

Bull ESCALA E Series

Upgrading the System

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Bull ESCALA E Series

Upgrading the System

Hardware

December 1997

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Communication Statements

The following statements apply to this product. The statements for other products intended for use with this product appears in their accompanying manuals.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider or the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

EC Council Directive

This product is in conformity with the protection requirements of the following EC Council Directives:

- 89/336/EEC and 92/31/EEC (for the electromagnetic compatibility)
- 73/23/EEC (for the low voltage)
- 93/68/EEC (for CE marking).

Neither the provider nor the manufacturer can accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards not supplied by the manufacturer.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Canadian Department of Communications Compliance Statement

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

VCCI 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。

The following is the translation of the VCCI Japanese statement in the box above.

This is a Class A product based on the standard of the Voluntary Control Council for Interferences by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Safety Notices

Definitions of Safety Notices

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

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

A *warning* notice indicates an action that could cause damage to a program, device, system, or data.

Placement of Safety Notices Inside This Manual

System safety notices which do not refer to a specific situation are included in these pages. Any specific safety notices are mentioned inside this manual whenever these must be observed during system operating or handling.

IT Power Systems

This equipment has been designed also for connection to IT Power Systems.

Device Disconnection

To remove the primary power from the unit, unplug the “Appliance Coupler” on the rear side.

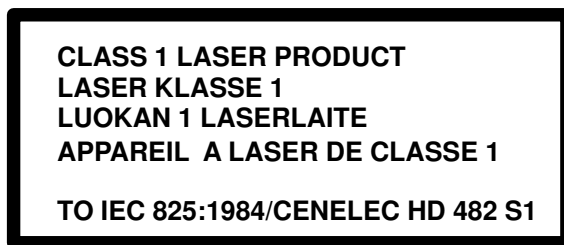
Laser Safety Information

Note: The Optical Link Card (OLC) referred to in this information is part of the Serial Optic Channel Converter assembly.

This system may contain a laser product called the Optical Link Card (OLC). In the U.S., the OLC is certified as a Class 1 laser product that conforms to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR Subchapter J. Internationally, the OLC is certified as a Class 1 laser product that conforms to the requirements contained in the International Electrotechnical Commission (IEC) standard 825 (1984), the Verband Deutscher Elektrotechniker (VDE) standard 0837 (1986), and the CENELEC (European Committee for Electrotechnical Standardization) Harmonization Document HD 482 S1 (1988). The German testing institute VDE assigned a certificate of conformity to DIN IEC 825/VDE 0837/02.86 and CENELEC HD 482 S1/03.88; the certificate registration number is 3642.

In addition, Statens Provningsanstalt (Swedish National Testing Institute) tested and approved the OLC for use in Sweden as a Class 1 laser product and assigned the approval number SP LA 89:184. The CDRH certification label and the VDE certificate of conformity mark are located on the plastic retainer of the OLC product. The figure shows the system Class 1 information label required by IEC 825.

Class 1 laser products are not considered to be hazardous. The OLC internally contains a gallium aluminum arsenide (GaAlAs) semiconductor laser diode emitting in the wavelength range of 770 to 800 nanometers. This laser diode is a Class 3B laser that is rated at 5.0 milliwatts. The design of the OLC is such that access to laser radiation above a Class 1 level during operation, user maintenance, or service conditions is prevented.



The Optical Link Card (OLC) must only be connected to another OLC or a compatible laser product. Any compatible laser product must contain the open fiber link detection and laser control safety system used in OLC. This is a requirement for correct operation of the optical link. In addition, the OLC product is designed and certified for use in applications with point-to-point optical links only. Using this product in any other type of optical link configuration (for example, links containing optical splitters or star couplers) is considered as not using the product correctly and may require that the user certify the laser product again for conformance to the laser safety regulations.

About This Guide

Audience

This guide is addressed to the people in charge of the system hardware upgrading.

Note: The upgrading procedures described in this guide must be performed by people trained to perform service tasks on the system and must be executed carefully following the instructions given in this guide.

The system supplier will not be liable for any problems deriving from incorrect handling or wrong installation of the upgradings.

How to Use This Guide

This guide explains how to upgrade your system in terms of memory, CPU's, controllers and devices.

This guide contains a brief description, configuration rules, installation and removal procedures for each upgradable component.

- Chapter 1, *Preparing Your System for an Upgrade*, describes what you should do before starting any upgrading procedure. It also includes the procedure for opening and closing the system panels.
- Chapter 2, *Memory*, includes memory description, configuration rules, and upgrading procedure.
- Chapter 3, *CPU's*, includes CPU cards description, configuration rules, upgrading and removal procedures.
- Chapter 4, *Controllers*, includes controllers description, configuration rules, installation and removal procedures, and information about SCSI controllers for internal devices.
- Chapter 5, *Devices*, includes devices description, configuration rules, upgrading and removal procedures, and information about devices hot swapping.

This guide is also available in an online version.

Related Publications

- *Hardware Tasks: Where Do I Find the Information I Need?*, is a hardware task roadmap which helps you find the task related information inside the documentation kit. This booklet is available on paper only.
- *Setting Up the System*, contains information about system setup, system startup and explains what to do when the system arrives. This guide is available both on paper and in an online version.
- *Operator's Guide*, contains information about system operability, features and use of installed devices. This guide is available both on paper and in an online version.
- *Maintenance and Service Guide*, provides the description of the base unit hardware components and the instructions for their installation and/or replacement. SCSI cables description and connection is also included. A section is dedicated to the maintenance tools provided with the system, such as offline tests, how to update system configuration parameters, for both the base unit and the disk expansion unit. This guide is addressed to people trained to perform service tasks on the system and is available on paper only.

- *AIX System Management Guide: Operating System and Devices*, explains the use of the System Management Interface Tool (SMIT) program.
This guide is available both on paper and in an online version.
- *Disks and Tapes Configuration Information*, describes the setting of addresses and switches for both disk and tape drives. It also includes information on CD-ROM drives setting.
This guide is available on paper only.
- *Bull ESCALA PowerCluster & HA Solutions Setup Guide*, describes how to set up Powercluster and High Availability solutions; it discusses both the hardware and software aspects.
This guide is available on paper only.

In addition, if at least one disk expansion unit is connected to the base unit, you can find the relevant information in the disk expansion unit specific documentation.

- *Disk Expansion Unit Quick Set Up*, describes the connection procedure to the base unit and the hardware procedure for a quick set up of the disk expansion unit.
This leaflet is available on paper only.
- *Using the Disk Expansion Unit*, contains information about the disk expansion unit operability, features and configuration rules.
This guide is available on paper only.
- *Disk Expansion Unit Service Guide*, provides the description of the disk expansion unit hardware components, instructions for their installation and/or replacement and the SCSI cable description and connections.
This guide is addressed to people trained to perform service tasks on the system.
This guide is available on paper only.

Chapter 1. Preparing Your System for an Upgrade

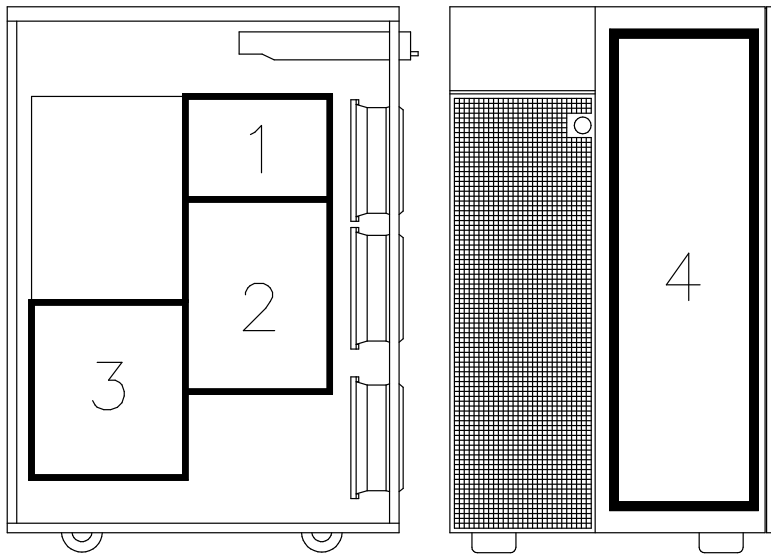
Before handling any hardware component, read carefully the following sections.

- How to Approach Your System**
- How to Handle Hardware Components**
- Preliminary and Restart Operations**

How to Approach Your System

This schematic of the system shows the working areas.

System Lateral Left View and Front View



- ① **Memory**
- ② **CPU's**
- ③ **Controllers**
- ④ **Devices**

Warning: Before handling any hardware component, be sure you know the procedures described in **How to Handle Hardware Components**, on page 1-3 and **Preliminary Operations**, on page 1-5.

How to Handle Hardware Components

Tools Needed

You should have the following tools available before you start installation and removal procedures on your system:

- A large flat blade screwdriver
- A torx screwdriver for torx screw \varnothing 6 mm.
- A screwdriver for cross-slotted screw
- An antistatic envelope
- An antistatic wrist strap.

How to Use the Antistatic Envelope

Warning: Controllers, memory, cards and devices are sensitive to electrostatic discharge. These components are shipped in antistatic envelopes to prevent this damage.

Take the following precautions when handling any of the above mentioned hardware components:

1. Do not remove the component from the antistatic envelope until you are ready to install it in the system.
2. Wear the antistatic wrist strap, refer to [How to Use the Antistatic Wrist Strap](#), below.
3. Grip hardware components by the edges. Hold drives by the frame. Avoid touching the soldered joints or pins.
4. If you need to lay the hardware component down while it is out of the antistatic envelope, lay it on the antistatic envelope.
5. Handle the hardware components carefully in order to prevent permanent damage.

How to Use the Antistatic Wrist Strap

The antistatic wrist strap must be used each time you need to handle a controller, memory or CPU card, a media device or a fixed hard disk, because these are sensitive to electrostatic discharge.

The antistatic wrist strap is a band of 1m length providing at one end an adhesive strap which is to be wrapped around your wrist, and at the opposite end a copper clip which is to be attached to a non-varnished metallic frame of the system unit in a position that does not block your working area or movements.

Preliminary and Restart Operations

- Preliminary Operations
- System Panels
- Restart Operations

Preliminary Operations

These preliminary operations must be performed whenever you upgrade your system.

Note: In case one hard disk drive is faulty, the Hot Swapping feature enables you to remove and replace it without stopping the system activity. Refer to the procedures described in **Device Hot Swapping**, on page 5-35.

1. Exit any applications that are running. Consult the application manuals for instructions. In case of High Availability configuration, refer to the *Bull ESCALA PowerCluster & HA Solutions Setup Guide* manual before stopping system unit(s).
2. Check that the media drives, if any, do not contain any media.
3. Stop the system unit(s), following the appropriate procedure (the stopping procedures of the system depend on the power control of the disk expansion unit):
 - **Remote Control:** use this procedure when
the base unit is alone

the base unit is connected to the disk expansion unit operating in remote mode;
power is controlled by the base unit, its key is set to the **R** position
 - **Local Control:** use this procedure when the base unit is connected to the disk expansion unit operating in stand-alone mode; power is controlled by the disk expansion unit itself, its key is set to the **L** position.

Note: For detailed information about Remote or Local Control of the disk expansion unit, refer to the *Using the Disk Expansion Unit* manual.


Remote Control

Stop the whole system performing the following steps:

- Exit the Operating System using the appropriate **shutdown -F** command. Refer to the Operating System documentation for details.
- Set the Key Mode Switch of the base unit to the Power Off position. Skip to step 4.

Local Control

If you must upgrade both the base and the disk expansion unit, or if you must upgrade only the base unit and the base unit is not included in a High Availability configuration, stop the whole system performing the following steps:

- Exit the Operating System using the appropriate **shutdown -F** command. Refer to the Operating System documentation for details.
- Set the Key Mode Switch of the disk expansion unit to the  (Local Standby) position.
- Set the Key Mode Switch of the base unit to the Power Off position. Skip to step 4.

If you must upgrade only the base unit and the base unit is included in a High Availability configuration, stop the base unit only performing the following step:

- Stop the system with a takeover of application(s) by the other system or, at least, stop High Availability asking for a resource takeover using *SMIT* program.


Note: Be careful stopping the system. Do not use the **shutdown -F** command, because it does not cause takeover of applications. Refer to the *Bull ESCALA PowerCluster & HA Solutions Setup Guide* manual.

- Set the Key Mode Switch of the base unit to the Power Off position. Skip to step 4.

If you must upgrade only the disk expansion unit, stop the disk expansion unit only performing the following steps:

- Logically remove all devices of the disk expansion unit from the device configuration database, through the *SMIT* program.

Notes:

- a. If you need more detailed information about the *SMIT* program, please refer to the *AIX System Management Guide: Operating System and Devices* manual, *Logical Volumes* and *System Management Interface Tool* chapters.
 - b. Once the maintenance operations are completed, you must restore the original device configuration. For details, please refer to the **Restart Operations** paragraph, on page 1-13.
- Set the Key Mode Switch of the disk expansion unit to the  (Local Standby) position. Skip to step 6.
4. Make sure the power switches for all the external devices connected to the stopped system unit(s), if any, are set to OFF.
 5. Unplug the power cord to all the external devices connected to the stopped system unit(s) from the outlet, if any.
 6. Unplug the stopped system unit(s) power cord from the outlet.

CAUTION:

To remove the primary power from the units unplug the “Appliance Coupler” on the rear side.

CAUTION:

After unplugging the power cord, it is necessary to wait at least 20 sec. before removing any electronic part of the system: the removed part could be damaged.

7. Disconnect all external cables from the unit(s). Keep trace of these connections.
8. Ensure that the two wheels on the rear of the system units are locked to improve the system stability.

CAUTION:

Before proceeding, ensure that these preliminary operations have been performed correctly to prevent a possible hazard.

DANGER

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

System Panels

One of these situations can exist:

- You want to upgrade your system with hard disk drives. Open the device shutter.
- You want to upgrade your system with media drives. Remove the front panel and the right lateral panel.
- You want to upgrade your system with memory, CPU or controller cards. Remove the left lateral panel.
- You have concluded the upgrading operations on your system. Close and/or re-install the system panel(s).

DEVICE SHUTTER

Opening on page 1-8

Closing on page 1-8

FRONT PANEL

Removal on page 1-9

Installation on page 1-10

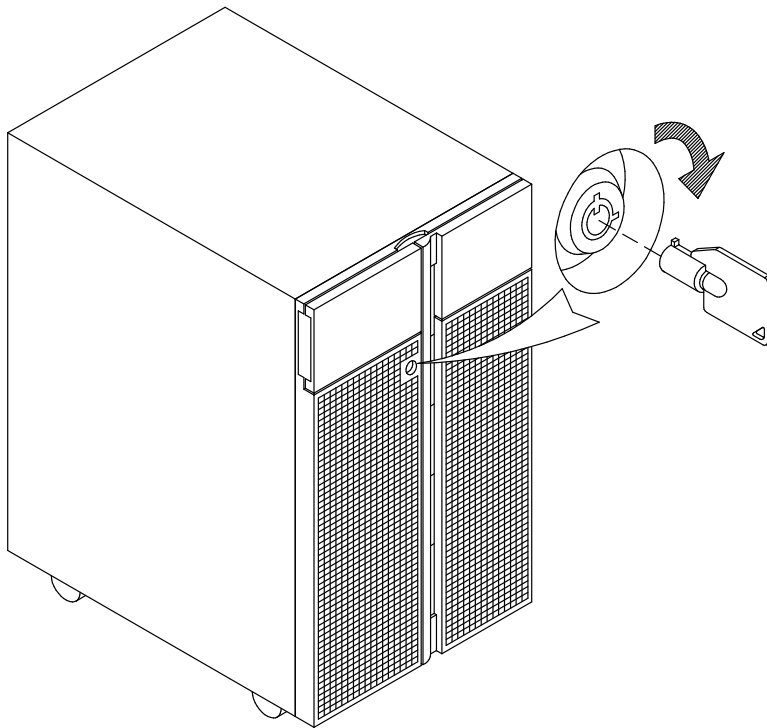
LATERAL PANEL

Removal on page 1-11

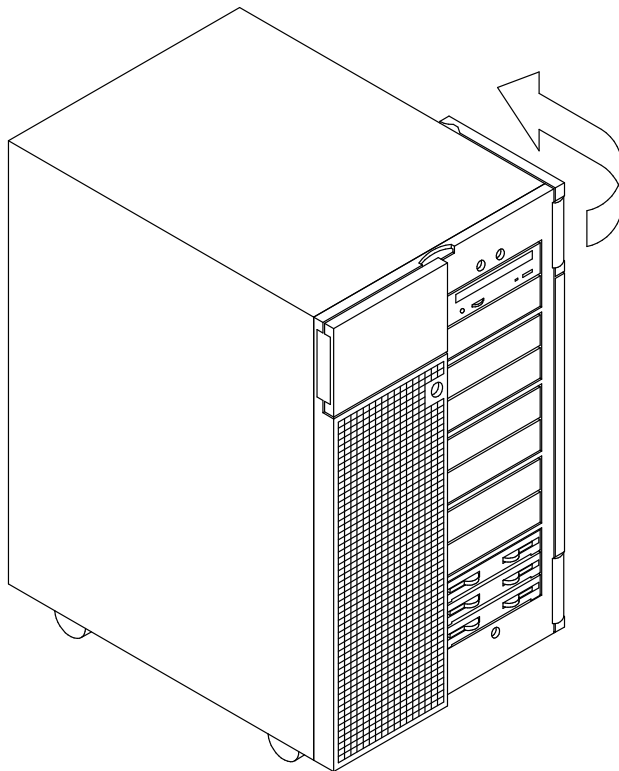
Installation on page 1-12

Device Shutter Opening

1. Insert the device shutter key and turn it to the right.



2. Open the device shutter of the front panel.



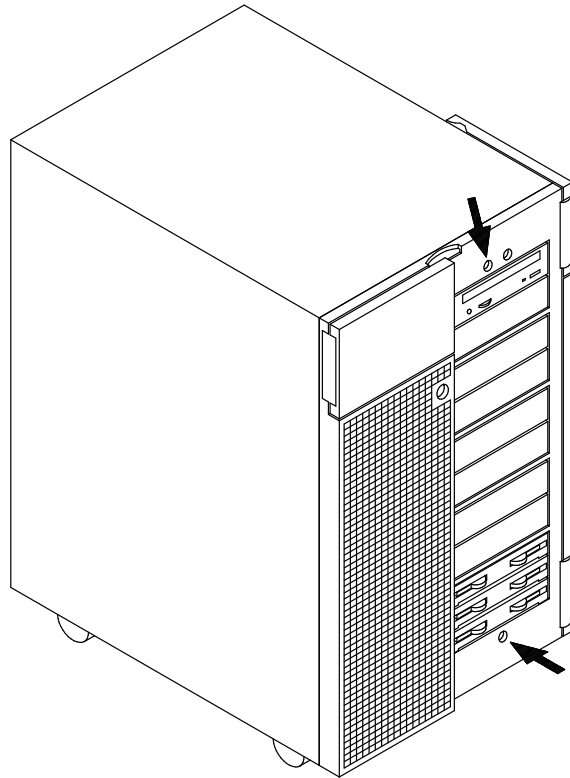
Device Shutter Closing

1. Close the device shutter.
2. Insert the device shutter key and turn it to the left.
3. Remove the device shutter key and store it.

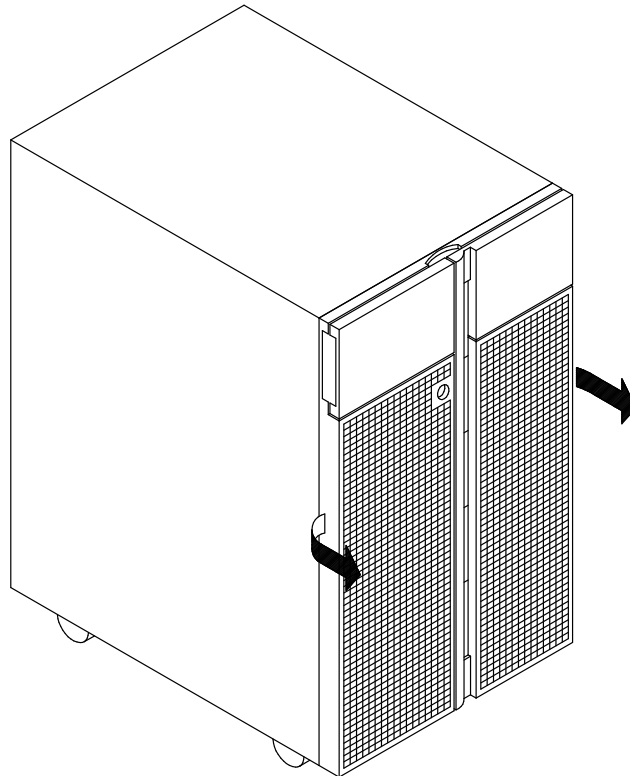
Warning: Remember to store the device shutter key safely to avoid any possible system misuse.

