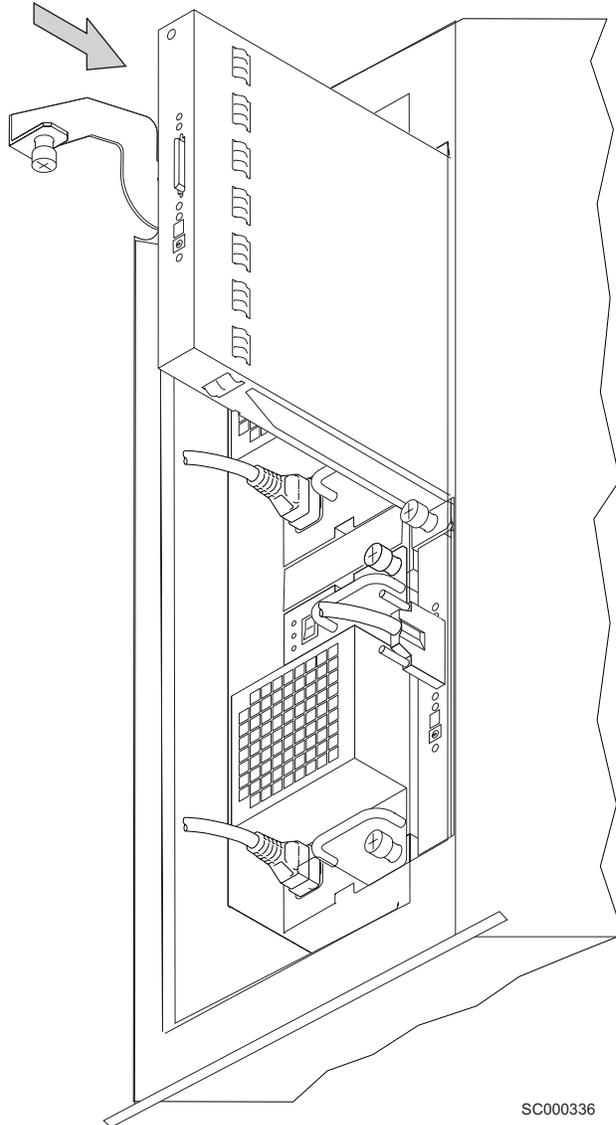
When two SCSI interface cards are installed and the 2104 Model TS4 is configured for single-bus mode, an ID conflict occurs if a drive is installed in the slot of SCSI ID 6. The ID conflict exists because one of the host bus adapter (HBA) SCSI IDs should be set to 6 when using both host ports. Unless the disable ID 6 handling switch is off or the drive is removed from the slot of SCSI ID 6, there will be an ID conflict between the HBA that is using ID 6 and the drive in the slot of SCSI ID 6. Removing the drive from slot 6 and replacing it with a dummy carrier eliminates the conflict.

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

14. The configuration switches **11** through **18** must always be set to off in the 2104 Model TS4, as Figure 26 on page 15 shows.
15. Reinstall the card assembly.
 - a. Insert the card assembly into the 2104 Model TS4, as shows. Push the assembly in until it stops.

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. (20)



SC000336

Figure 27. Inserting the card assembly

- b. Push the lever until it is fully closed to plug the card assembly into the 2104 Model TS4, as Figure 28 shows.
- c. Tighten the thumbscrew fully.

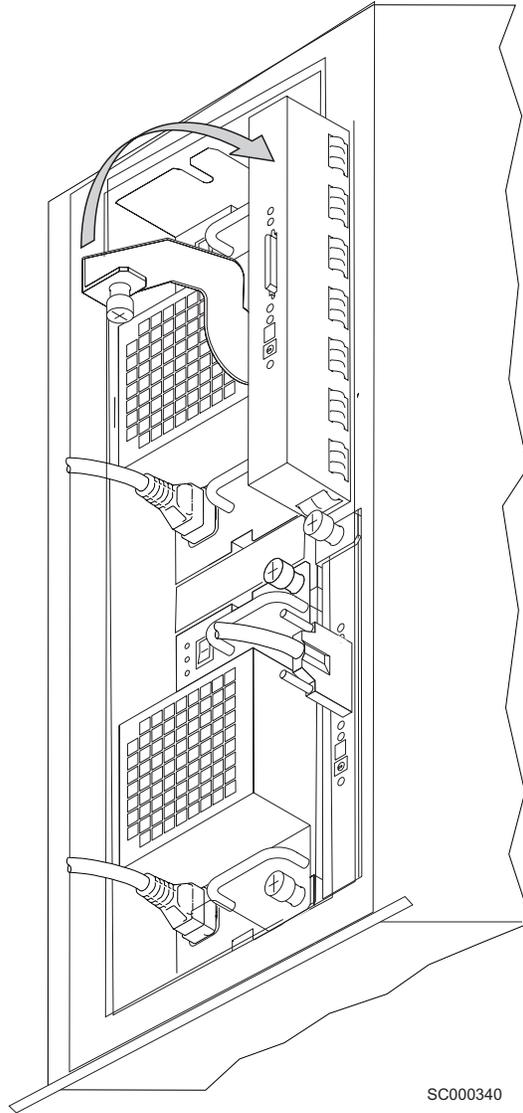


Figure 28. Closing the lever on the card assembly

Connecting the 2104 Model TS4 to the power source

Perform the following steps to connect the 2104 Model TS4:

1. Ensure that the dc on/standby switch **1** on each fan-and-power-supply assembly is set to standby. See Figure 29.

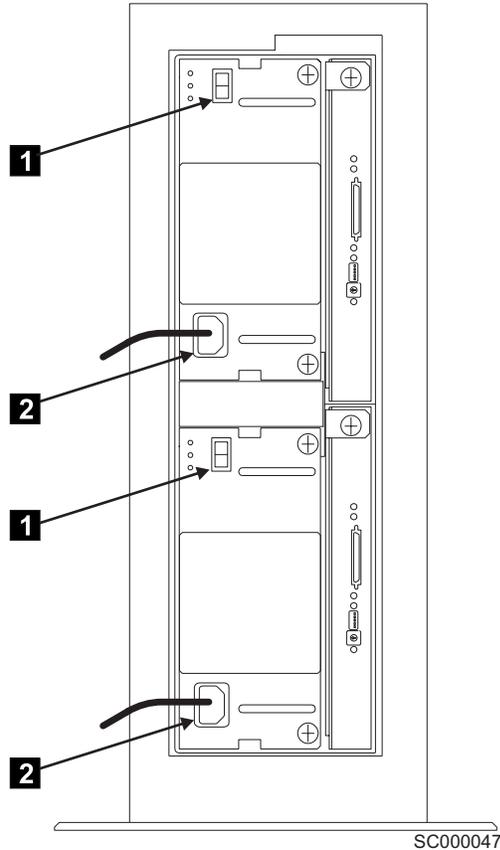


Figure 29. Connecting power cables

2. At the back of the 2104 Model TS4, plug a power cable into the mainline power connector **2** on each fan-and-power-supply assembly.
3. Perform the grounding checks described in the *Expandable Storage Plus: 2104 Model DS4 and Model TS4 Service Guide*.
4. Plug the other end of each power cable into a mainline electrical power outlet. If the power outlet has a switch, switch it on. The green ac pwr light comes on.
5. Switch on the dc on/standby switch **1** on each fan-and-power-supply assembly. If option switch **5** (see Figure 22 on page 11) is on, the green dc power light **3** comes on. See Figure 29. If option switch **5** (see Figure 22 on page 11) is off, the green dc power light (see Figure 29) stays off. It will come on when the 2104 Model TS4 is connected to the host system.
6. Go to “Connecting the 2104 Model TS4 to the host system” on page 19.

Connecting the 2104 Model TS4 to the host system

Perform the following steps to connect the 2104 Model TS4 to the host system:

1. Refer to your preinstallation planning information or 2104 Model TS4 configuration information and check how the 2104 Model TS4 is to be connected to the host system. Verify your configuration by referring to “Valid configurations” on page 25.
2. Attach identification labels to the external SCSI signal cables (see the appropriate *Adapters, Devices and Cables Information* manual for details). See Figure 30.

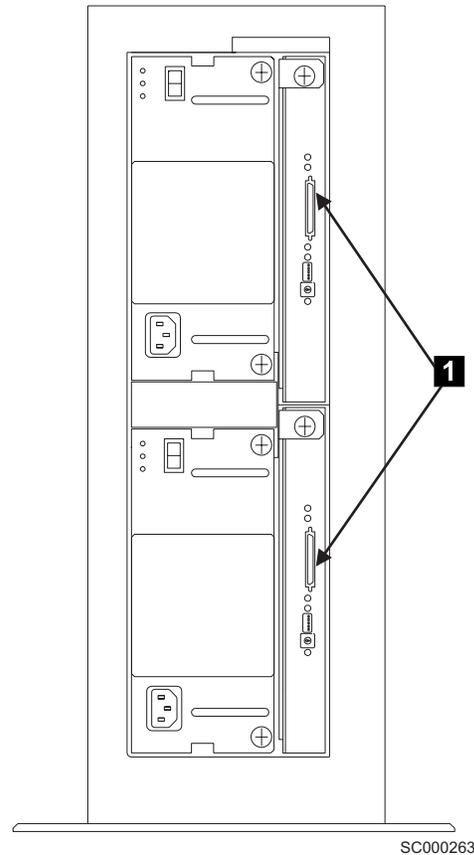


Figure 30. Connecting SCSI cables

3. Tighten the retaining screws. Plug the SCSI signal cables into the connectors **1** on the SCSI interface cards. Ensure that the retaining screws on the connectors are tightened. If necessary, use a small screwdriver to do this.
Attention: Do not use a power-driven screwdriver during this step; it could produce excessive torque and break the screw or card.
4. Ensure that all SCSI signal cables are correctly connected. An incorrect connection can prevent the 2104 Model TS4 from powering on fully.