Front Panel Removal

1. Insert the device shutter key and turn it to the right.
2. Open the device shutter of the front panel.
3. Loosen the two retaining screws.



4. Close the device shutter, grip the front panel at the sides and slide it towards you.



Front Panel Installation

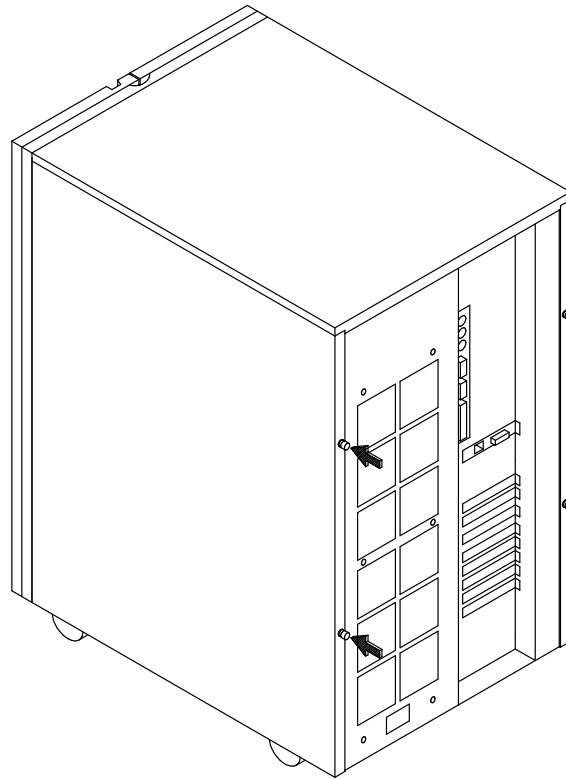
1. Grip the front panel at the sides and position it in the corresponding retainers on the chassis.
2. Push the front panel towards the chassis until it is well seated.
3. Open the device shutter.
4. Tighten the two retaining screws.
5. Close the device shutter.
6. Insert the device shutter key and turn it to the left.
7. Remove the device shutter key and store it.

Warning: Remember to store the device shutter key safely to avoid any possible system misuse.

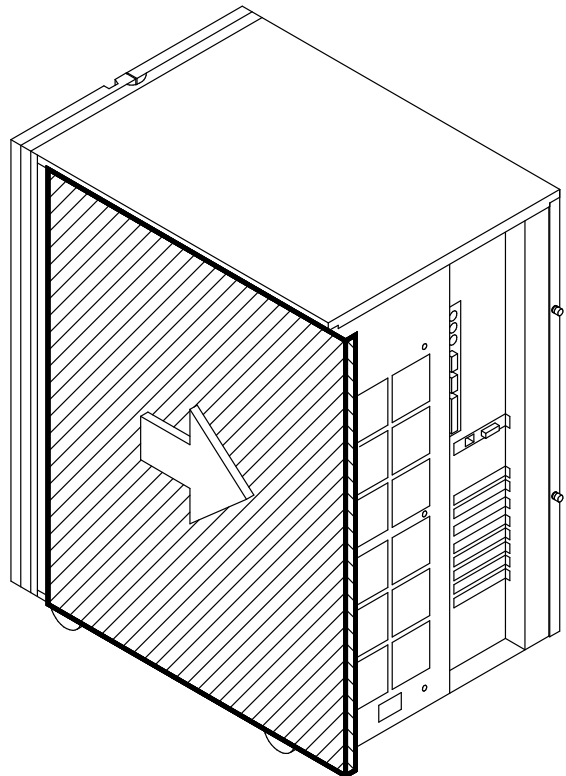
Lateral Panel Removal

Note: The figures show the removal of the right lateral panel, but the same procedure applies also to the left lateral panel.

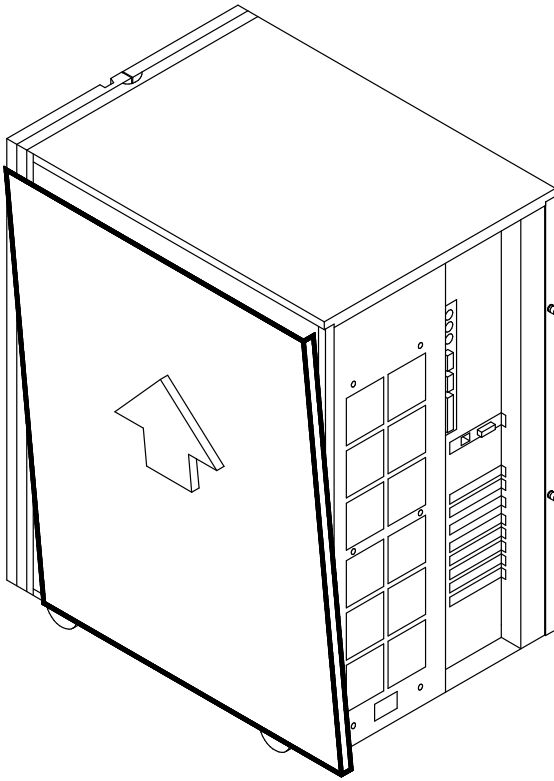
1. Access the system from the rear.
2. Unscrew the two retaining screws located on the panel frame of the lateral panel to be removed.



3. Gently slide the panel towards you.



4. The panel will tilt automatically outward.



5. Lift the panel from the unit and remove it.


Lateral Panel Installation

1. Access the system from the rear.
2. Hook the retaining brackets on the panel with the corresponding retainers on the chassis.
3. Push the panel towards the unit.
4. Firmly slide the panel into the system until the retaining brackets are locked.
5. Tighten clockwise the two retaining screws located on the panel frame.

Restart Operations

The following operations must be performed after all operations on your system are concluded.

The starting procedures of the system depend on the power control of the disk expansion unit.

- **Remote Control:** the disk expansion unit operates in remote mode, power is controlled by the base unit through the RS-485 interconnection, its key is set to the **R** position
- **Local Control:** the disk expansion unit operates in stand-alone mode, power is controlled by the disk expansion unit itself, its key is set to the  (Local Standby) position.

Follow the appropriate procedure, accordingly.


CAUTION:

For proper cooling and safe operation of the system, all the panels must be in place before you power up the system unit(s).

Remote Control

1. Make sure that the RS-485 interconnection has been properly performed from unit to unit.
2. Connect any required external cables to the disk expansion unit.
3. Make sure the disk expansion unit Key Mode Switch is set to the **R** position (Remote Control).

Note: The key position for the disk expansion unit is sensed when the unit power cord is connected to the outlet. Ensure the Key Mode Switch is set to the proper position before connecting the disk expansion unit power cord.

4. Connect the power cord of the external devices, if any, to the power outlets.
5. Connect the power cord of the disk expansion unit(s) to the power outlet.
6. Make sure the base unit Key Mode Switch is set to the Power Off position.
7. Connect the power cord of the base unit to the power outlet.
8. Switch on the external devices, if connected.
9. Switch on the system console.
10. Set the base unit Key Mode Switch to the  Normal position to power on the whole system.


Note: Powering on the system by setting the Key Mode Switch of the base unit to the Service position, you enter the Operating System diagnostic mode.

The system begins its normal startup routine and is ready for use.

Note: If you want to prevent an unauthorized reset of the system, set the Key Mode Switch of the base unit to the Secure position and remove the key.

Local Control

If the Base Unit is Operating


1. Make sure the disk expansion unit Key Mode Switch is set to the  position (Local Standby).

Note: The key position for the disk expansion unit is sensed when the unit power cord is connected to the outlet. Ensure the Key Mode Switch is set to the proper position before connecting the disk expansion unit power cord.

2. Connect any required external cables to the disk expansion unit.
3. Connect the power cord of the disk expansion unit to the power outlet.
4. Power on the disk expansion unit by setting the Key Mode Switch to the **L** Position (Local Control).
5. Logically add all devices of the disk expansion unit to the device configuration database, through the *SMIT* program.

Note: If you need more detailed information, please refer to the *AIX System Management Guide: Operating System and Devices* manual, *Logical Volumes* and *System Management Interface Tool* chapters.

If the Base Unit is Stopped

1. Make sure that the disk expansion unit(s) Key Mode Switch is set to the  position (Local Standby).

Note: The disk expansion unit key position is sensed when the disk expansion unit power cord is connected to its outlet. Make sure you set the key position, before connecting the disk expansion unit power cord.

2. Connect any required external cables to the unit(s).
3. Connect the power cord of the external devices, if any, to the power outlets.
4. Connect the power cord of the disk expansion unit(s) to the power outlet.
5. Make sure the base unit Key Mode Switch is set to the Power Off position.
6. Connect the power cord of the base unit to the power outlet.
7. Switch on the external devices, if connected.
8. Switch on the system console.
9. Power on the disk expansion unit(s) by setting the Key Mode Switch to the **L** Position (Local Control).
10. Power on the base unit by setting its Key Mode Switch to the **OK** Normal position.

The system begins its normal startup routine and is ready for use.

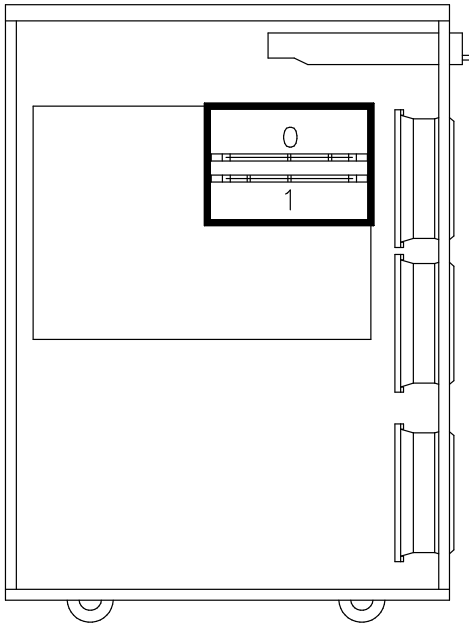
After the physical upgrade is completed, you may need to perform some software operations to use the new component (e.g. install a new device driver or create a file system for the new disk or start the High Availability software). Refer to your Operating System documentation.

Chapter 2. Memory

- Memory Description
- Memory Configuration
- Memory Upgrading

Memory Description

There are two memory connectors on the unit System Planar and they are located as shown below:

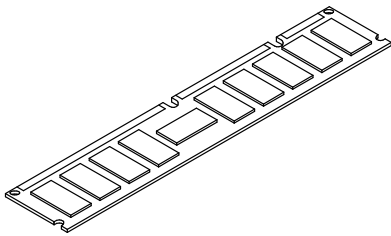


The two memory connectors on the System Planar can house:

- Either one memory bank, or
- Two memory risers hosting up to eight memory banks.

Your system memory is organized in memory banks made up of two memory DIMM's each.

A memory DIMM looks like:



The memory DIMM's supported by your system have the characteristics summarized below.

DIMM Standard 72 bit 168 pin
VCC 3.3V
Time of Access 60 ns
Functionality Extended Data Output (EDO)
Height 1.25 inch max
Package Type TSOPII
Application ECC

A memory bank can be made up of memory DIMM's having capacity of: 16/32/64/128 M bytes.

The memory bank characteristics are given in the following table:

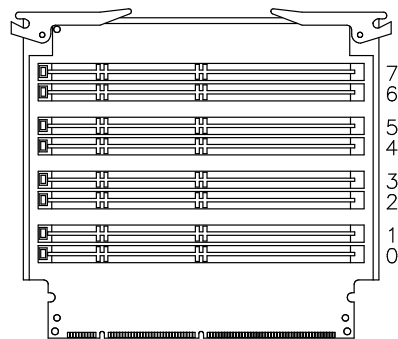
Technology	DIMM Size (M bits)	Refresh	DIMM Size (M bytes)	Memory Bank Capacity
16M bits	2Mx72	2K	16M bytes	32M bytes
16M bits	4Mx72	4K	32M bytes	64M bytes
64M bits	8Mx72	4K	64M bytes	128M bytes
64M bits	16Mx72	8K	128M bytes	256M bytes

The minimum memory configuration is 32M bytes.

The maximum memory bank capacity is 256M bytes.

You can expand your system memory on two memory risers directly plugged into memory connectors on the System Planar.

A memory riser hosts eight memory DIMM connectors, as shown in the figure:



A memory bank hosted on memory risers is made up of 1 DIMM for each memory riser (total of 2 memory DIMM's).

Two memory risers host up to eight memory banks.

The maximum memory configuration on memory risers is 2G bytes.

You can find memory configuration rules in **Memory Configuration**, on page 2-4 and instructions to expand your system memory in **Memory Upgrading**, on page 2-7.

Memory Configuration

- Configuration Rules
- Configuration Examples

Configuration Rules

The mandatory configuration rules are:

- The memory DIMM's belonging to the same memory bank must have the same capacity
- Memory DIMM's belonging to the same memory bank must be plugged into the same connector on each memory riser; for example: memory bank 0 will be made up of 1 memory DIMM plugged in position 0 on each memory riser.

If you respect the above configuration rules, your system is able to work with any memory configuration; nevertheless, there are some other rules you should follow if you want to get the best performances from it:

- When you use memory risers, always install an even number of memory banks
- Install memory banks on memory risers in couples of homogeneous capacities; each couple of homogeneous memory banks must be installed in contiguous slots, starting from slots 0 - 1 and then 2 - 3, 4 - 5 and 6 - 7
- Considering the amount of memory you want to use, prefer using as many memory banks as you can, instead of two memory banks only, provided that you do not compromise a possible future upgrading (see **Configuration Examples**, on page 2-6 for more details)
- If your memory configuration is made up of eight installed memory banks, you can mix up to three different memory bank capacities
- If your memory configuration is made up of six or less installed memory banks, you can mix up to two different memory bank capacities.

You can find memory description in **Memory Description**, on page 2-2 and upgrading instructions in **Memory Upgrading**, on page 2-7.

Configuration Examples

Following, are some examples of good memory upgrading. As they always foresee the use of more than one memory bank, the use of memory risers is required. You can always decide to upgrade your memory by installing a higher capacity memory bank on the System Planar but this implies the disadvantages that you have to discard the old memory bank and that you cannot fully exploit the performance possibilities given by the use of multiple banks.

1st Example: Upgrade from 32M bytes to 128M bytes

You have a starting point of a 32M-byte memory bank installed on the System Planar and want to upgrade your memory configuration to 128M bytes.

The best configuration you can adopt is:

- Add three 32M-byte memory banks to the one you already have. This configuration provides good performances, leaving in the meantime four free slots for future upgrading.

<u>Memory Riser</u>	<u>Memory DIMM Connector</u>							
	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
0	16	16	16	16	empty	empty	empty	empty
1	16	16	16	16	empty	empty	empty	empty

2nd Example: Upgrade from 64M bytes to 512M bytes

You have a starting point of a 64M-byte memory bank installed on the System Planar and want to upgrade your memory configuration to 512M bytes.

You have two possibilities:

- If you think that this is the maximum memory configuration you will ever reach, you can add seven 64M-byte memory banks to the one you already have; splitting memory on eight memory banks is for sure the best configuration from the performance stand point.

<u>Memory Riser</u>	<u>Memory DIMM Connector</u>							
	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
0	32	32	32	32	32	32	32	32
1	32	32	32	32	32	32	32	32

- If you want to keep some free slots for future upgrading, you can add three 64M-byte memory banks to the one you already have, plus two 128M-byte memory banks. This leaves two free slots for future upgrading.

<u>Memory Riser</u>	<u>Memory DIMM Connector</u>							
	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
0	32	32	32	32	64	64	empty	empty
1	32	32	32	32	64	64	empty	empty

3rd Example: Upgrade from 128M bytes to 1024M bytes

You have a starting point of two 64M-byte memory banks installed on the memory risers and want to upgrade your memory configuration to 1024M bytes.

The best configuration you can adopt is:

<u>Memory Riser</u>	<u>Memory DIMM Connector</u>							
	slot 0	slot 1	slot 2	slot 3	slot 4	slot 5	slot 6	slot 7
0	32	32	32	32	64	64	128	128
1	32	32	32	32	64	64	128	128

Memory Upgrading

One of these situations can exist:

- You have a memory bank plugged directly on the System Planar and you want to replace it with a higher capacity memory bank.
See **Memory Upgrading on System Planar**, on page 2-8.
- You have a memory bank plugged directly on the System Planar and you want to add other memory banks.
See **Memory Upgrading on Memory Risers**, on page 2-10.
- You have memory risers already installed and you want to add memory banks.
See **Adding a Memory Bank on Memory Risers**, on page 2-15.

Memory Upgrading on System Planar

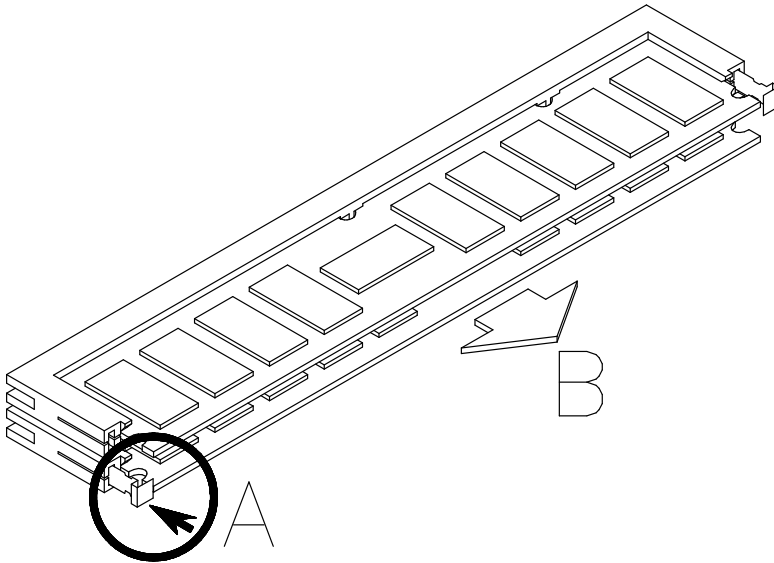
Warning: Before handling any memory bank, be sure you know the rules described in [Memory Description](#), on page 2-2 and [Memory Configuration](#), on page 2-4.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see [Preliminary Operations](#), on page 1-5).
2. Remove the left lateral panel (for details, if needed, see [Lateral Panel Removal](#), on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the finger connector (for details, if needed, see [How to Handle Hardware Components](#), on page 1-3).

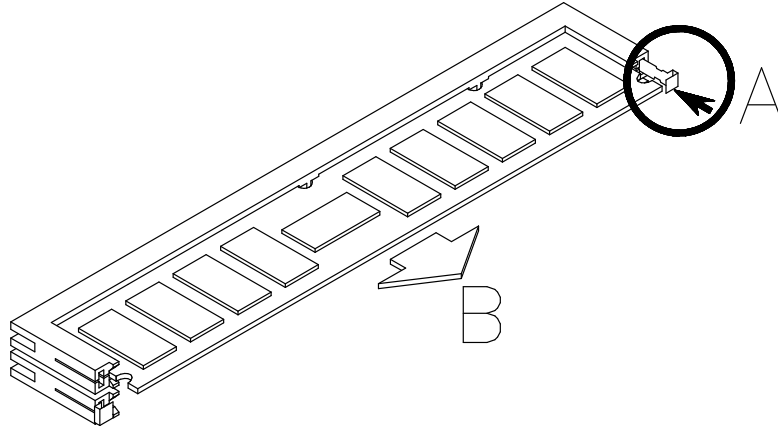
Warning: The keys of the upper memory connector (0) are reversed with respect to the keys of the lower memory connector (1).
The figures in this section illustrate the memory DIMM in the upper memory connector on the System Planar.

1st step: Removal of a memory bank directly plugged on System Planar

1. First, remove the lower memory DIMM pushing the eject lever at the left side (A) of the memory connector and then, grip the memory DIMM and firmly pull it out of the memory connector (B).



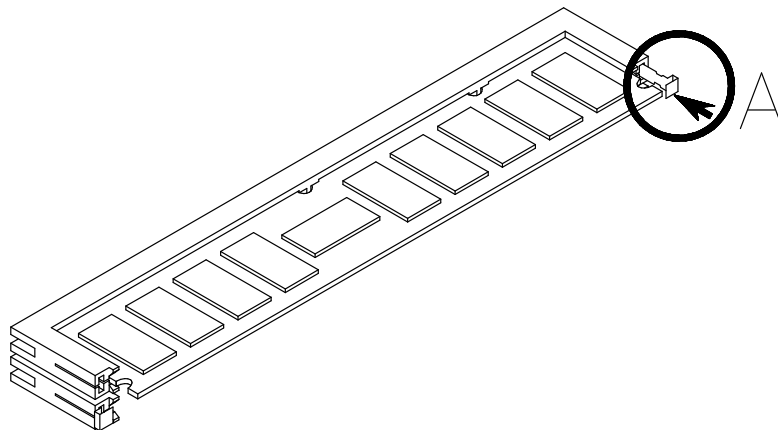
2. Repeat the steps for the upper memory DIMM pushing the eject lever at the right side (A) of the memory connector and then, grip the memory DIMM and firmly pull it out of the memory connector (B).