Testing the installation

Perform the following steps to verify the status of the 2104 Model TS4:

1. Verify that the attached host system is powered on and the SCSI cables are connected correctly.

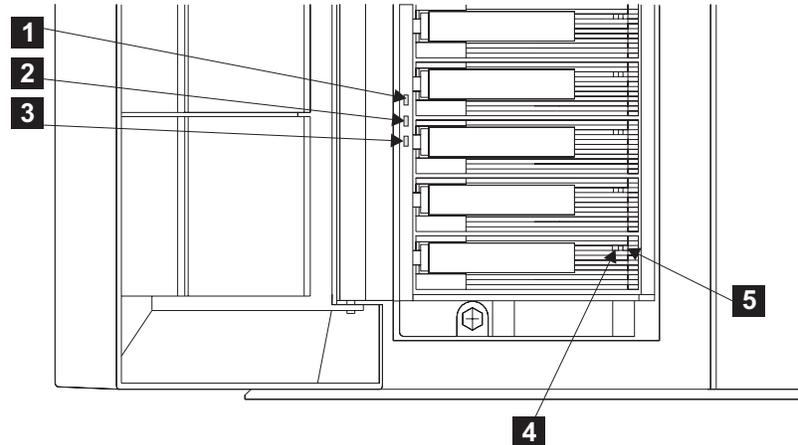


Figure 31. Checking the lights

- a. The 2104 Model TS4 has three lights. The green Power light **1** comes on and stays on. The amber Check light **2** comes on for approximately two seconds and goes off. The blue Unit Identify light **3** stays off.
- b. Each disk drive module has two lights. The green Activity light **4** comes on for approximately two seconds, when power is first supplied to the disk drive, then goes off. The amber Check light **5** then comes on for approximately two seconds and goes off.

Note: Dummy disk drive modules have no lights.

2. Configuration is complete when the lights on the 2104 Model TS4, and its installed disk drive modules, are as described in Figure 31:

Power light **1** : on

Check light **2** : off

Unit Identify **3** : off

Activity light **4** on each installed disk drive module: off

Check light **5** on each installed disk drive module: off

If the lights are correct:

1. Refer to “Web sites” on page xxvi for the latest microcode and system software levels. Ensure that the using system software is at the correct level for the 2104 Model TS4, and that the correct level of microcode for the disk drive modules is loaded.
2. Go to Appendix A, “Operating with RISC systems”, on page 21, for information about how to configure your 2104 Model TS4 to the host system, what service aids are available, and how to collect statistics during the operation of your 2104 Model TS4.

If the lights are not as described here, refer to the *Expandable Storage Plus: 2104 Model DS4 and Model TS4 Service Guide* for information on identifying the fault.

Appendix A. Operating with RISC systems

This appendix describes how to operate an RS/6000 or IBM @server pSeries computer to which one or more 2104 Model DS4 or Model TS4s are attached.

System service aids

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

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

Identifying a 2104 Model TS4 and the disk drive modules

There are separate ways to identify a 2104 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 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 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 TS4 to an AIX host system

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

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

Unconfiguring a 2104 Model TS4 from an AIX host system

To remove a 2104 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 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
```

Appendix B. Cable configurations

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

Valid configurations

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

You can attach a 2104 Model TS4 with only one SCSI interface card to one SCSI adapter or integrated SCSI port. You can attach a 2104 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 TS4.

You can configure a 2104 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 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 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 1 shows a summary of valid configurations and SCSI ID assignments.

Table 1. Valid configurations

SCSI bus mode	Number of connected adapters	SCSI IDs of adapters	Maximum number of disk drive modules	SCSI IDs of disk drive modules	SCSI ID of enclosure services processor	Adapters supported
Single bus	1	7	14	0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14	15	See "Valid configurations" on page 25 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 25 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 25 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 TS4 to off.

You can connect each 2104 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 TS4s.

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

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

Figure 32 shows one adapter in one host system connected to one 2104 Model TS4 (single-bus mode).

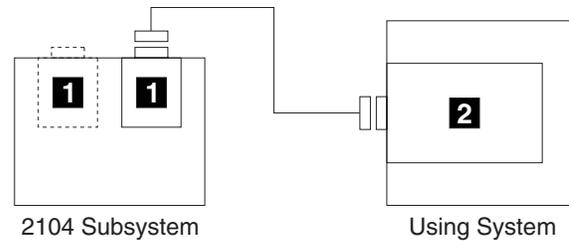


Figure 32. One adapter in one host system connected to one 2104 Model TS4 (single-bus mode)

1	<p>SCSI interface card.</p> <p>Note: The second SCSI interface card that is in the 2104 Model TS4 is optional.</p>
2	<p>SCSI adapter of one of these types:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following adapters to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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) <p>Note: The 2104 Model TS4 can be connected to an integrated SCSI port instead of to one of these adapters.</p>

Note: The SCSI address of the adapter that is connected to the 2104 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 TS4s

Figure 33 shows two adapters in one host system connected to two 2104 Model TS4s (single-bus mode).

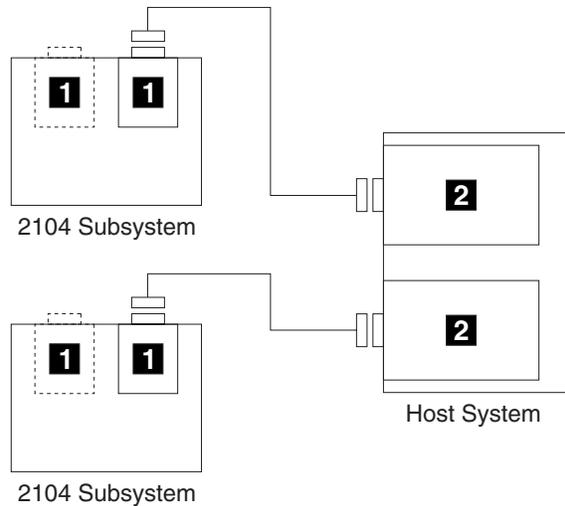


Figure 33. Two adapters in one host system connected to two 2104 Model TS4s (single-bus mode)