3. Store the removed memory DIMM's in an antistatic envelope.

2nd step: Installation of a memory bank with higher capacity

1. Grip one memory DIMM and move it horizontally to one memory connector on the System Planar, **making sure that the two keys on the memory DIMM fit the two keys on the memory connector**.
2. Firmly push the memory DIMM towards the System Planar until it is seated into the memory connector and the eject lever is pushed out (A), as shown in the figure.



3. Repeat the steps for the second memory DIMM.

When the memory upgrading procedure is concluded, perform the following steps:

1. Re-install the left lateral panel (for details, if needed, see [Lateral Panel Installation](#), on page 1-12).
2. Perform a system power on (for details, if needed, see [Restart Operations](#), on page 1-13).
3. When the Operating System is up and running, check that the system memory configuration is updated.
If not, check that the memory DIMM's are well installed and that you did not break any of the rules described in [Memory Configuration](#), on page 2-4. If the problem persists, refer to the *Maintenance and Service Guide* manual for memory test execution or call your Service Representative for assistance.

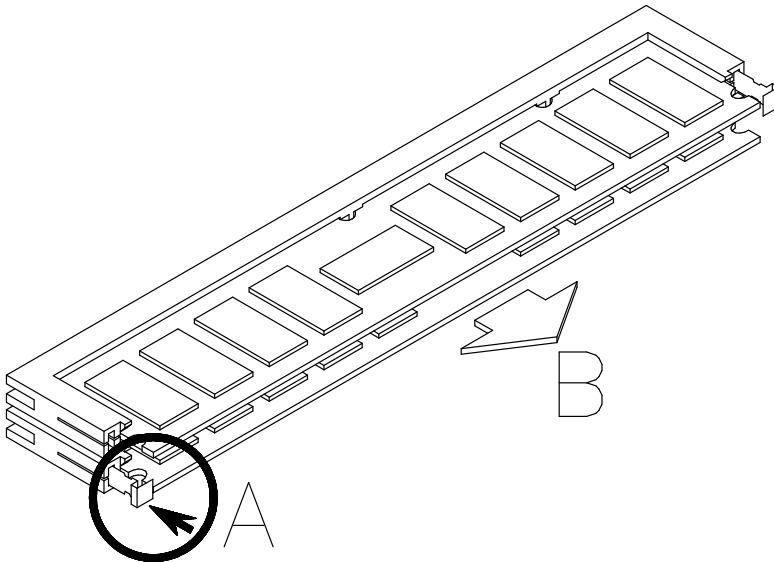
Memory Upgrading on Memory Risers

Warning: Before handling any memory bank, be sure you know the rules described in [Memory Description](#), on page 2-2 and [Memory Configuration](#), on page 2-4.

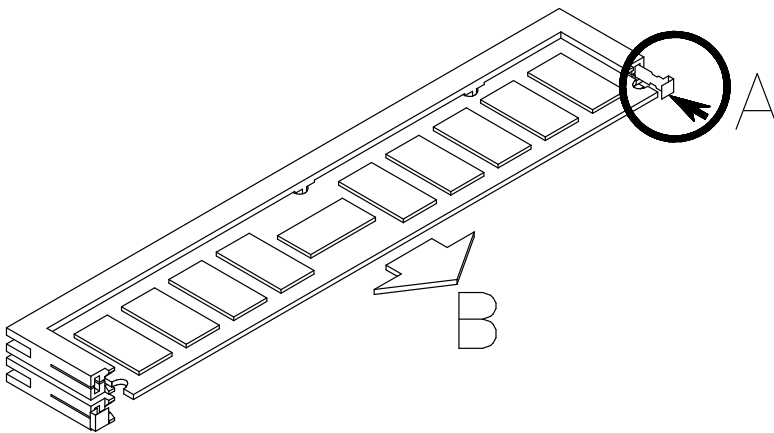
1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see [Preliminary Operations](#), on page 1-5).
2. Remove the left lateral panel (for details, if needed, see [Lateral Panel Removal](#), on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the finger connector (for details, if needed, see [How to Handle Hardware Components](#), on page 1-3).

1st step: Removal of a memory bank directly plugged on System Planar

1. First, remove the lower memory DIMM pushing the eject lever at the left side (A) of the memory connector and then, grip the memory DIMM and firmly pull it out of the memory connector (B).



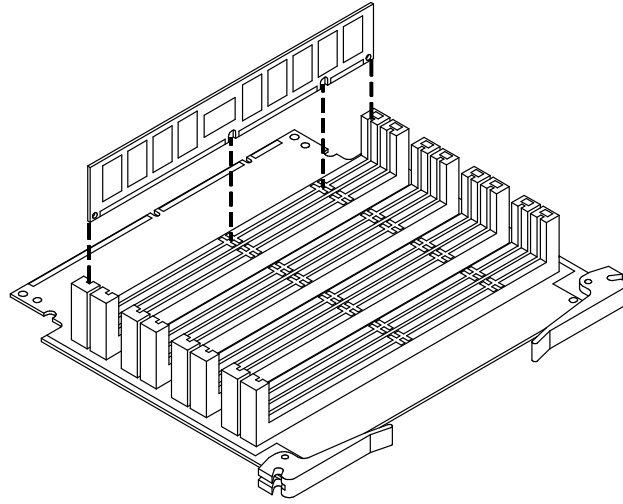
2. Repeat the steps for the upper memory DIMM pushing the eject lever at the right side (A) of the memory connector and then, grip the memory DIMM and firmly pull it out of the memory connector (B).



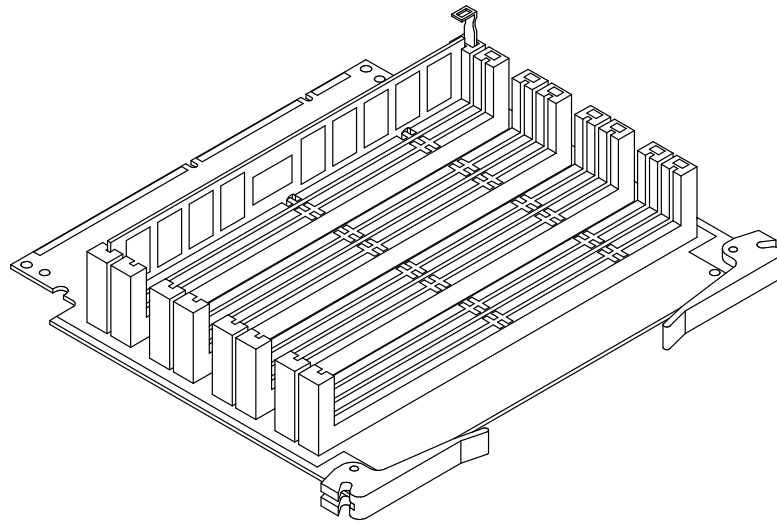
3. Store the removed memory DIMM's in an antistatic envelope until they are re-installed.

2nd step: Installation of a memory bank on memory risers

1. Grip a memory riser by the hooked clips and lay it down on an antistatic envelope until all operations on it are concluded.
2. Grip one memory DIMM by the edges and guide it vertically to the appropriate memory DIMM connector on the memory riser, **making sure that the two keys on the memory DIMM fit the two keys on the memory DIMM connector.**



3. Firmly push the memory DIMM down until it is seated into the memory DIMM connector and the eject lever is pushed out, as shown in the figure.

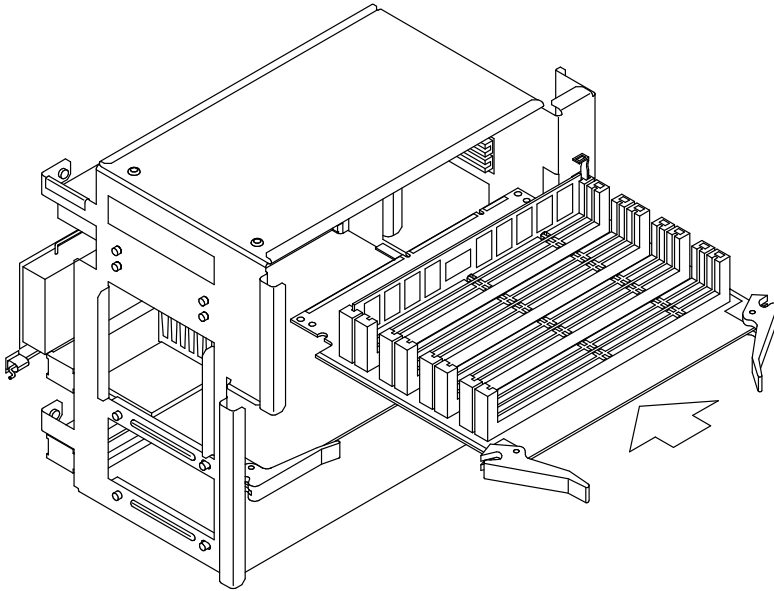


4. Repeat the steps for the second memory riser.

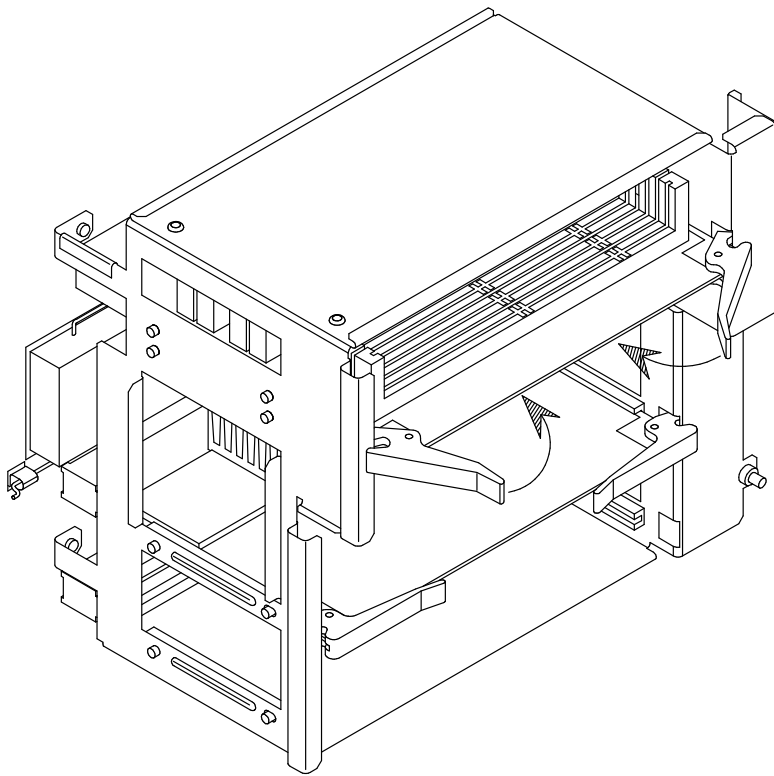
3rd step: Memory risers installation

1. Open outward the two hooked clips of one memory riser.
2. Grip the memory riser by the hooked clips and align it with the designated memory connector on the System Planar.

Note: In the upper slot (0), the memory riser DIMM's must be facing the top of the system unit.

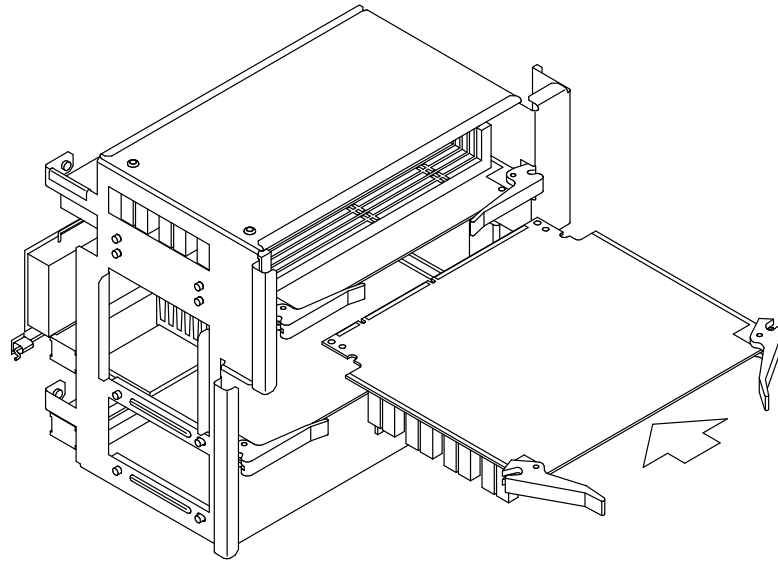


3. Tilt the hooked clips until these are anchored to the metallic structure and push the memory riser until the finger connector is firmly seated into the memory connector on the System Planar.

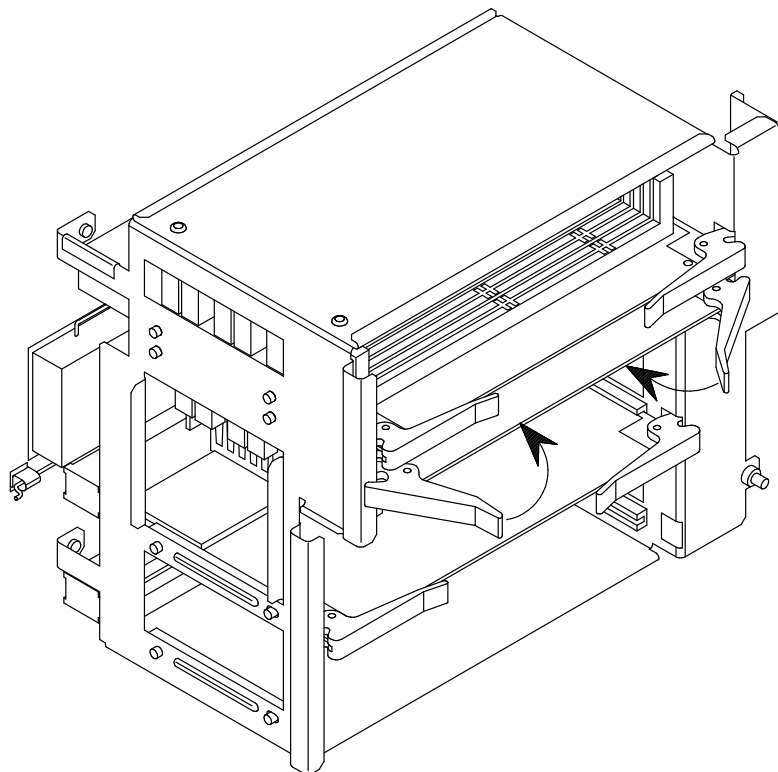


4. Grip the second memory riser by the hooked clips and align it with the designated memory connector on the System Planar.

Note: In the lower slot (1), the memory riser DIMM's must be facing the bottom of the system unit.



5. Tilt the hooked clips until these are anchored to the metallic structure and push the memory riser until the finger connector is firmly seated into the memory connector on the System Planar.



When the memory upgrading procedure is concluded, perform the following steps:

1. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 1-12).
2. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).
3. When the Operating System is up and running, check that the system memory configuration is updated.
If not, check that the memory DIMM's are well installed and that you did not break any of the rules described in **Memory Configuration**, on page 2-4. If the problem persists, refer to the *Maintenance and Service Guide* manual for memory test execution or call your Service Representative for assistance.

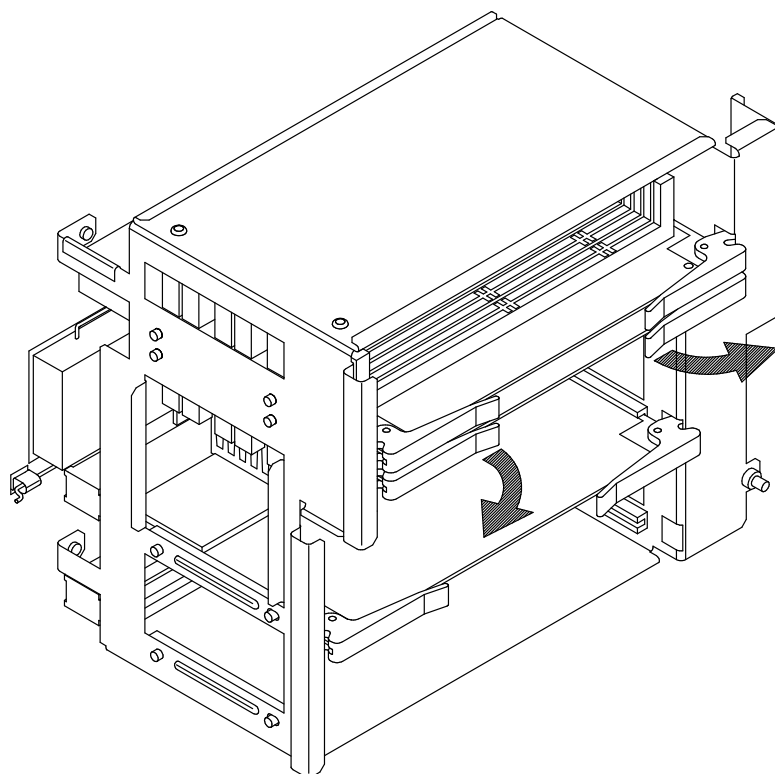
Adding a Memory Bank on Memory Risers

Warning: Before handling any memory bank, be sure you know the rules described in **Memory Description**, on page 2-2 and **Memory Configuration**, on page 2-4.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 1-5).
2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the finger connector (for details, if needed, see **How to Handle Hardware Components**, on page 1-3).

1st step: Memory risers removal

1. Using the hooked clips of the memory riser, unplug one memory riser and slide it out of the metallic structure.

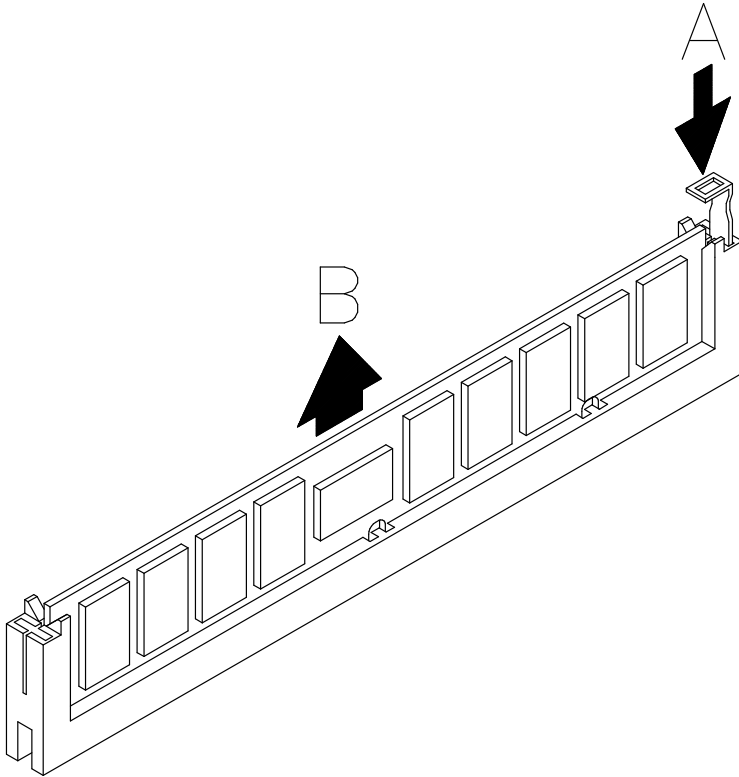


2. Lay it down on an antistatic envelope until all operations on it are concluded.
3. Repeat the steps for the second memory riser.

If you need to reorganize the memory bank configuration to follow the **Configuration Rules**, on page 2-5, you may need to remove the memory bank(s) already installed, following the instructions below; otherwise skip to the **Installation of a memory bank on memory risers** step, on page 2-16.

2nd step: Removal of a memory bank installed on memory risers

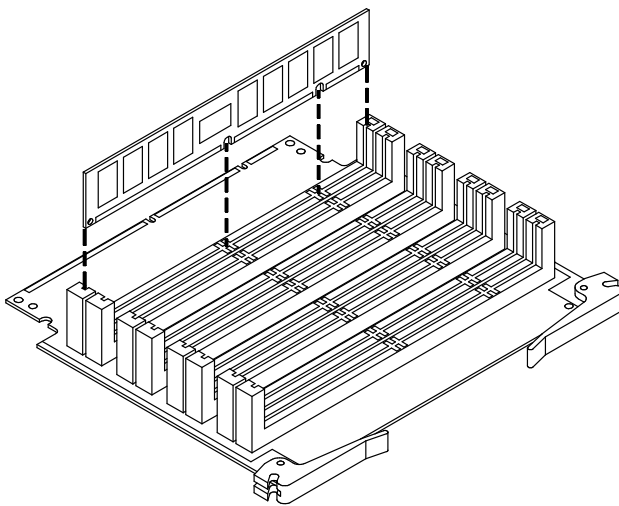
1. Push the eject lever at the right side of the memory DIMM connector (A) and then, grip the memory DIMM by the edges and firmly pull it out of the memory riser (B).