1	<p>SCSI interface card.</p> <p>Note: The second SCSI interface card that is in the 2104 Model TS4 is optional.</p>
2	<p>SCSI adapter of one of these types:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following adapters to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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) <p>Note: The 2104 Model TS4 can be connected to an integrated SCSI port instead of to one of these adapters.</p>

Note: The SCSI address of the adapter that is connected to the 2104 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 TS4s

Figure 34 shows one adapter in each of two host systems connected to two 2104 Model TS4s (single-bus mode).

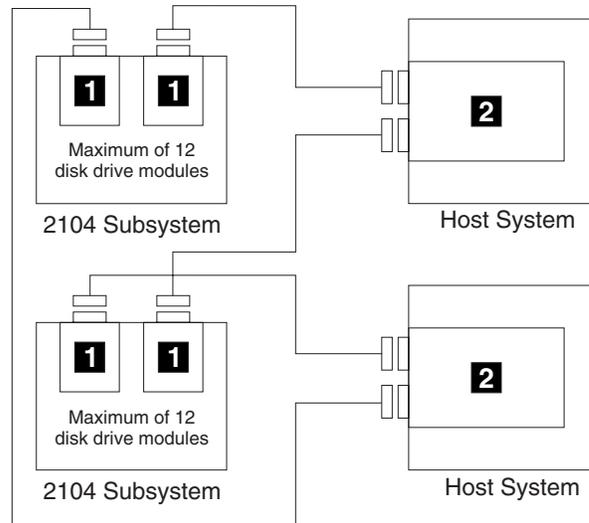


Figure 34. One adapter in each of two host systems connected to two 2104 Model TS4s (single-bus mode)

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

1	SCSI interface card.
2	<p>For HACMP configurations in standby and mutual takeover mode:</p> <ul style="list-style-type: none"> • 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) <p>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:</p> <ul style="list-style-type: none"> • 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 TS4 must be different from the addresses of the installed disk drive modules. When a second adapter is connected to a 2104 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 TS4.

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

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

Figure 35 shows one adapter in one host system connected to two 2104 Model TS4s (single-bus mode).

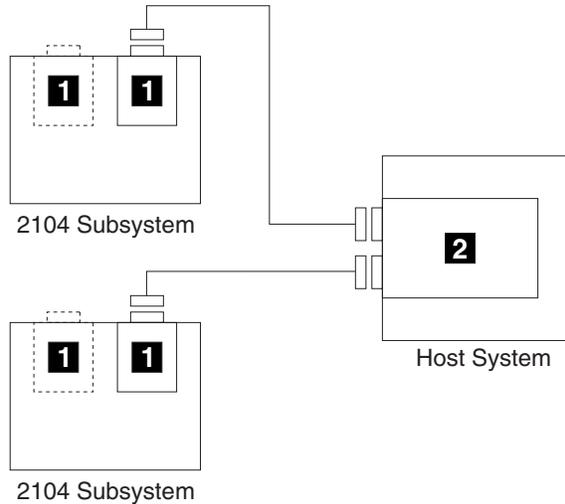


Figure 35. One adapter in one host system connected to two 2104 Model TS4s (single-bus mode)

1	<p>SCSI interface card.</p> <p>Note: The second SCSI interface card that is in the 2104 Model TS4 is optional.</p>
2	<p>SCSI adapter of one of these types:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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) <p>Note: The 2104 Model TS4 can be connected to an integrated SCSI port instead of to one of these adapters.</p>

Notes:

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

Figure 36 shows one adapter, one host system with internal RAID array, and two 2104 Model TS4s (single-bus mode).

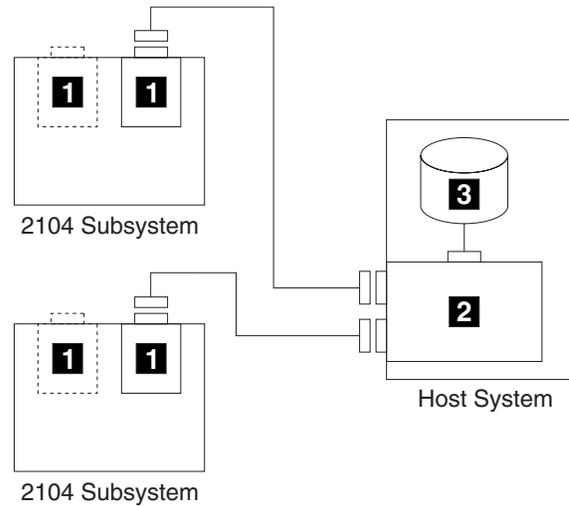


Figure 36. One adapter, one host system with internal RAID array, and two 2104 Model TS4s (single-bus mode)

1	SCSI interface card. Note: The second SCSI interface card that is in the 2104 Model TS4 is optional.
2	SCSI adapter: <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4:</p> <ul style="list-style-type: none"> • PCI-X Dual Channel Ultra320 SCSI RAID Adapter (type number 5703, feature code 5703)