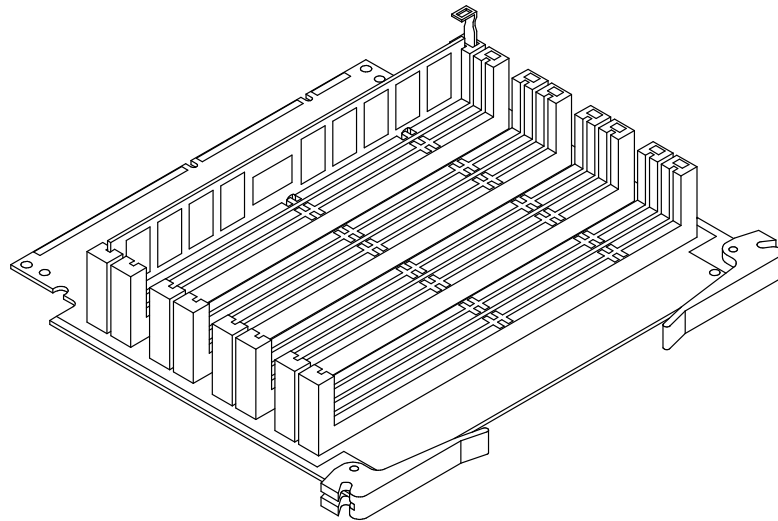
2. Repeat the step for the second memory DIMM (on the other memory riser).
3. Store the removed memory DIMM's in an antistatic envelope until they are re-installed.

3rd step: Installation of a memory bank on memory risers

1. Grip one memory DIMM by the edges and guide it vertically to the appropriate memory DIMM connector on the memory riser, **making sure that the two keys on the memory DIMM fit the two keys on the memory DIMM connector.**



2. Firmly push the memory DIMM down until it is seated into the memory DIMM connector and the eject lever is pushed out, as shown in the figure.

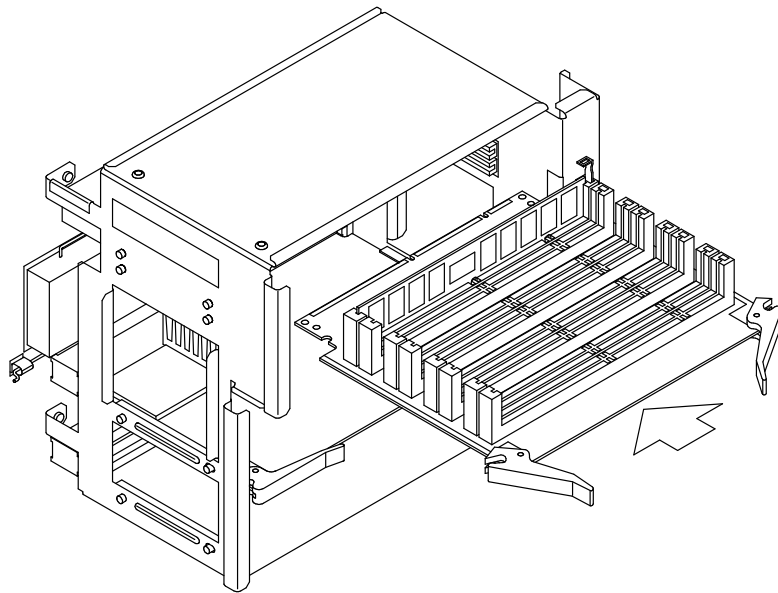


3. Repeat the steps for the second memory DIMM (on the other memory riser).

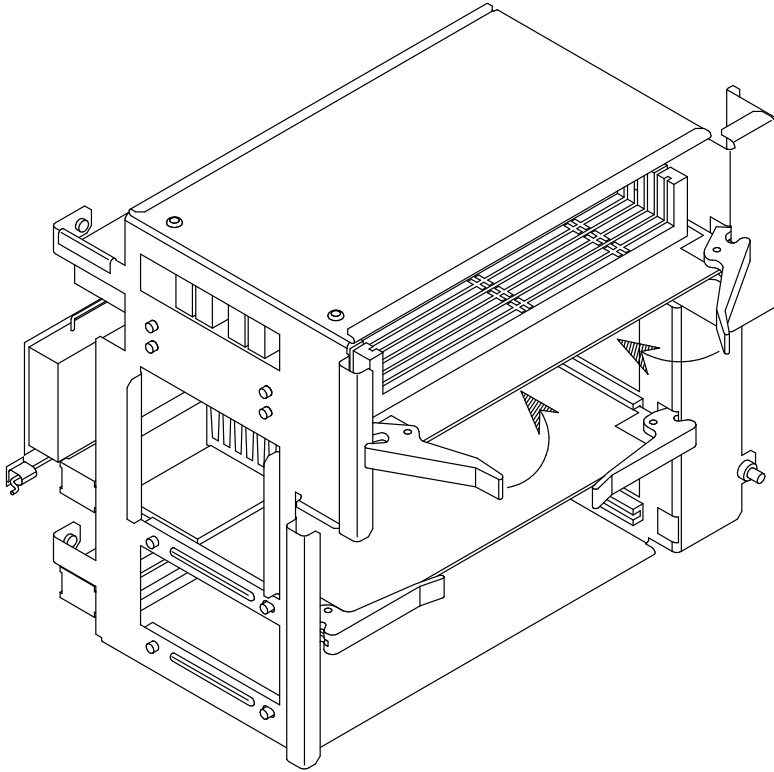
4th step: Memory risers installation

1. Open outward the two hooked clips of the memory riser.
2. Grip one memory riser by the hooked clips and align it with the designated memory connector on the System Planar.

Note: In the upper slot (0), the memory riser DIMM's must be facing the top of the system unit.

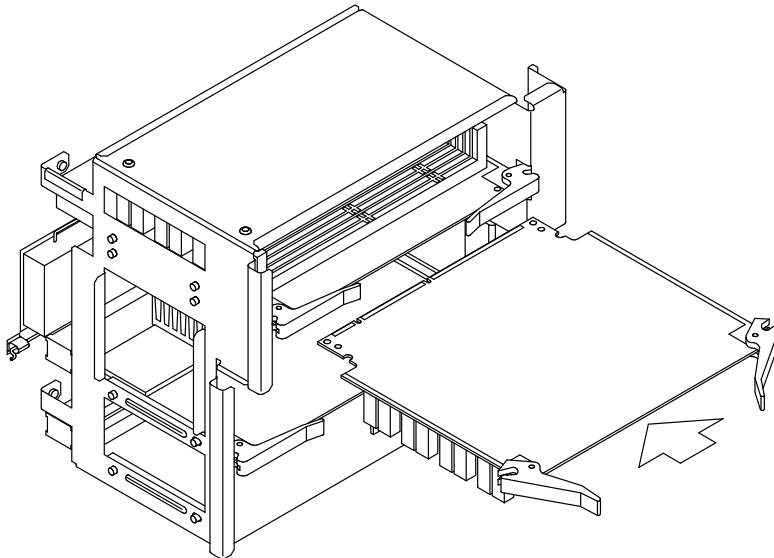


3. Tilt the hooked clips until these are anchored to the metallic structure and push the memory riser until the finger connector is firmly seated into the memory connector on the System Planar.

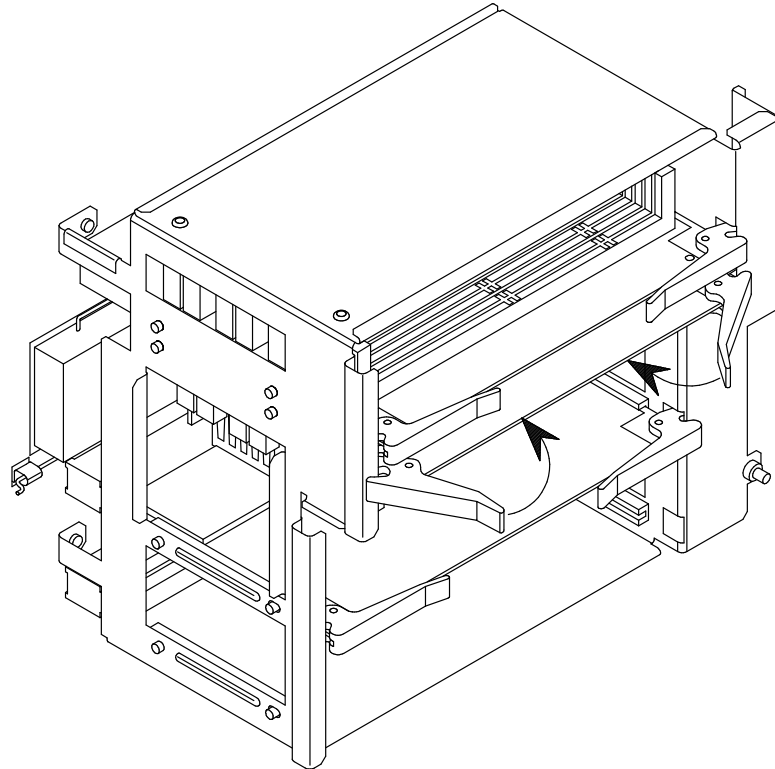


4. Grip the second memory riser by the hooked clips and align it with the designated memory connector on the System Planar.

Note: In the lower slot (1), the memory riser DIMM's must be facing the bottom of the system unit.



5. Tilt the hooked clips until these are anchored to the metallic structure and push the memory riser until the finger connector is firmly seated into the memory connector on the System Planar.



When the memory upgrading procedure is concluded, perform the following steps:

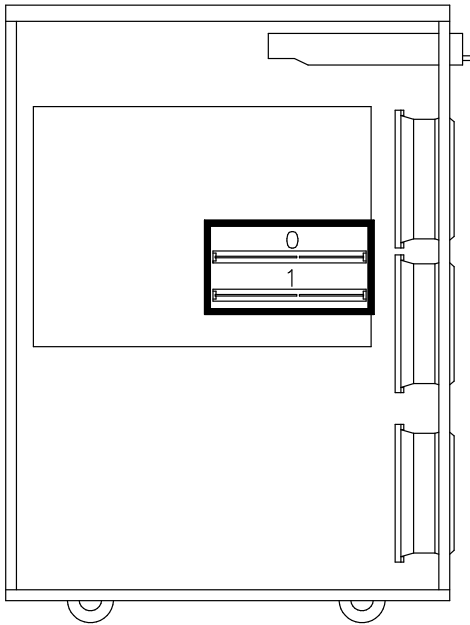
1. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 1-12).
2. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).
3. When the Operating System is up and running, check that the system memory configuration is updated.
If not, check that the memory DIMM's are well installed and that you did not break any of the rules described in **Memory Configuration**, on page 2-4. If the problem persists, refer to the *Maintenance and Service Guide* manual for memory test execution or call your Service Representative for assistance.

Chapter 3. CPU's

- CPU Description
- CPU Configuration
- CPU Upgrading
- CPU Removal

CPU Description

Each system supports up to two CPU cards which are installed into the dedicated slots on the System Planar, as shown in the figure.

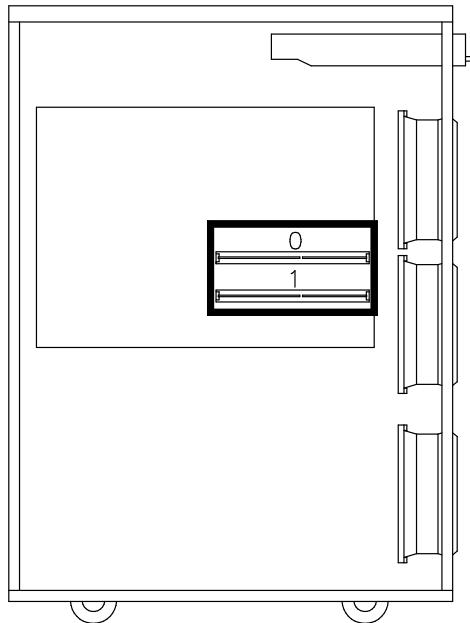


Your system supports CPU cards based on the RISC PowerPC™ microprocessor family. Different cards are available, according to the system model you have chosen.

You can find CPU card configuration rules and instructions to expand your system in **CPU Configuration**, on page 3-3 and **CPU Upgrading**, on page 3-4.

CPU Configuration

CPU cards must be installed starting from CPU card connector slot 0.



It is recommended that you install CPU cards in the following order:

<u>CPU Card</u>	<u>CPU Card Slot #</u>
1 st	0 (on the System Planar)
2 nd	1 (on the System Planar)

CPU cards installed in the system must be homogeneous.

In case a CPU card is faulty, the system itself deconfigures it during the power on phase.

If you have one CPU card installed on the System Planar and it seems faulty, you can move this card to the second CPU card connector. If the problem persists, call your Service Representative for assistance.

You can find CPU card description in **CPU Description**, on page 3-2 and instructions to handle CPU card in **CPU Upgrading**, on page 3-4 and **CPU Removal**, on page 3-6.

CPU Upgrading

Warning: Before handling any CPU card, be sure you know the rules described in [CPU Description](#), on page 3-2 and [CPU Configuration](#), on page 3-3.

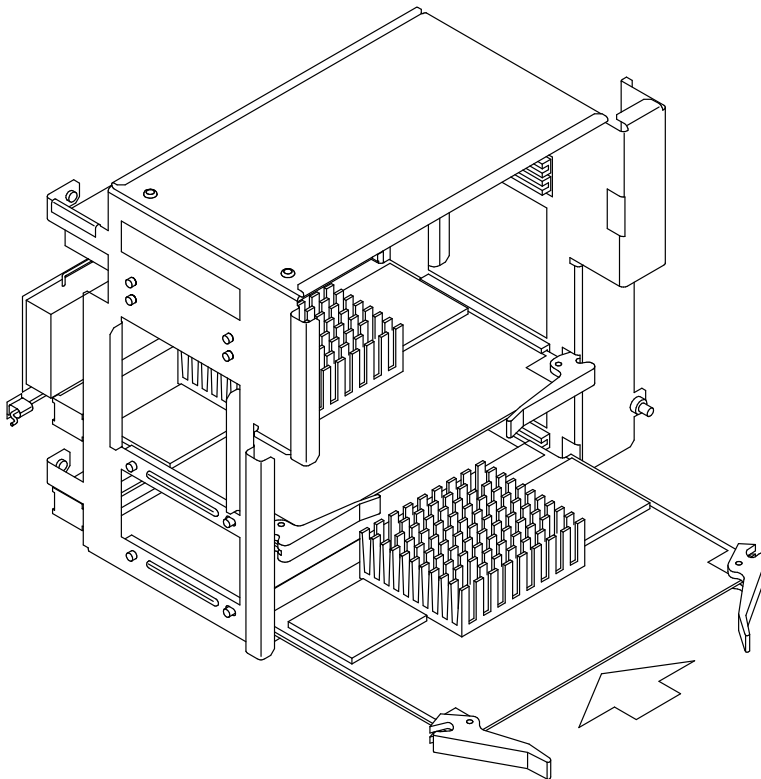
Note: The following procedure applies to any models of the CPU cards supported by the system.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see [Preliminary Operations](#), on page 1-5).
2. Remove the left lateral panel (for details, if needed, see [Lateral Panel Removal](#), on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the card components and connector (for details, if needed, see [How to Handle Hardware Components](#), on page 1-3).

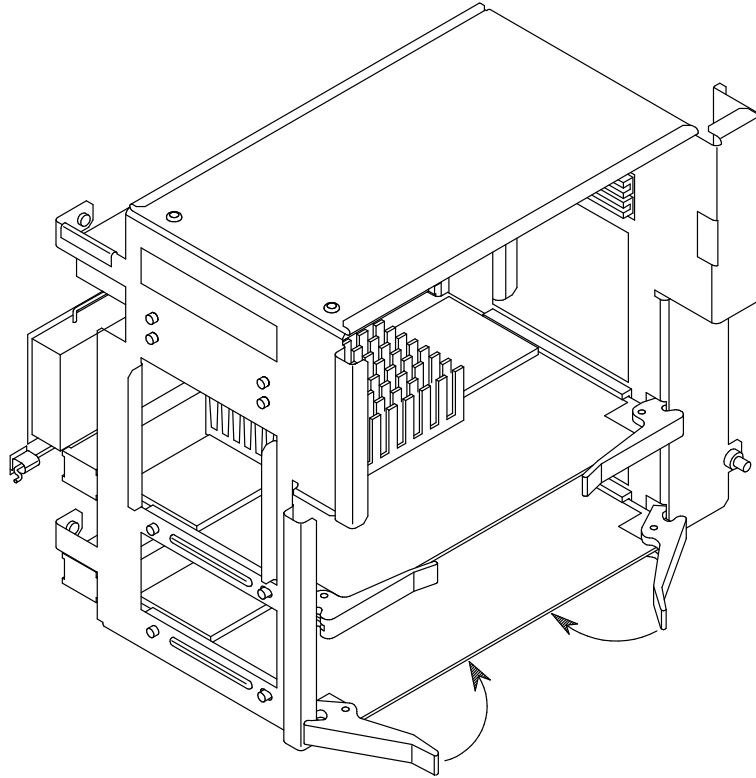
Note: The following figures show the installation of the second CPU card on the System Planar. The same procedure applies to the first CPU card.

If you are replacing either the first or the second CPU card with a new one, before proceeding with the upgrading procedure, you must remove the required CPU card from the System Planar. If you need detailed information about this, skip to [CPU Removal](#), on page 3-6, then continue with the following steps.

4. Open outward the two hooked clips of the CPU card.
5. Grip the CPU card by the hooked clips and align it with the designated CPU card connector on the System Planar. The CPU card must be inserted with the component side facing the top of the system unit.



6. Tilt the hooked clips until these are anchored to the metallic structure and push the CPU card until the finger connector is firmly seated into the CPU card connector on the System Planar.



7. Re-install the left lateral panel (for details, if needed, see [Lateral Panel Installation](#), on page 1-12).
8. Perform a system power on (for details, if needed, see [Restart Operations](#), on page 1-13).
9. When the Operating System is up and running, check that the new card is correctly configured.
If not, check that the CPU card is well installed. If the problem persists, refer to the *Maintenance and Service Guide* manual for CPU test execution or call your Service Representative for assistance.

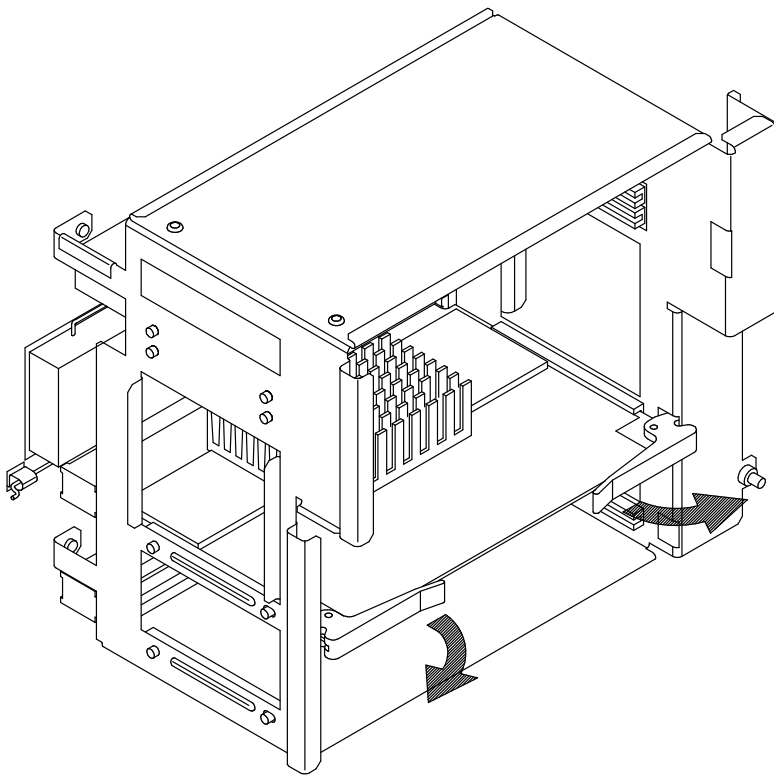
CPU Removal

Note: The following procedure applies to any models of the CPU cards supported by the system.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 1-5).
2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the card components and the connector (for details, if needed, see **How to Handle Hardware Components**, on page 1-3).

Note: The following figure shows the removal of the first CPU card from the System Planar. The same procedure applies to the second CPU card.

4. Using the hooked clips of the CPU card, unplug the CPU card and slide it out of the metallic structure.



5. Store the removed CPU card in an antistatic envelope.
6. If you need to replace the CPU card just removed with another one, skip to **CPU Upgrading** step 4, on page 3-4, otherwise continue with the following steps.
7. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 1-12).
8. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).

Chapter 4. Controllers

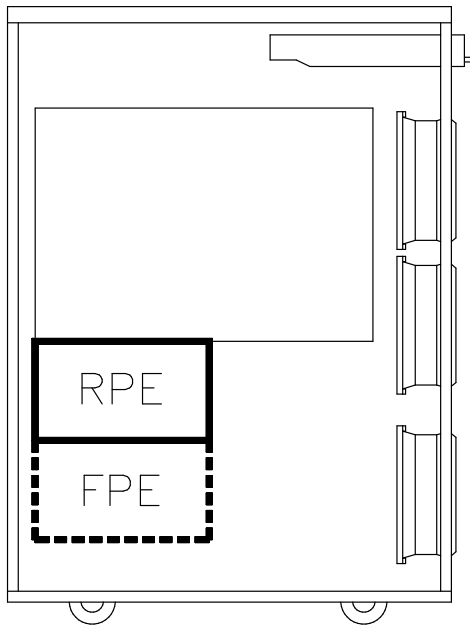
- Controller Description
- Controller Configuration
- Controller Installation
- Controller Removal
- SCSI Controller for Internal Devices

Controller Description

Depending on your needs in terms of PCI expandability, your system unit supports two types of PCI configuration:

- The **Basic PCI Configuration**, where the system is equipped with an **RPE** (Reduced PCI Expander) planar, which connects up to 4 controller cards:
 - Up to 2, 64/32 bit, 33 MHz, PCI controllers
 - Up to 2, 8/16 bit, ISA controllers.
- The **Full PCI Configuration**, where the system is equipped with a **FPE** (Full PCI Expander) planar, which connects up to 7 controller cards:
 - Up to 7, 32 bit, 33 MHz, PCI controllers
 - Up to 2, 8/16 bit, ISA controllers.

The PCI/ISA controller area is shown in the figure.



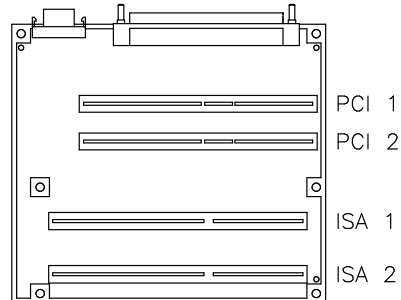
You can find controller configuration rules in **Controller Configuration**, on page 4-3 and upgrading instructions in **Controller Installation**, on page 4-6.

Controller Configuration

Basic PCI Configuration (RPE Planar)

The system provides one integrated PCI bus (bus 0) which manages the two PCI slots and generates an ISA bus which manages the two ISA slots.

The controller card connector location on the RPE planar is as below:



The following table shows the PCI bus dependencies, the controller card type supported by each slot and the recommended installation sequence of the controller cards on the RPE planar:

<u>Bus Identification</u>	<u>Controller Card Connector</u>	<u>Controller Card Type</u>	<u>Installation Sequence (*)</u>
PCI # 0	slot PCI 1 slot PCI 2	PCI 32/64 bit, 33 MHz	P1 P2
ISA	slot ISA 1 slot ISA 2	ISA 8/16 bit	I1 I2

(*) Legend:

P = PCI controller

I = ISA controller

n = number giving the installation sequence of the controllers inside the system unit.

The two ISA slots provide the support of the remote maintenance through the installation of a specific modem card. For this purpose, these slots are always powered even if the system is in standby state. Refer to the *Maintenance and Service Guide* manual for details about the Remote Maintenance feature.

Refer to the documentation delivered with the controller card for its characteristics and configuration requirements, if any.

Refer to the *Maintenance and Service Guide* for details about PCI/ISA bus features, otherwise call your Service Representative for assistance.

You can find controller card description in **Controller Description**, on page 4-2 and instructions to handle controller cards in **Controller Installation**, on page 4-6 and **Controller Removal**, on page 4-10.

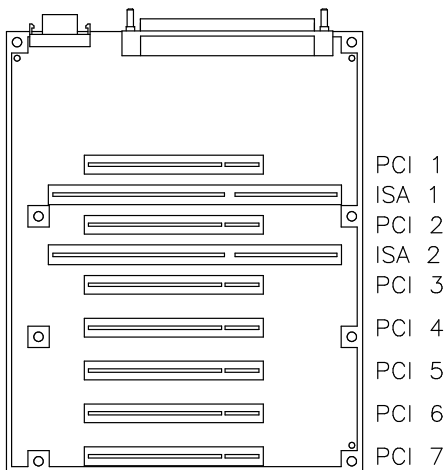
Full PCI Configuration (FPE Planar)

The system provides one integrated PCI bus (bus 0).

This bus generates, through a PCI to ISA bridge, an ISA bus which manages the ISA controllers.

It also generates, through two PCI to PCI bridges, two additional PCI busses, which manage the PCI controllers.

The controller card connector location on the FPE planar is as below:



The following table shows the PCI bus dependencies, the controller card type supported by each slot and the recommended installation sequence of the controller cards on the FPE planar:

<u>Bus Identification</u>	<u>Controller Card Connector</u>	<u>Controller Card Type</u>	<u>Installation Sequence (*)</u>
PCI # 0_1	slot PCI 1	PCI 32 bit, 33 MHz	P7
	slot PCI 2		P6
	slot PCI 3		P4
	slot PCI 4		P2
PCI # 0_2	slot PCI 5	PCI 32 bit, 33 MHz	P5
	slot PCI 6		P3
	slot PCI 7		P1
ISA	slot ISA 1	ISA 8/16 bit	I1
	slot ISA 2		I2

(*) Legend:

P = PCI controller

I = ISA controller

n = number giving the installation sequence of the controllers inside the system unit.

The configuration rules are:

- If you need to install two controllers of the same type (e.g., two SCSI controllers), it is recommended that you **install them one per bus** (one in bus 0_1 and the other one in bus 0_2), to obtain the best performances
- It is not possible to have both slots **PCI 1** and **ISA 1** occupied by controller cards; if you use the **PCI** slot you cannot use the **ISA** one and vice versa; the same applies to slots **PCI 2** and **ISA 2**
- **64 Port Asynchronous RS-232/RS-422** controllers cannot be installed in contiguous slots

- Install **graphic controllers** before RAID controllers (e.g., if a RAID controller is installed in **PCI 2** slot, install the graphic one in **PCI 1** slot)
- The internal **modem card** for remote maintenance, if present, must be installed in one **ISA** slot; ISA slots are powered even in standby state. Refer to the *Maintenance and Service Guide* manual, for details about the Remote Maintenance feature.

Refer to the documentation delivered with the controller card for its characteristics and configuration requirements, if any.

Refer to the *Maintenance and Service Guide* for details about PCI/ISA bus features, otherwise call your Service Representative for assistance.

You can find controller card description in **Controller Description**, on page 4-2 and instructions to handle controller cards in **Controller Installation**, on page 4-6 and **Controller Removal**, on page 4-10.

Controller Installation

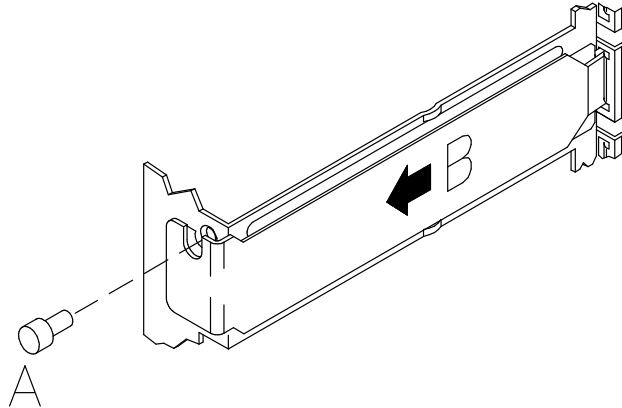
One of these situations can occur:

- You want to replace a controller card or you want to install an additional controller card on the RPE planar or FPE planar.
See **Controller Installation on RPE or FPE Planar**, on page 4-7.
- You have a basic PCI configuration and you need to increase the number of PCI/ISA controller slots. You must replace the RPE planar with the FPE planar.
See **Controller Planar Upgrading**, on page 4-9.

Controller Installation on RPE or FPE Planar

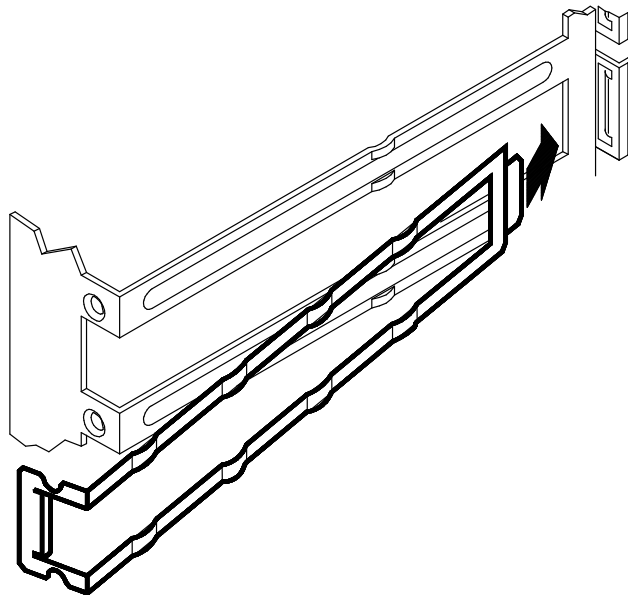
Warning: Before handling any controller card, be sure you know the rules described in **Controller Description**, on page 4-2 and **Controller Configuration**, on page 4-3.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 1-5).
2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the card components and the finger connector (for details, if needed, see **How to Handle Hardware Components**, on page 1-3).
4. Loosen the PCI/ISA slot cover retaining screw (A) of the designated controller card slot and slide it out (B).

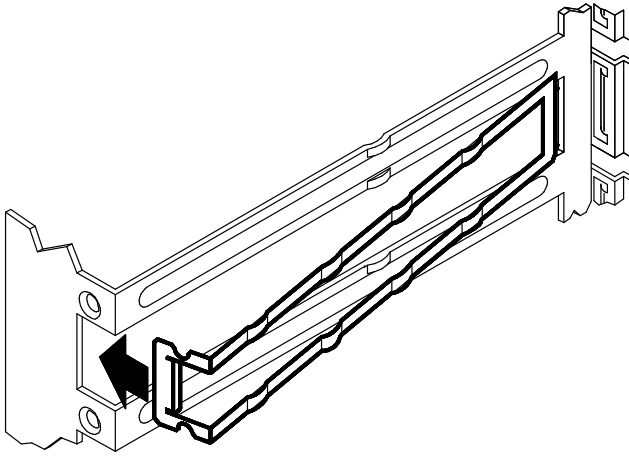


Warning: It is recommended to store the removed slot cover for possible re-installation.

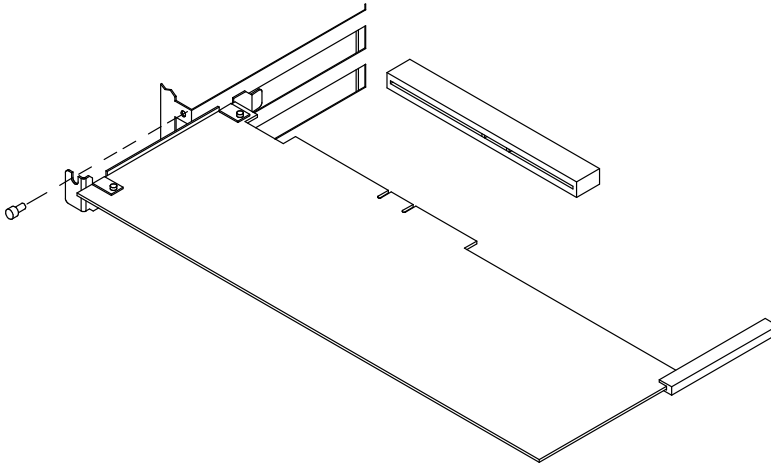
5. If the spring shifts while removing the PCI/ISA slot cover, re-install it executing the following steps:
 - a. Position the spring as indicated in the figure.



- b. Push the spring as indicated, until it is well seated.



6. Lay the controller card on an antistatic envelope and set the jumpers or switches, if any, according to your configuration requirements. Refer to the documentation delivered with the controller.
7. Grip the controller card by the edges.
8. Align and slide the controller card into the designated controller card connector on the RPE/FPE planar.



9. Firmly push the controller card towards the RPE/FPE planar until its finger connector is plugged in securely.
10. Secure the controller card in the slot by tightening clockwise its retaining screw.
11. Connect any connector cable to the controller card just installed, if any.

Note: If you need to install a SCSI controller to manage internal devices, see **SCSI Controller for Internal Devices**, on page 4-12.

Warning: It is recommended to install a slot cover in any free controller card slot.

12. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 1-12).
13. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).
14. When the Operating System is up and running, check that the new card is correctly configured. You may need to perform some software operations to use the new component (e.g. install a new controller driver). Refer to the controller card documentation and to your Operating System documentation.

Controller Planar Upgrading

You have a basic PCI configuration and you want to equip your system with a full PCI configuration. You must replace the RPE planar with the FPE planar. This operation should be performed by a technician.

If you want to upgrade your system with the FPE planar on your own, consult the *Maintenance and Service Guide*. Otherwise, call your Service Representative for assistance.

Controller Removal

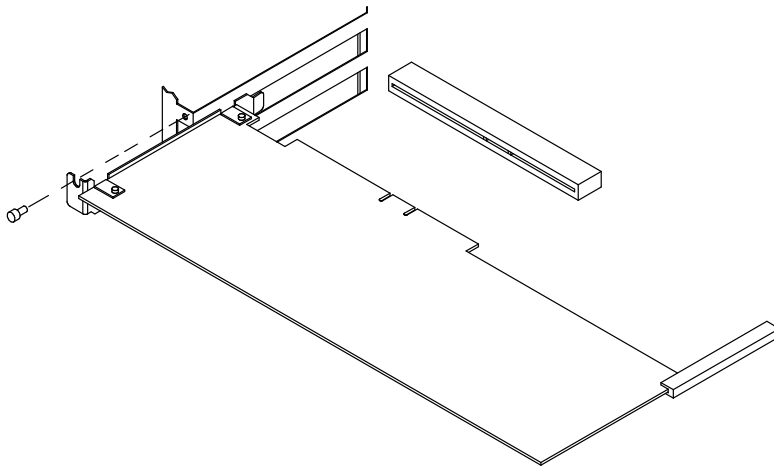
Note: The removal procedure of controller cards described below applies either to RPE planar or FPE planar.

1. Before powering off the system, you may need to perform some software operations (e.g. unload current controller configuration). Refer to your Operating System documentation.
2. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 1-5).
3. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 1-11).
4. Wear the antistatic wrist strap. It is recommended not to touch the card components and the finger connector (for details, if needed, see **How to Handle Hardware Components**, on page 1-3).
5. Disconnect any connector cable from the controller card, if any.

If you are removing more than one controller card at a time, record which connector cable attaches to which controller card.

Note: If you need to remove a SCSI controller managing internal devices, see **SCSI Controller for Internal Devices**, on page 4-12.

6. Loosen the retaining screw used to lock the controller card.
7. Firmly grip the controller card by the edges and slide it out of the slot.

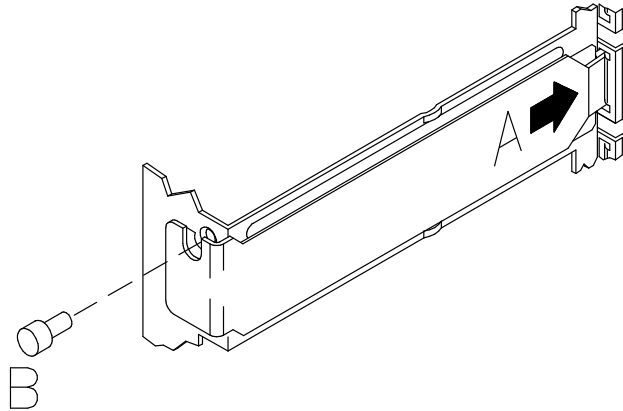


8. Lay the controller card on an antistatic envelope and record the settings of any jumpers or switches, if these are present.
9. Store the removed controller card in an antistatic envelope.

If the controller card just removed will be replaced with another one, skip to the **Controller Installation** step 5, on page 4-7, otherwise continue with the following steps.

Warning: While removing the controller card, the spring may shift. Re-install it.

10. Position the slot cover in the free slot (**A**) and secure it by tightening clockwise its retaining screw (**B**).



Warning: It is recommended to install a slot cover in any free controller card slot.

11. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 1-12).

12. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).

SCSI Controller for Internal Devices

The installation of an additional SCSI controller to manage internal devices requires some additional operations with respect to any other controller.

Once you have installed the controller, as described in **Controller Installation**, you need to use the internal controller cable(s) to connect the internal connector(s) of the controller to the system bulkhead. This operation requires an overall knowledge of the system SCSI configuration.

If you are doing this operation on your own, you can find the proper information in the *Maintenance and Service Guide*. Otherwise, call your Service Representative for assistance.

The same applies to the SCSI controller removal.

Chapter 5. Devices

- Device Description
- Device Configuration
- Device Upgrading
- Device Removal
- Device Hot Swapping
- Disk Expansion Unit

Device Description

Your system base unit has five device areas. These are located vertically, on the right of the front side of the system.

Front Side	Area 1
	Area 2
	Area 3
	Area 4
	Area 5

A description of the possible use of the base unit areas is given below:

- Area 1 hosts up to two 1.6 inch media drives
- Area 2 may host either up to two 1.6 inch media drives or up to two 1.6 inch hard disk drives or three 1 inch hard disk drives
- Areas 3, 4 and 5 may host each either up to two 1.6 inch hard disk drives or up to three 1 inch hard disk drives.

A disk cage is required to install hard disk drives. Each disk cage occupies one area. There are two types of disk cage:

- KP2 disk cage, to connect up to two 1.6 inch hard disk drives
- KP3 disk cage, to connect up to three 1 inch hard disk drives.

The connection to the SCSI bus is done through the disk cage back planes.

No disk cage is required to install media drives. They are installed with their mounting kit on the unit chassis and directly connected to the SCSI bus.

When devices are not present, plugs are mounted in front of the empty slots.

You can find the device configuration rules in **Configuration Rules**, on page 5-5 and upgrading instructions in **Device Upgrading**, on page 5-14.

You can find the disk expansion unit configuration in the *Using the Disk Expansion Unit* manual.

Device Configuration

- Base Unit Configuration
- Configuration Rules
- SCSI-ID Configuration

Base Unit Configuration

Front Side	Area 1
	Area 2
	Area 3
	Area 4
	Area 5

The system base unit provides one native SCSI controller.

Its use depends on your system configuration (i.e. how many media and hard disk drives are installed).

The management of SCSI drives can be summarized as follows:

- Media drives installed in Areas 1 and 2 are always controlled by the native controller
- Hard disk drives installed in Areas 3 and 2 must be controlled by one additional SCSI controller installed in any available PCI slot
- Hard disk drives installed in Areas 5 and 4 could either be managed by the native controller or by one additional SCSI controller installed in any available PCI slot, in particular:
 - These are managed by the native controller when up to two media drives are installed in Area 1, while
 - These are managed by an additional SCSI PCI controller when more than two media drives are installed (media drives in Areas 1 and 2).

Please see **Configuration Examples**, on page 5-10, for further information.

The system unit can house:

- Up to four media drives (Areas 1 and 2, two media drives per Area)
- Up to eight 1.6 inch hard disk drives (Areas 2, 3, 4, 5, two hard disk drives per Area)
- Up to twelve 1 inch hard disk drives (Areas 2, 3, 4, 5, three hard disk drives per Area).

The information about the device configuration supported by the disk expansion unit is described in the **Disk Expansion Unit Configuration** paragraph, in the *Using the Disk Expansion Unit* manual.

Base Unit RAID Configuration

A maximum of two SCSI busses can be managed in RAID configurations. These are the busses managing Area 5 (and Area 4 if managed by the same bus) and Area 3 (and Area 2 if managed by the same bus).

Note: RAID controllers do not support High Availability configurations.

Base Unit High Availability Configuration

The base unit can be included in High Availability configurations, where the full availability is guaranteed by the physical interconnection and software management of two base units in such a way that, if one fails, the other one takes the control and all the activity goes on without interruption.

Note: High Availability configurations are not supported by RAID controllers.

Configuration Rules

Specific rules are given to make the installation and management of SCSI devices easier and obtain the best performances.

- Install the system disk drive in the upper slot of Area 5 of the base unit
- Install devices beginning **always** from the upper free slot inside the Area
- A mix of KP2 and KP3 disk cages is allowed
- A mix of media drives and hard disk drives inside the same Area is **not** allowed.

Refer to **SCSI-ID Configuration**, on page 5-6, for details about the SCSI-ID identification that the device will acquire once it is installed and for some suggestions about the device installation sequence.

Refer to the documentation delivered with the device for characteristics and configuration requirements, if any.

You can find the device description in **Device Description**, on page 5-2 and the upgrading procedures in **Device Upgrading**, on page 5-14.

The configuration rules of the device areas in the disk expansion unit are described in the **Disk Expansion Unit Configuration Rules** paragraph, in the *Using the Disk Expansion Unit* manual.

SCSI-ID Configuration

- Media Drive SCSI-ID
- Hard Disk Drive SCSI-ID
- Configuration Examples

Media Drive SCSI-ID

Each SCSI device must be identified on the SCSI bus by a logical address, called SCSI-ID.