3	Internal RAID array.

Notes:

1. The SCSI address of the adapter that is connected to the 2104 Model TS4 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 TS4

Figure 37 shows one adapter in each of two host systems connected to one 2104 Model TS4 (single-bus mode).

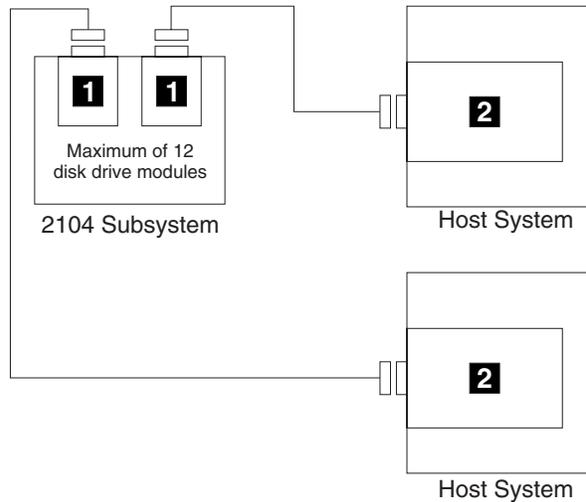


Figure 37. One adapter in each of two host systems connected to one 2104 Model TS4 (single-bus mode)

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

1	SCSI interface card.
2	<p>For HACMP configurations in standby or mutual takeover mode:</p> <ul style="list-style-type: none"> • 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) <p>For non-HACMP configurations:</p> <ul style="list-style-type: none"> • 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) <p>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 TS4 cannot be shared.</p>

Notes:

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

Figure 38 shows two adapters in one non-HACMP host system connected to one 2104 Model TS4 (dual-bus mode).

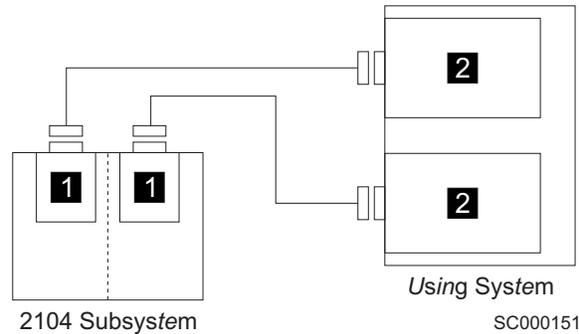


Figure 38. Two adapters in one non-HACMP host system connected to one 2104 Model TS4 (dual-bus mode)

1	SCSI interface card.
2	<p>SCSI or SCSI RAID adapter of one of these types:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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) <p>Note: Connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters.</p>

Notes:

1. The SCSI addresses of the adapters that are connected to the 2104 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 TS4s

Figure 39 shows three adapters in two non-HACMP host systems connected to two 2104 Model TS4s (dual-bus mode).

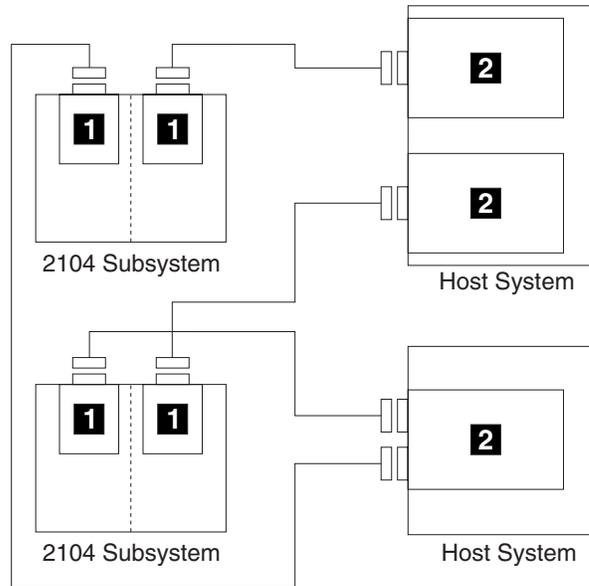


Figure 39. Three adapters in two non-HACMP host systems connected to two 2104 Model TS4s (dual-bus mode)

1	SCSI interface card.
2	<p>SCSI or SCSI RAID adapter of one of these types:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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) <p>Note: The connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters.</p>

Notes:

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

Figure 40 shows one adapter in one non-HACMP host system connected to one 2104 Model TS4 and an internal RAID array (dual-bus mode).

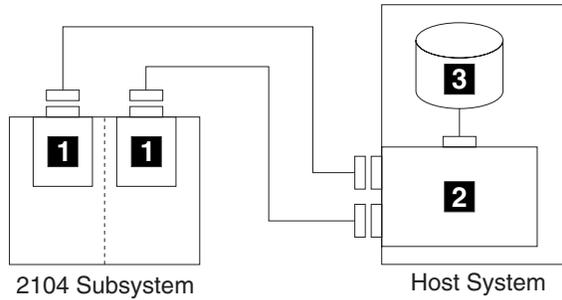


Figure 40. One adapter in one non-HACMP host system connected to one 2104 Model TS4 and an internal RAID array (dual-bus mode)

1	SCSI interface card.
2	<p>SCSI adapter:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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 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 TS4s