Before installing a media drive, it is necessary to define its SCSI-ID. This is normally done through switches or jumpers placed at the rear of the device. See the documentation delivered with the device for the details on setting.

Note: If you purchased the media drive from a supplier other than your system supplier, be sure that the device itself has no SCSI terminator. Refer to the documentation delivered with the device.

On your system, the SCSI-ID to be set for a given media drive depends on the physical position of this device.

The following table shows the correspondence between physical position and SCSI-ID for media drives installed on your system. It also gives the suggested installation sequence. Notice that there is not a direct link between the installation sequence and the SCSI-ID. Even if the installation sequence is not the one reported here, you must keep the correspondence between physical position and SCSI-ID.

MEDIA DRIVE CONFIGURATION TABLE

<u>Device Area</u>	<u>Physical Position</u>	<u>SCSI-ID</u>
	<u>Base Unit</u>	
1	M1	6
	M2	5
2	M3	4
	M4	3
3	—	—
	—	—
4	—	—
	—	—
5	—	—
	—	—

Legend:

Mn = M media drive

n number giving the installation sequence of the devices inside the system unit.

Hard Disk Drive SCSI-ID

Each SCSI device must be identified on the SCSI bus by a logical address, called SCSI-ID.

Hard disk drives are identified by a SCSI-ID which is automatically defined as the hard disk drive is installed in a given position. No manual intervention is required.

Note: If you purchased the hard disk drive from a supplier other than your system supplier, be sure that the device itself has no SCSI-ID set and no SCSI terminator. Refer to the documentation delivered with the device.

The following table details the correspondence between physical position and SCSI-ID for hard disk drives installed on your system.

It details also the suggested installation sequence.

The suggested sequence fills in:

- First Areas 5 and 4, which can be managed by the native SCSI controller, and
- Then Areas 3 and 2, which must be managed by an additional SCSI controller.

If you install additional SCSI controllers, even if all the disk devices you have could be managed by the present one(s), the suggestion is to balance the load between the available controllers (e.g., if you have four disk devices and two controllers, install two disk devices in Area 5 and the other two in Area 3).

The installation sequence is not directly linked to the SCSI-ID. Even if the installation sequence is not the one reported here, the correspondence between physical position and SCSI-ID remains unchanged.

HARD DISK DRIVE CONFIGURATION TABLE (KP2 disk cages)

<u>Device Area</u>	<u>Physical Position</u>	<u>SCSI-ID</u>
	<u>Base Unit</u>	
1	—	—
	—	—
2	D7	8
	D8	9
3	D5	0
	D6	1
4	D3	8
	D4	9
5	D1	0
	D2	1

Legend:

Dn = D hard disk drive

n number giving the installation sequence of the devices inside the system unit.

HARD DISK DRIVE CONFIGURATION TABLE (KP3 disk cages)

<u>Device Area</u>	<u>Physical Position</u>	<u>SCSI-ID</u>
	<u>Base Unit</u>	
1	—	—
	—	—
2	D10	8
	D11	9
	D12	A
3	D7	0
	D8	1
	D9	2
4	D4	8
	D5	9
	D6	A
5	D1	0
	D2	1
	D3	2

Legend:

Dn = D hard disk drive

n number giving the installation sequence of devices inside the system unit.

Configuration Examples

The following tables show some configuration examples of a system base unit. The physical connections of SCSI cables and jumpers, necessary to implement these configurations, are described in the *Maintenance and Service Guide* manual. This guide is available at your supplier.

1st CONFIGURATION EXAMPLE

This example shows a basic device configuration managed by the native SCSI controller; it includes two media drives installed in Area 1 and three hard disk drives installed in Area 5. No additional controllers are foreseen, as there are no devices in the other Areas.

BASE UNIT (equipped with KP3 disk cages)

<u>SCSI Connection</u>	<u>Area</u>	<u>Device Type</u>	<u>SCSI-ID</u>
Native SCSI controller	1	M1	6
		M2	5
	2	—	—
		—	—
		—	—
	3	—	—
		—	—
		—	—
	4	—	—
		—	—
		—	—
Native SCSI controller	5	D1	0
		D2	1
		D3	2

Legend:

M = M media drive

D = D hard disk drive

n = number giving the installation sequence of the devices inside the system unit.

2nd CONFIGURATION EXAMPLE

This example shows a full device configuration where the native SCSI controller manages media drives in Areas 1 and 2 and two additional controllers manage respectively Areas 5 and 4 and Area 3.

BASE UNIT (equipped with KP3 disk cages)

<u>SCSI Connection</u>	<u>Area</u>	<u>Device Type</u>	<u>SCSI-ID</u>
Native SCSI controller	1	M1	6
		M2	5
Native SCSI controller	2	M3	4
		M4	3
Additional SCSI controller (#2)	3	D7	0
		D8	1
		D9	2
Additional SCSI controller (#1)	4	D4	8
		D5	9
		D6	A
Additional SCSI controller (#1)	5	D1	0
		D2	1
		D3	2

Legend:

M = M media drive

D = D hard disk drive

n = number giving the installation sequence of the devices inside the system unit.

3rd CONFIGURATION EXAMPLE (WITH RAID)

This example shows a device configuration where the native SCSI controller manages Areas 1 and 5, while a RAID controller manages Areas 3 and 2.

BASE UNIT (equipped with KP3 disk cages)

<u>SCSI Connection</u>	<u>Area</u>	<u>Device Type</u>	<u>SCSI-ID</u>
Native SCSI controller	1	M1	6
		M2	5
RAID controller (1 st RAID Bus)	2	D7	8
		D8	9
		D9	A
RAID controller (1 st RAID Bus)	3	D4	0
		D5	1
		D6	2
	4	–	–
		–	–
		–	–
Native SCSI controller	5	D1	0
		D2	1
		D3	2

Legend:

M = M media drive

D = D hard disk drive

n = number giving the installation sequence of the devices inside the system unit.

4th CONFIGURATION EXAMPLE (HIGH AVAILABILITY)

This example shows the connection of disk devices in Areas 3 and 2 of two base units (A and B) in a High Availability configuration.

The disk devices installed in Areas 5 and/or 4 and media devices in Area1 are not included in this High Availability configuration.

Two additional SCSI controllers per base unit are needed for this configuration.

Notice that the controllers are **NOT** RAID controllers, as High Availability configurations are not supported by RAID controllers.

BASE UNIT A (equipped with KP3 disk cages)

<u>SCSI Connection</u>	<u>Area</u>	<u>Physical Position</u>	<u>SCSI-ID</u>
	1	–	–
		–	–
Base Unit A SCSI Controller (#1) and Base Unit B SCSI Controller (#1)	2	D8	8
		D9	9
		D10	A
	3	D5	0
		D6	1
		D7	2
	4	–	–
		–	–
	5	–	–
		–	–

BASE UNIT B (equipped with KP3 disk cages)

<u>SCSI Connection</u>	<u>Area</u>	<u>Physical Position</u>	<u>SCSI-ID</u>
	1	–	–
		–	–
Base Unit B SCSI Controller (#2) and Base Unit A SCSI Controller (#2)	2	D8	8
		D9	9
		D10	A
	3	D5	0
		D6	1
		D7	2
	4	–	–
		–	–
	5	–	–
		–	–

Legend:

D = hard disk drive

n = number giving the installation sequence of the devices inside the disk expansion unit.

Device Upgrading

- Media Drive Upgrading
- Hard Disk Drive Upgrading

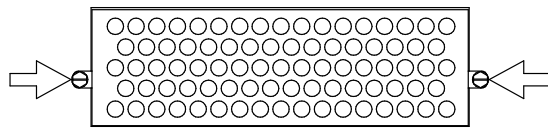
Media Drive Upgrading

Warning: Before handling any device, be sure you know the rules described in [Device Description](#), on page 5-2 and [Device Configuration](#), on page 5-3.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see [Preliminary Operations](#), on page 1-5).
2. Remove the front panel and the right lateral panel (for details, if needed, see [Front Panel Removal](#), on page 1-9 and [Lateral Panel Removal](#), on page 1-11).
3. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see [How to Handle Hardware Components](#), on page 1-3).

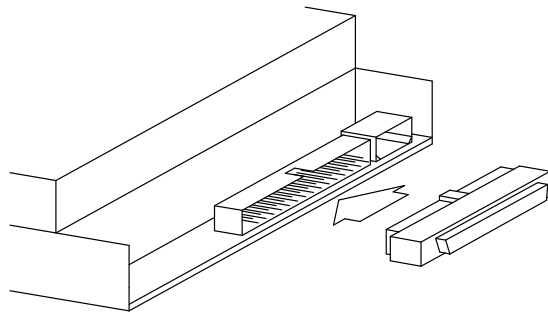
Note: The figures in this section illustrate a CD-ROM drive. The procedures apply to any media drive model.

4. Remove the metal blank from the designated slot by loosening the screws used to retain the blank to the chassis.

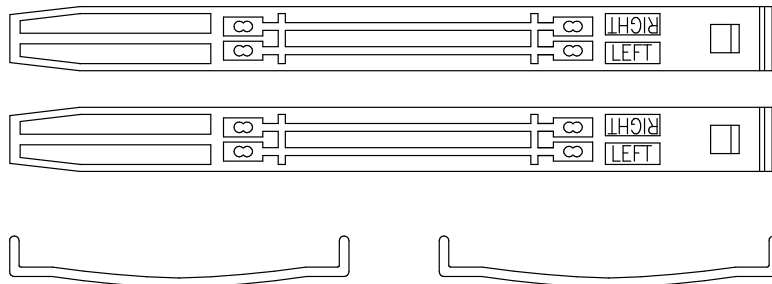


Warning: It is recommended to store the metal blank and screws for possible future re-installation.

5. Set the SCSI-ID of the media drive according to [Media Drive SCSI-ID](#) rules, on page 5-7.
6. Install the SCSI adapter on the SCSI connector of the media drive. This SCSI adapter is needed to adapt the SCSI connector of the media drive to the connector present on the SCSI cable.

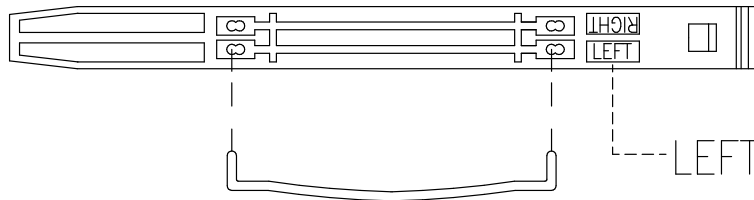
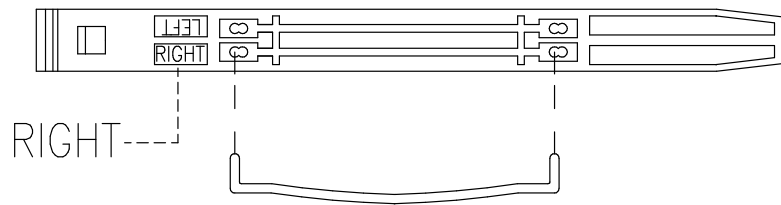


7. Install the media drive mounting kit at the sides of the media drive. It consists of two plastic rails and two contact springs, as shown in the figure.

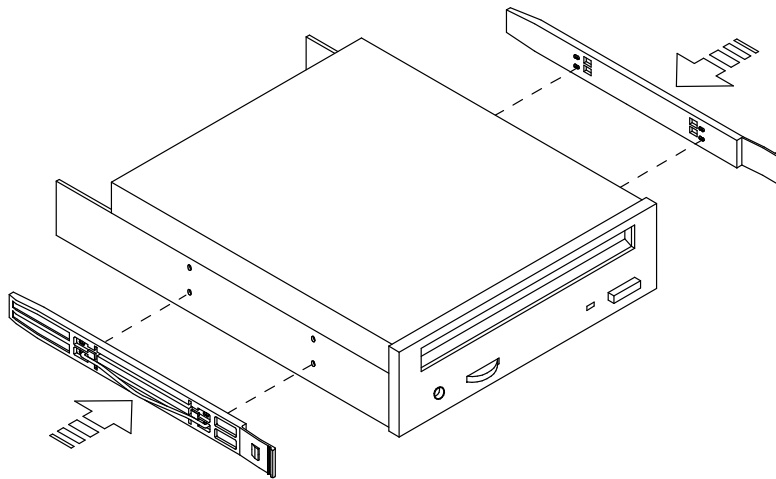


If the media drive that you are going to install is already equipped with the media drive mounting kit, skip to step 12, otherwise perform the following steps.

8. Identify the media drive mounting kit and fit together the plastic rails and the contact springs as shown in the figure.

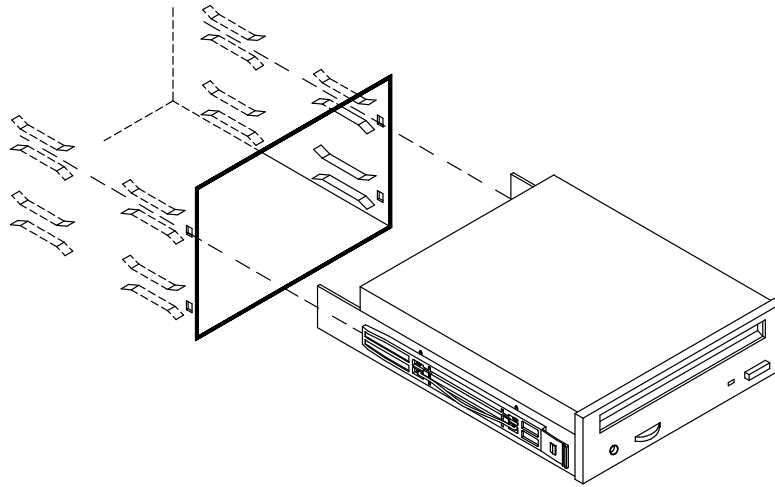


9. Lay the media drive down on a flat surface.
10. Position the plastic rails, one a time, on the right and left of the media drive, assuring that the points of the contact spring match exactly with the holes present on the media drive side.

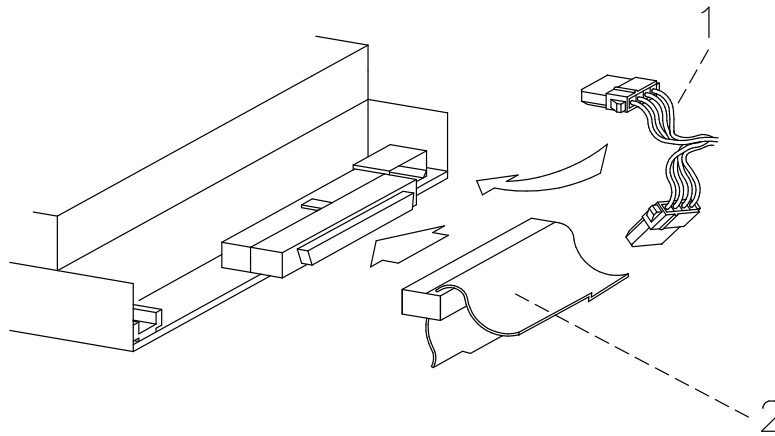


11. Firmly push the plastic rails towards the media drive.

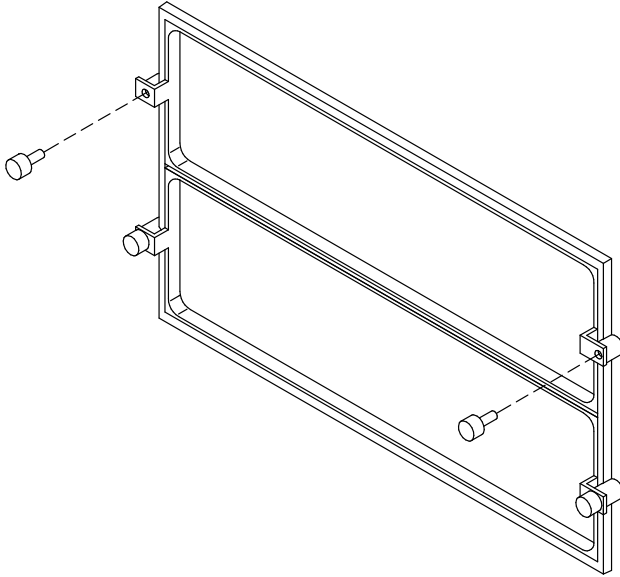
12. Firmly grip the media drive by the edges. Identify the upper side of the media drive checking the orientation of any symbols or labels on the front panel of the media drive. Consult the documentation delivered with the media drive for any specific characteristic.
13. Align the device with its plastic rails in the designated slot and then slide it inside the unit.



14. Firmly push the device until a click tells you that it is well seated.
15. Connect the first free connector of the split power cable (1) and the SCSI cable (2) to the media drive.



16. Remove the plastic blank on the front panel that corresponds to the slot in which you have just installed the media drive, by performing the following steps:
- Accessing the front panel from its internal side, loosen the screws used to retain the plastic blank to the front panel
 - Slide the plastic blank from the front panel.



Warning: Store the removed plastic blank and screws for possible future re-installation.

CAUTION:

It is recommended to protect any free device slot with the appropriate plastic and metal blanks. This is important for your safety and for the proper functioning of the air cooling system.

17. Re-install the front panel and the right lateral panel (for details, if needed, see **Front Panel Installation**, on page 1-10 and **Lateral Panel Installation**, on page 1-12).
18. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).
19. When the Operating System is up and running, check that the new device is seen by the system. Refer to the device and Operating System documentation for details on any operation you may need to perform on the new device to have it working (e.g. install the device driver).

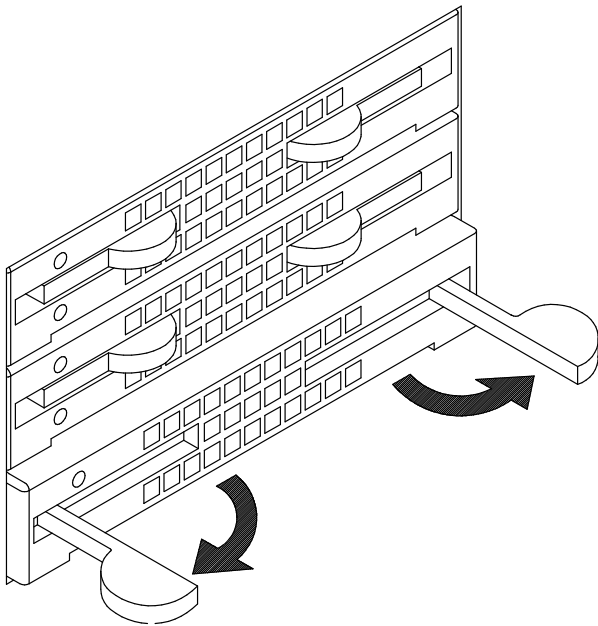
Hard Disk Drive Upgrading

- Add a Hard Disk Drive to a Disk Cage
- Add a Disk Cage

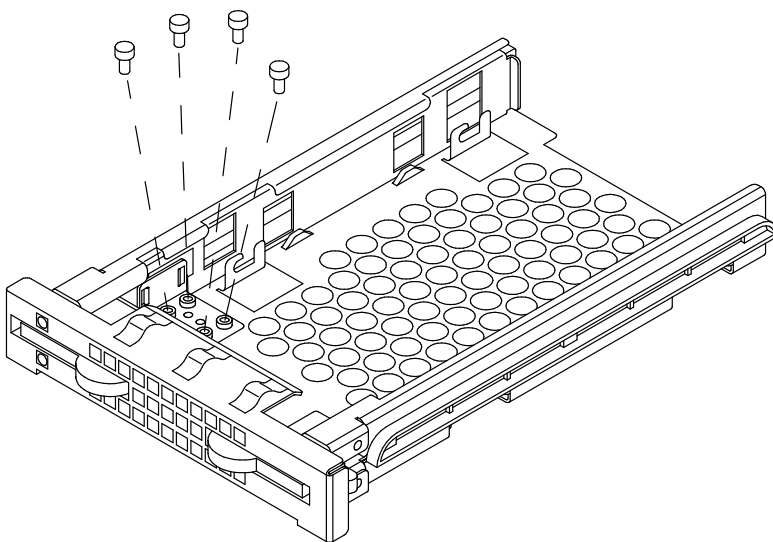
Add a Hard Disk Drive to a Disk Cage

Warning: Before handling any device, be sure you know the rules described in **Device Description**, on page 5-2 and **Device Configuration**, on page 5-3.

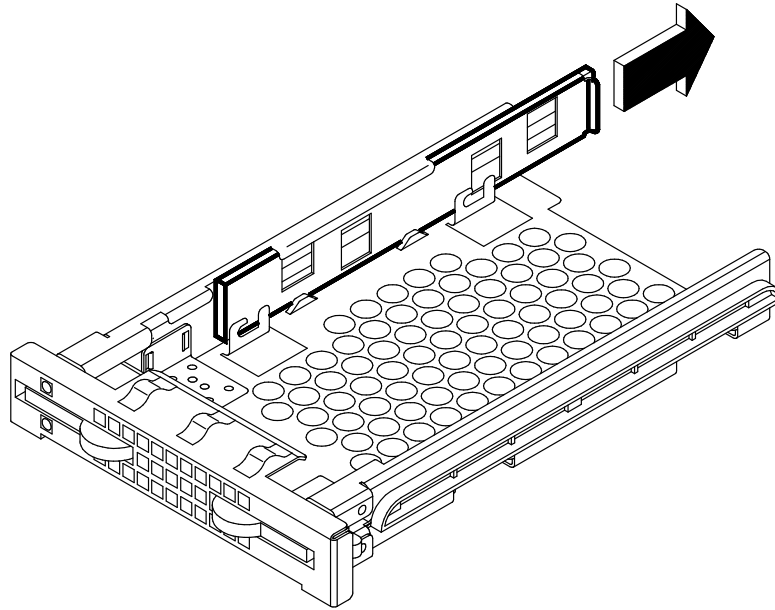
1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 1-5).
2. Open the device shutter (for details, if needed, see **Device Shutter Opening**, on page 1-8).
3. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see **How to Handle Hardware Components**, on page 1-3).
4. Release the disk carrier from the disk cage by opening the latches on the front side. Remove it from the disk cage. **It is recommended to lay it on a flat surface.**



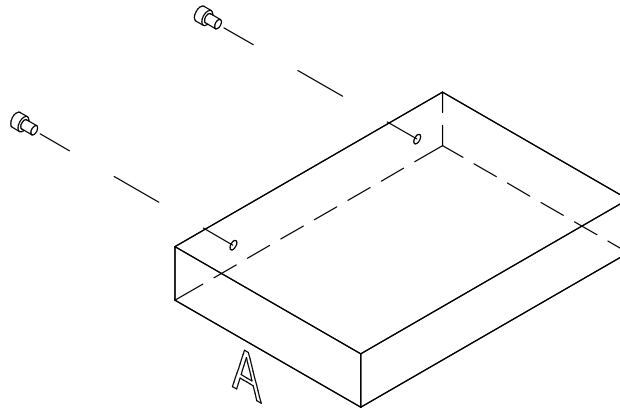
5. Unscrew the mounting screws provided with each installed disk carrier.



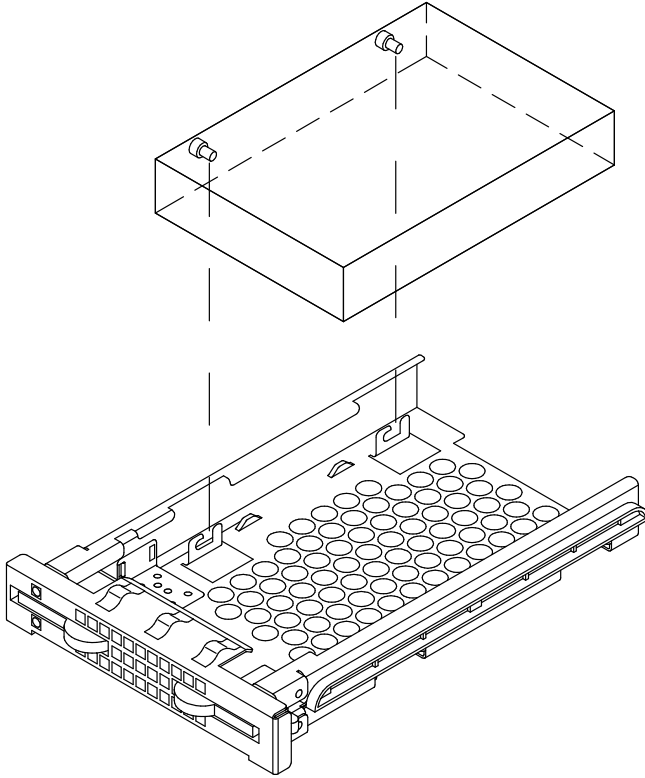
6. Grip the metal support of the light ducts and pull it out of the disk carrier.



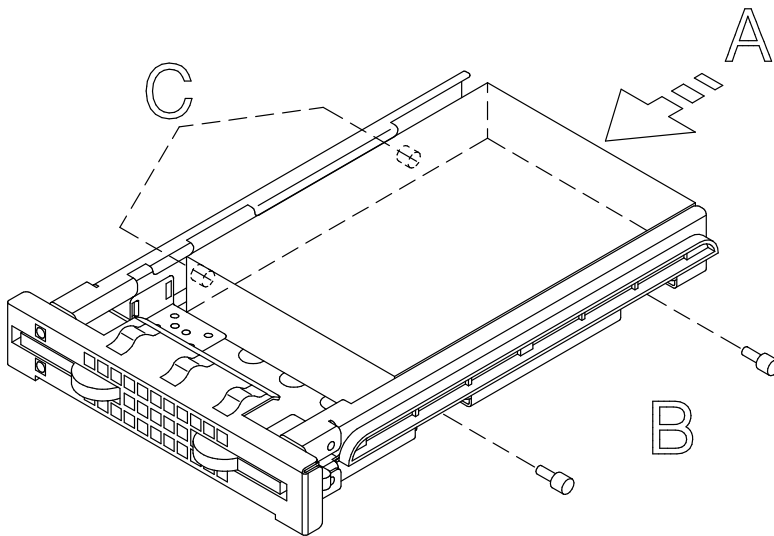
7. If you purchased the hard disk drive from a supplier other than your system supplier, be sure that the device itself has no SCSI-ID set and SCSI terminator. Refer to the documentation delivered with the device.
8. Insert two screws into the holes on the left side of the hard disk drive and screw them partially. In the illustration, the front side of the hard disk is identified by character **A** (the SCSI connector is on the opposite side).



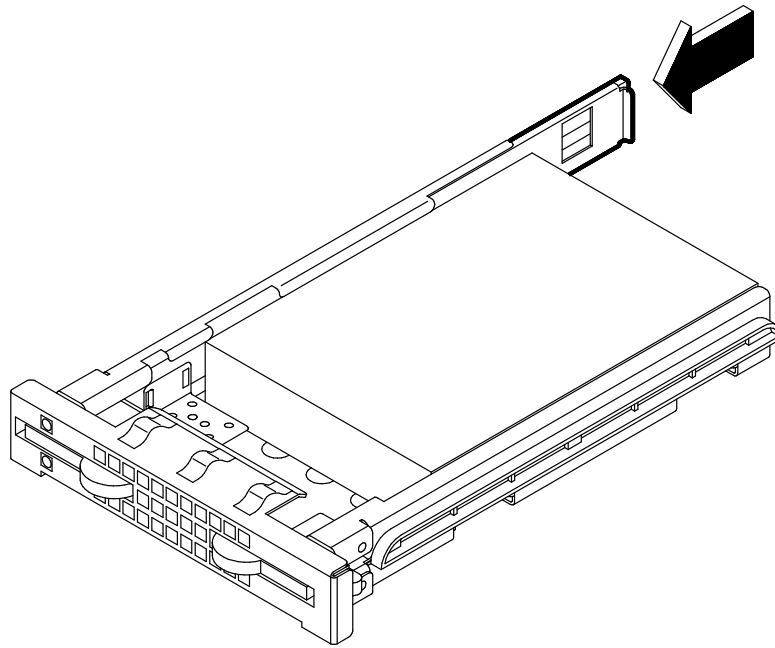
- Slide the hard disk drive into the disk carrier making sure that the screw threads fit into the locking brackets of the disk carrier. The SCSI connector of the hard disk drive must be kept towards the rear of the disk carrier.



- Lightly push the drive towards the front side of the disk carrier to seat the screws in the locking brackets (A). Secure the hard disk drive by tightening first the screws on the right side (B) and then the screws on the left side of the disk carrier (C).

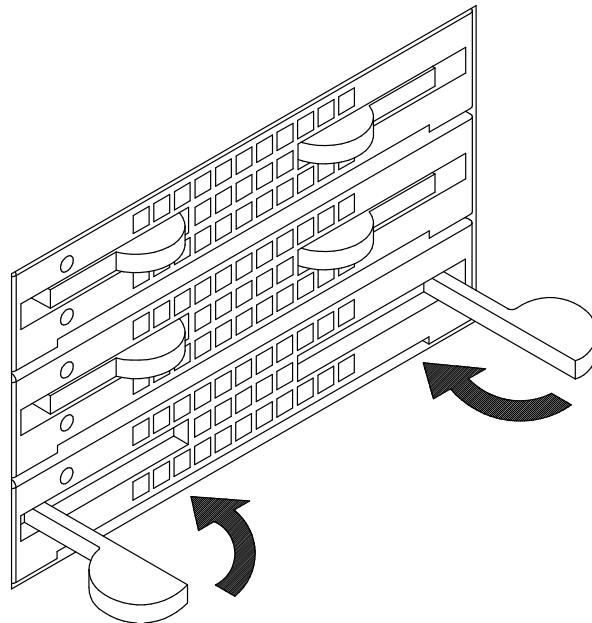


11. Grip the light duct support and slide it into its slide-way until a click tells you that it is well seated.



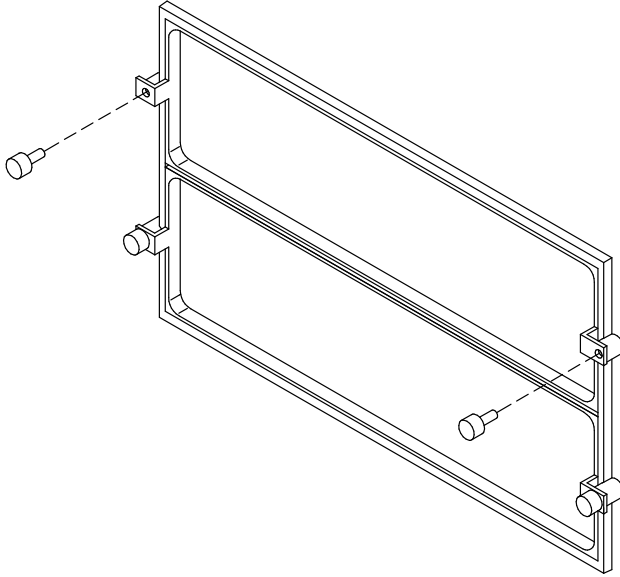
12. Firmly grip the disk carrier and slide it inside the empty slot of the disk cage.

13. Tilt the latches until these are anchored to the disk cage and lock the disk carrier by closing the latches.



14. Refer to **Hard Disk Drive SCSI-ID**, on page 5-8 to know the SCSI-ID identification that the hard disk drive will acquire.

15. Remove the plastic blank on the front panel that corresponds to the slot in which you have just installed the hard disk drive by performing the following steps:
- Accessing the opened device shutter from its internal side, loosen the screws used to retain the plastic blank to the front panel
 - Slide the plastic blank from the front panel.



Warning: Store the removed plastic blank and screws for possible future re-installation.

CAUTION:

It is recommended to protect any free device slot with the appropriate plastic blank. This is important for your safety and for the proper functioning of the air cooling system.

16. Close the device shutter (for details, if needed, see [Device Shutter Closing](#), on page 1-8).
17. Perform a system power on (for details, if needed, see [Restart Operations](#), on page 1-13).
18. When the Operating System is up and running, check that the new device is seen by the system. Refer to the device and Operating System documentation for details on any operation you may need to perform on the new device to have it working (e.g. create a file system).

Add a Disk Cage

Adding a disk cage to the system unit requires some operations which should be performed by a technician with a good knowledge of the system architecture.

If you want to add a disk cage on your own, consult the *Maintenance and Service Guide*. Otherwise, call your Service Representative for assistance.

Device Removal

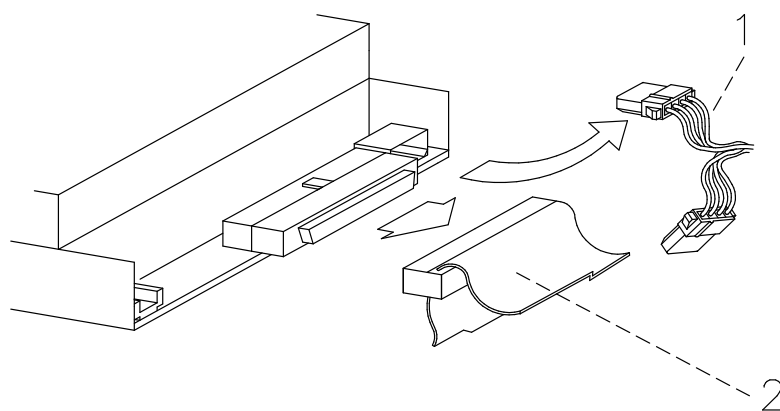
- Media Drive Removal
- Hard Disk Drive Removal

Media Drive Removal

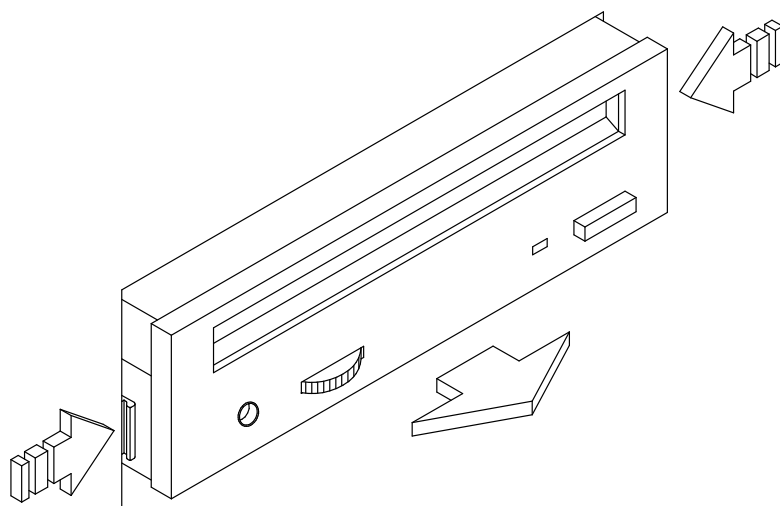
1. Before executing a system shutdown, check that the media drive does not contain any media.
2. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 1-5).
3. Remove the front panel and the right lateral panel (for details, if needed, see **Front Panel Removal**, on page 1-9 and **Lateral Panel Removal**, on page 1-11).
4. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see **How to Handle Hardware Components**, on page 1-3).

Note: The figures in this section illustrate a CD-ROM drive. The procedures apply to any media drive model.

5. Disconnect the split power cable (1) and the SCSI cable from the media drive rear.

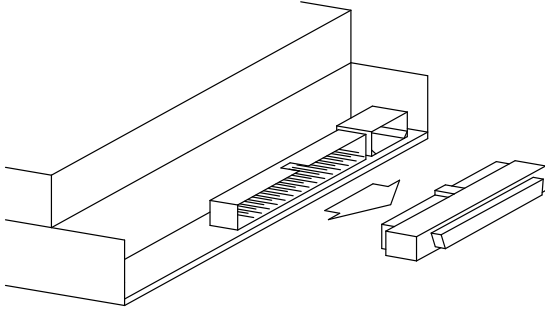


6. Pushing simultaneously the snaps at the sides of the media drive, slide it out from the slot.



7. Lay the media drive down on a flat surface.

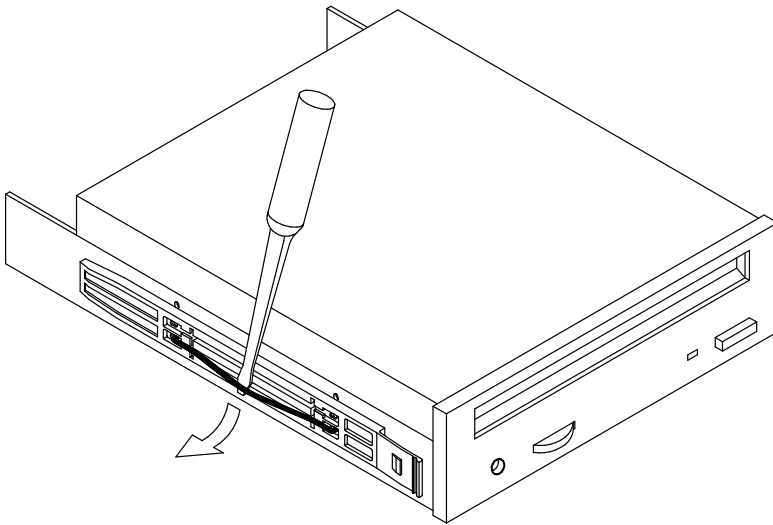
8. Remove the SCSI adapter from the SCSI connector of the media drive.



Warning: It is recommended to store the SCSI adapter for possible future re-installation.

9. Remove the two plastic rails from the media drive performing the steps indicated below:

- Insert a flat screwdriver between the contact spring and the plastic rail
- Press the screwdriver blade towards the outside.



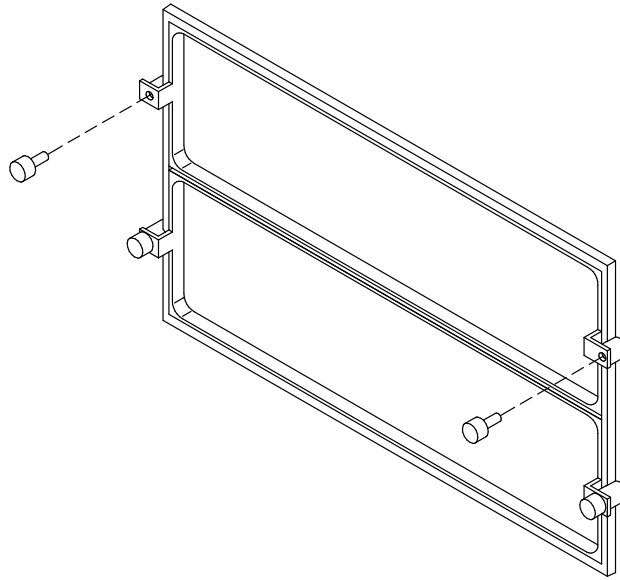
Warning: It is recommended to store the plastic rails and contact springs for possible future re-installation.

If you replace the media drive with a new one, record the SCSI-ID setting and skip to **Media Drive Upgrading** step 5, on page 5-15.

If you do not replace the media drive just removed with any other media drive, perform the following steps:

- a. Store the removed media drive in an antistatic envelope.
- b. Install the appropriate metal blank on the chassis:
 - Grip the metal blank by the edges and position it in the corresponding free slot
 - Secure the metal blank to the chassis by tightening its retaining screws.

- c. Install the plastic blank on the front panel in the corresponding free slot:
 - Accessing the front panel from its internal side, with the plastic blank facing the rear, insert it in the dedicated slot
 - Secure the plastic blank by tightening the two retaining screws.



CAUTION:

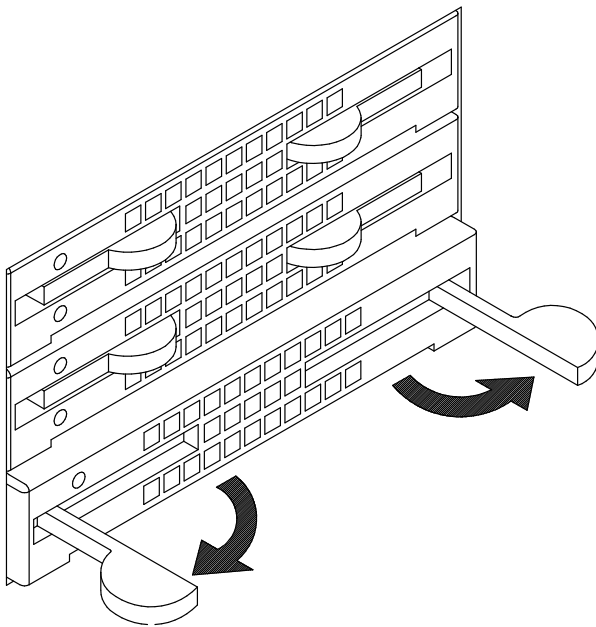
It is recommended to protect any free device slot with the appropriate plastic and metal blanks. This is important for your safety and for the proper functioning of the air cooling system.

- d. Re-install the front panel and the right lateral panel (for details, if needed, see **Front Panel Installation**, on page 1-10 and **Lateral Panel Installation**, on page 1-12).
- e. Perform a system power on (for details, if needed, see **Restart Operations**, on page 1-13).