Figure 41 shows one adapter in each of two non-HACMP host systems connected to one 2104 Model TS4s (dual-bus mode).

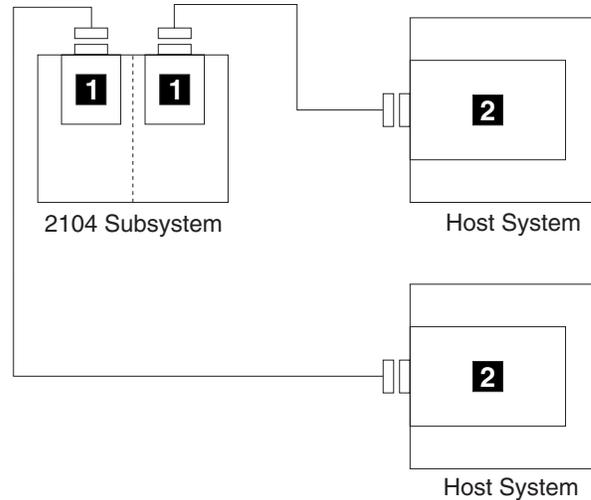


Figure 41. One adapter in each of two non-HACMP host systems connected to one 2104 Model TS4s (dual-bus mode)

1	SCSI interface card.
2	<p>SCSI or SCSI RAID adapter of one of these types:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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) <p>Note: Connection can be to an integrated SCSI port instead of to a SCSI connector on one of the listed SCSI adapters.</p>

Note: The SCSI address of the adapter that is connected to the 2104 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 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 TS4s

Figure 42 shows one RAID adapter in each of two non-HACMP host systems connected to two 2104 Model TS4s (dual-bus mode).

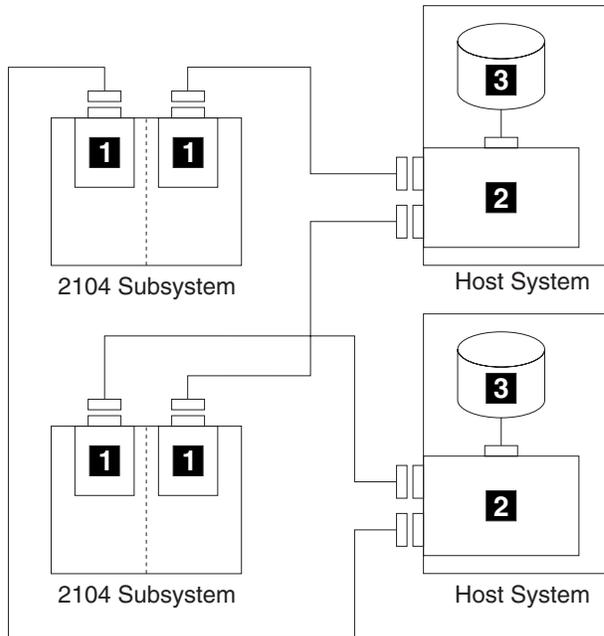


Figure 42. One RAID adapter in each of two non-HACMP host systems connected to two 2104 Model TS4s (dual-bus mode)

1	SCSI interface card.
2	<p>SCSI RAID adapter:</p> <ul style="list-style-type: none"> • 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) <p>Important: An RS/6000 or IBM @server pSeries computer running Linux for pSeries uses the following to connect to the 2104 Model TS4.</p> <ul style="list-style-type: none"> • 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 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 TS4

Figure 43 shows two adapters in one host system connected to one 2104 Model TS4 (single-bus mode).

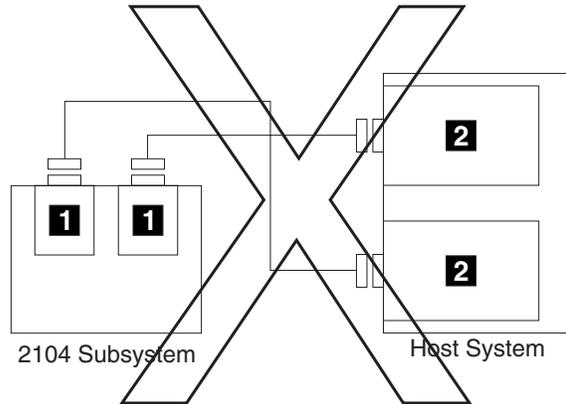


Figure 43. Two adapters in one host system connected to one 2104 Model TS4 (single-bus mode). This configuration is invalid.

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 TS4 is configured in single-bus mode, but is valid when the 2104 Model TS4 is configured in dual-bus mode. See page 36.

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

Figure 44 shows one adapter in one host system connected to two 2104 Model TS4s through the SCSI Interface cards.

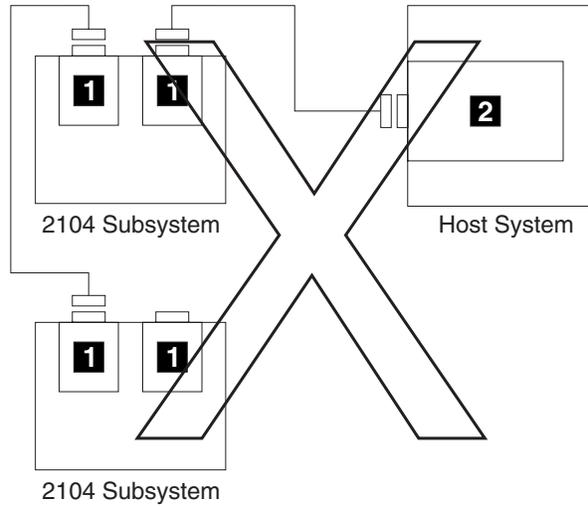


Figure 44. One adapter in one host system connected to two 2104 Model TS4s through the SCSI Interface cards. This configuration is invalid.

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 TS4s through a Y-cable (1)

Figure 45 shows one adapter in one host system connected to two 2104 Model TS4s through a Y-cable (1).

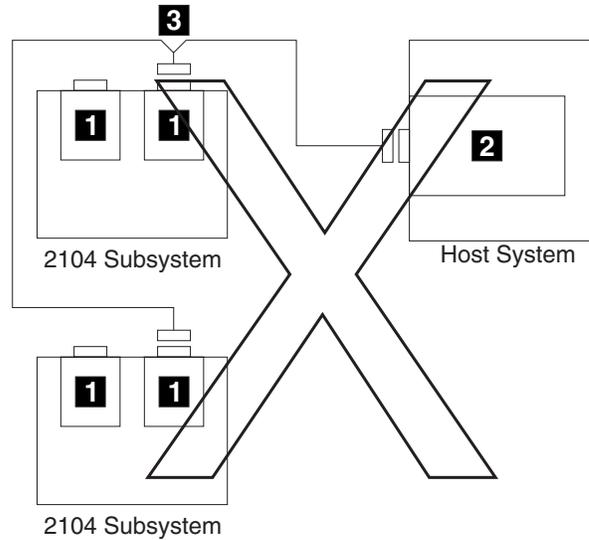


Figure 45. One adapter in one host system connected to two 2104 Model TS4s through a Y-cable (1). This configuration is invalid.

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 TS4.

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

Figure 46 shows one adapter in one host system connected to two 2104 Model TS4s through a Y-cable (2).

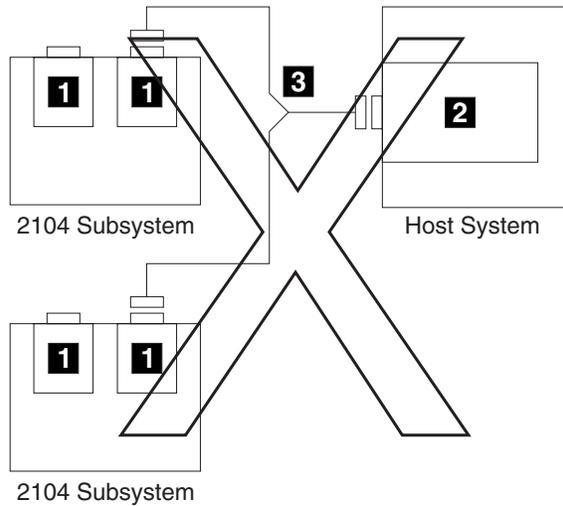


Figure 46. One adapter in one host system connected to two 2104 Model TS4s through a Y-cable (2). This configuration is invalid.

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 2104 Model TS4

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

Figure 47 shows one dual-channel non-RAID adapter in one host system connected to two 2104 Model TS4s and internal disk drives.

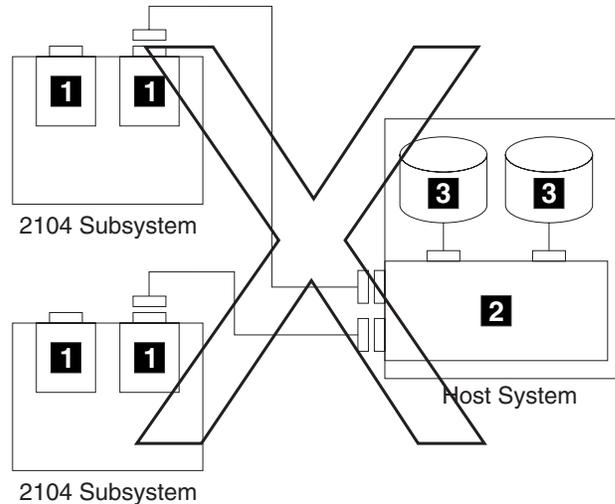


Figure 47. One dual-channel non-RAID adapter in one host system connected to two 2104 Model TS4s and internal disk drives. This configuration is invalid.

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 TS4s

Figure 48 shows one RAID adapter in each of two host systems connected to two 2104 Model TS4s. This configuration is invalid.

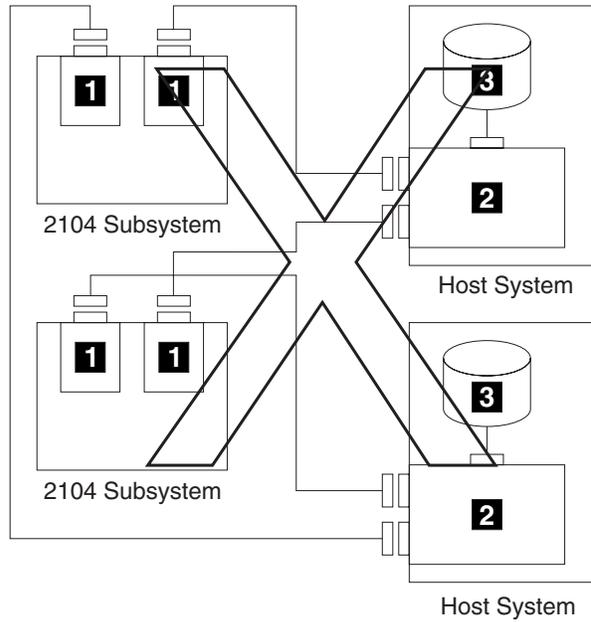


Figure 48. One RAID adapter in each of two host systems connected to two 2104 Model TS4s. This configuration is invalid.

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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Attention: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Where shielded or special cables (for example, cables fitted with ferrites) are used in the test to make the product comply with the limits:

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

Germany compliance statement

Zulassungsbescheinigung laut Gesetz ueber die elektromagnetische

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

Dieses Geraet ist berechtigt, in Uebereinstimmung mit dem deutschen EMVG das EG-Konformitaetszeichen - CE - zu fuehren.

Der Aussteller der Konformitaetserklaeung ist die IBM Deutschland.

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

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

EN 55022 Klasse A Geraete beduerfen folgender Hinweise:

Nach dem EMVG: ¹

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

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

Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Nach der EN 55022:

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

Anmerkung:

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

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

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

Korean Government Ministry of Communication (MOC) statement

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

Taiwan class A compliance statement

警告使用者:

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

VS07171L

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