Hard Disk Drive Removal

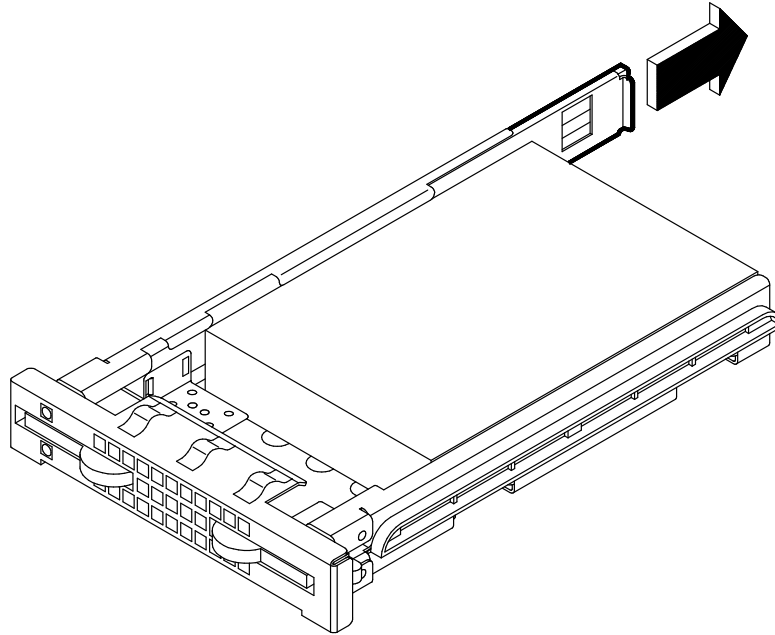
Note: In case you are replacing a faulty hard disk drive, the Hot Swapping feature enables you to remove and replace it without stopping the system activity. The procedure is described in [Device Hot Swapping](#), on page 5-35.

1. Before powering off the system, you may need to perform some software operations (e.g. unmount the file system(s) created on the hard disk). Refer to your Operating System documentation.
2. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see [Preliminary Operations](#), on page 1-5).
3. Open the device shutter (for details, if needed, see [Device Shutter Opening](#), on page 1-8).
4. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see [How to Handle Hardware Components](#), on page 1-3).
5. Release the disk carrier from the disk cage by opening the latches on the front side.



6. Slide the disk carrier out of the disk cage and lay it on a flat surface.

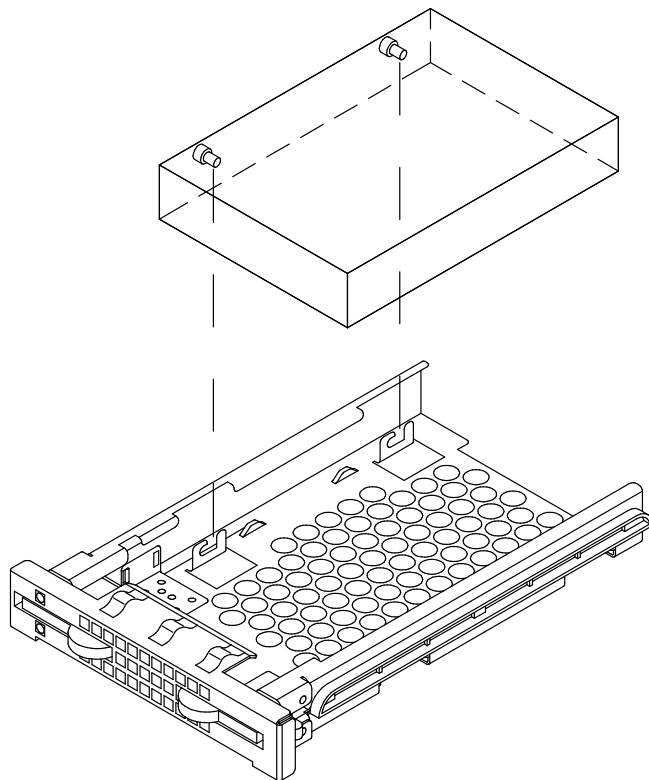
7. Grip the metal support of the light ducts and pull it out of the disk carrier.



8. Unscrew the screws on the right side of the disk carrier and remove them.

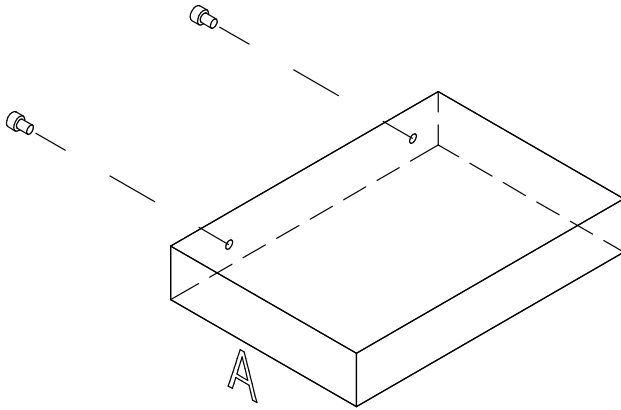
9. Partially loosen the screws on the left side of the disk carrier.

10. Move the hard disk drive out of the locking brackets in the disk carrier and slide it out.



11. Lay the hard disk drive on a flat surface.

12. Unscrew the screws on the left of the hard disk drive. In the illustration, the front side of the hard disk is identified by character **A** (the SCSI connector is on the opposite side).

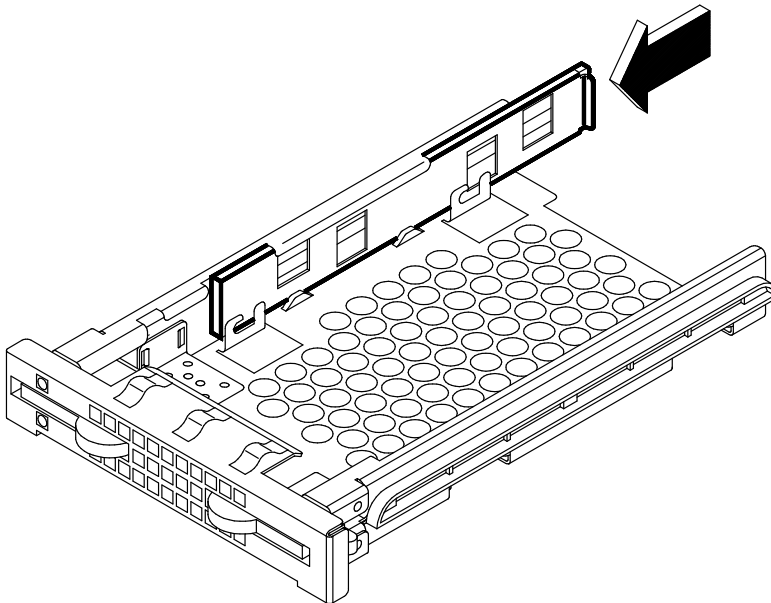


13. Store the removed device in an antistatic envelope.

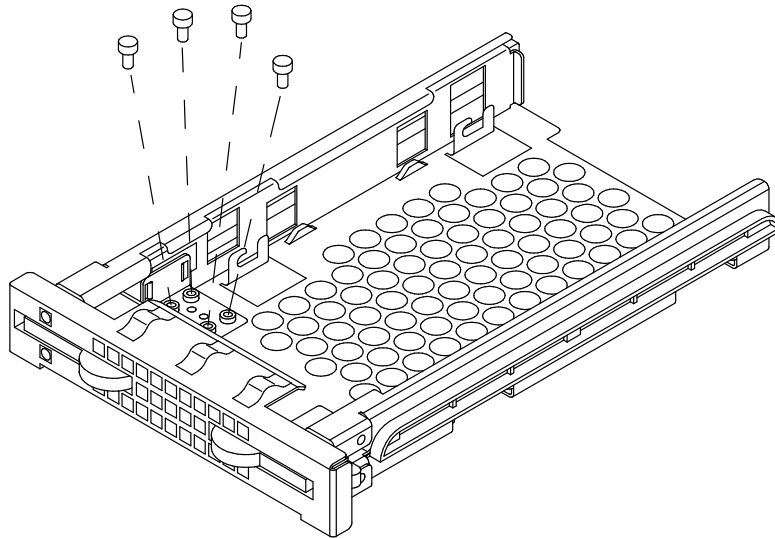
If you replace the hard disk drive with a new one, refer to **Add a Hard Disk Drive to a Disk Cage** step 7, on page 5-21.

If you do not replace the hard disk drive just removed with any other device, perform the following steps:

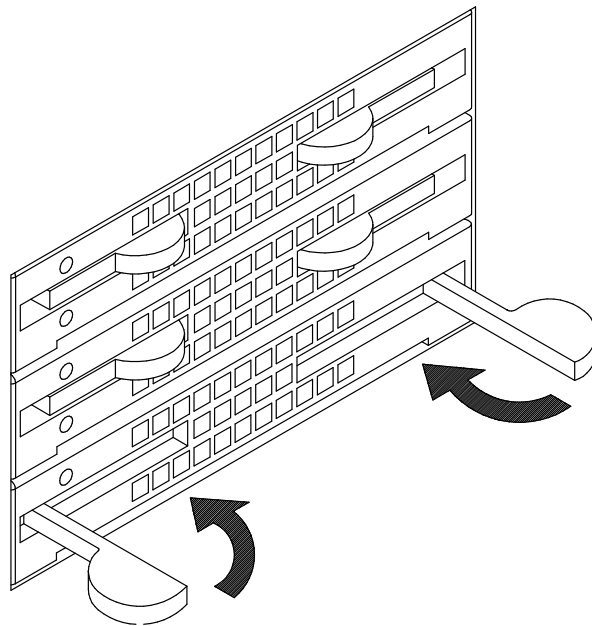
- a. Re-install the disk carrier:
 - Grip the light duct support and slide it into its slide-way until a click tells you that it is well seated



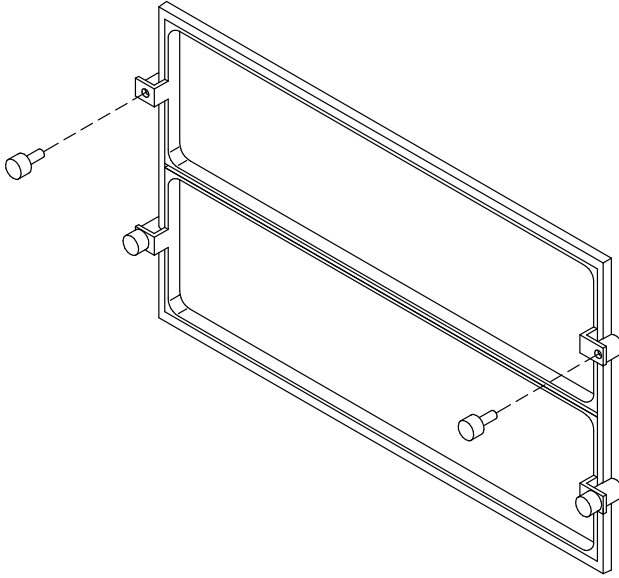
- Screw the mounting screws onto the disk carrier for future re-installation



- Grip the disk carrier by the edges and slide it in the corresponding free slot
- Tilt the latches until these are anchored to the disk cage and lock the disk carrier by closing the latches.



- b. Install the plastic blank on the device shutter in the corresponding free slot:
 - Accessing the device shutter from its internal side, with the plastic blank facing the rear, insert it in the dedicated slot
 - Secure the plastic blank by tightening the two retaining screws.



CAUTION:

It is recommended to protect any free device slot with the appropriate plastic blank. This is important for your safety and for the proper functioning of the air cooling system.

- c. Close the device shutter (for details, if needed, see [Device Shutter Closing](#), on page 1-8).
- d. Perform a system power on (for details, if needed, see [Restart Operations](#), on page 1-13).

Device Hot Swapping

If a hard disk drive is faulty, it can be removed and replaced **without interrupting the system activity** through the Hot Swapping feature implemented on your system.

The replacement operation is reserved to the System Administrator (*root* authority).

The detailed description of actions to be taken follows.

- Hot Swapping under Basic (JBOD) Configuration**
- Hot Swapping under RAID Configuration**

Hot Swapping under Basic (JBOD) Configuration

Warning: Before handling any device, be sure you know the rules described in [Device Description](#), on page 5-2 and [Device Configuration](#), on page 5-3.

Perform the following steps to replace one faulty hard disk drive.

1. Identify the faulty hard disk drive and stop running activity on it, if any.
2. Perform the preliminary software operations to remove it logically from the device configuration database through the *SMIT* program.

Note: If you need more detailed information, consult the *AIX System Management Guide: Operating System and Devices* manual, in the *Logical Volumes* and *System Management Interface Tool* chapters.

3. Open the device shutter by turning the device shutter key to the right.
4. Identify the faulty hard disk drive through the green LED light off.

Warning: Before physically removing the faulty hard disk drive, ensure that no backup activity on the media drives is running. An automatic SCSI reset could cause loss of data.

5. Physically remove the hard disk drive according to the instructions described in [Hard Disk Drive Removal](#) step 5, on page 5-30.
6. Replace the hard disk drive with a new one according to the instructions described in [Add a Hard Disk Drive to a Disk Cage](#) step 7, on page 5-21.
7. Configure the new hard disk drive through the *SMIT* program (*System Management* → *Devices* → *Add a Disk*) and restore the original device configuration.
8. Check the green LED is on; this means that the swapping procedure is successfully completed.
9. Close the device shutter by turning the device shutter key to the left and store it safely.

Hot Swapping under RAID Configuration

Warning: Before handling any device, be sure you know the rules described in **Device Description**, on page 5-2 and **Device Configuration**, on page 5-3.

If a hard disk drive under RAID configuration is faulty, this is automatically detected.

Perform the following steps to replace a faulty hard disk drive.

1. Open the device shutter by turning the device shutter key to the right.
2. Identify the faulty hard disk drive through the amber LED light on and steady.

Warning: Before physically removing the faulty hard disk drive, ensure that no backup activity on the media drives is running. An automatic SCSI reset could cause loss of data.

3. Physically remove the hard disk drive according to the instructions described in **Hard Disk Drive Removal** step 5, on page 5-30.
4. Replace the hard disk drive with a new one according to the instructions described in **Add a Hard Disk Drive to a Disk Cage** step 7, on page 5-21.
5. The rebuilding procedure of the data on the new hard disk drive starts automatically. The amber LED blinks until any operation on it is concluded.

Note: This operation can take more or less time depending on the number of hard disk drives configured in the RAID array and their capacity.

6. Check that the amber LED light is off; this means that the swapping procedure is successfully completed and the RAID configuration is restored.
7. Close the device shutter by turning the device shutter key to the left and store it safely.

Disk Expansion Unit

Up to two disk expansion units can be connected to the base unit.

Each disk expansion unit has five device areas.

- The upgrading and removal procedures for devices in the disk expansion unit are the same ones described for the base unit in this guide, **Devices** chapter.
- The configuration rules of the disk expansion unit device areas are detailed in the *Using the Disk Expansion Unit* manual.

The connection rules to the base unit and the set up of the disk expansion unit are described in the *Disk Expansion Unit Quick Set Up* leaflet.

Glossary

A

A: Ampere.

AC: Alternating Current.

AIX: IBM's implementation of UNIX operating system.

ANSI: American National Standards Institute.

Appliance Coupler: A standard IEC 320 male plug placed on the system rear side.

ASCII: American Standard Code for Information Interchange.

AUI: Attachment Unit Interface.

B

bank: See memory bank.

BOT: Beginning Of Tape marker. A marker on a magnetic tape used to indicate the beginning of the recordable area; for example, a photoreflexive strip, a transparent section of tape. Contrast with end of tape marker (EOT).

bulkhead: The pass-thru plate for the connection of the SCSI busses.

BUMP: Bring-Up Microprocessor. A low power microprocessor which monitors the system, especially during the various boot phases before the Operating System is loaded.

C

CD-ROM: Compact Disc Read-Only Memory. High-capacity read-only memory in the form of an optically readable compact disc.

chip: Synonym for integrated circuit (IC).

CPU: Central Processing Unit.

D

DDS: Digital Data Storage.

device shutter: The shutter which protects media and disk device areas. This shutter should be kept closed during system operations.

DIMM: Dual In-line Memory Module. It is the smallest component of the system memory.

disk cage: A metallic box which can host two or three disk carriers.

disk carrier: A sled used to install hard disk drives into the system.

E

ECC: Error Correcting Code.

ECMA: European Computer Manufacturers Association.

EDO: Extended Data Output.

EOT: End Of Tape marker.

F

FAST-10 WIDE-16: A standard SCSI interface, 16 bits, providing synchronous transfer rate of up to 10 MHz, with a data transfer speed of 20M bytes per second.

FAST-20 WIDE-16: An enhanced standard SCSI interface, 16 bits, providing synchronous transfer rate of up to 20 MHz, with a data transfer speed of up to 40M bytes per second. It is also called ULTRA WIDE.

firmware: It describes the microcode in read-only memory (ROM). It consists of an ordered set of instructions and data stored in a way that is functionally independent of main storage.

FPE: Full PCI Expander. It is a planar which connects up to seven controller cards.

G

No entries.

H

high availability: Continuous availability of system resources due to their redundant configuration.

hot swapping: The operation of removing a faulty hard disk drive and replacing it with a good one without interrupting the system activity.

I

ID: A number which uniquely identifies a device on a bus.

I/O: Input /Output.

IPL: Initial Program Load. It defines the firmware functional phases during the system initialization.

ISA: Industry Standard Architecture.

J

JBOD: Just a Bunch Of Disks.

K

Key Mode Switch: Key controlled switch which controls the system operation mode.

KP2: The back plane of a disk cage that connects two hard disk drives with 1.6 inch form factor.

KP3: The back plane of a disk cage that connects three hard disk drives with 1 inch form factor.

L

LAN: Local Area Network.

LED: Light-Emitting Diode. On the disk expansion unit operator panel, it indicates the power on status.

M

media and disk device areas: Areas which house the media drives and the hard disk drives.

memory bank: The minimum quantity of memory used by the system. It physically consists of two memory DIMM's. See also DIMM and riser.

multimedia: Information presented through more than one type of media. On computer systems, this media includes sound, graphics, animation and text.

multitasking: The ability to perform several tasks simultaneously. Multitasking allows you to run multiple applications at the same time and exchange information among them.

N

NVRAM: Non Volatile Random Access Memory.

O

OF: Open Firmware. See Open Firmware.

OP: Operator Panel. See Operator Panel.

Open Firmware: An architecture for the firmware that controls a computer before the Operating System execution. It also provides a user-interface.

Operating System: The software which manages the computer's resources and provides the operating environment for application programs.

Operator Panel: The system panel where the 3-Digit Hexadecimal Display and Key Mode Switch are located.

P

PCI: Peripheral Component Interconnect. A bus architecture that supports high-performance peripherals such as graphic boards, multimedia video cards and high-speed network adapters.

POST: Power On Self Test.

PowerPC: A standard RISC microprocessor family.

Q

QIC: Quarter-Inch Cartridge.

R

RAID: Redundant Array of Inexpensive Disks. A method of combining hard disk drives into one logical storage unit which offers disk-fault tolerance.

riser: A card which can host up to eight memory DIMM's. It is used to expand the system memory storage.

ROM: Read-Only Memory.

RS-232: An EIA interface standard that defines the physical, electronic and functional characteristics of an interface line.

RS-422: An EIA interface standard that defines the physical, electronic and functional characteristics of an interface line.

RS-485: The interface for base / disk expansion unit interconnection. This connection allows the remote control of the disk expansion unit power on/off.

RPE: Reduced PCI Expander. It is a planar which connects up to four controller cards.

S

SCSI: Small Computer System Interface. An input and output bus that provides a standard interface used to connect peripherals such as disks or tape drives in a daisy chain.

SCSI-ID: See ID.

slot cover: A metallic plate that covers free PCI/ISA controller card slots in order to protect the system unit from dust or debris, and to guide cooling air to the top of the unit.

SMIT: System Management Interface Tool. It is an interactive screen-oriented command interface. It is provided with your Operating System.

Stand-By menu: A menu which is available on the terminal connected to the COM1 port when the system is in standby state. It is used for system maintenance and testing activities.

SYSID: System Identification.

system console: A console, usually equipped with a keyboard and display screen, that is used by an operator to control and communicate with a system.

system planar: The planar which interconnects all the system resources.

SVGA: Super Video Graphics Array.

T

torx: A special screw with a six-point starlike hollow.

TSOPII: Tin Small Outline Package II.

U

ULTRA SCSI: See Fast-20 WIDE-16.

UPS: Uninterruptible Power Supply. A device which provides continuous power and sustains the system it is connected to, in case of outages.

V

V: Volt.

VCC: Voltage Continuous Current.

VGA: Video Graphics Array.

W

No entries.

X

No entries.

Y

No entries.

Z

No entries.

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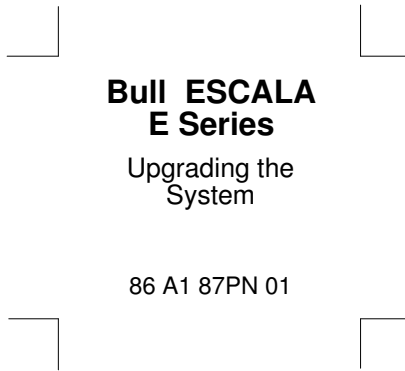
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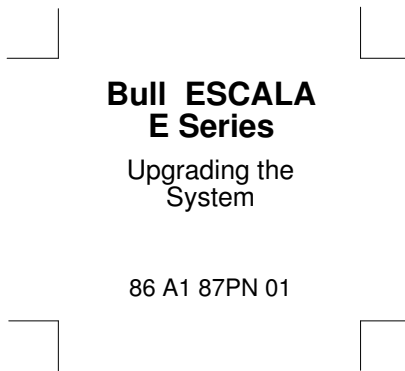
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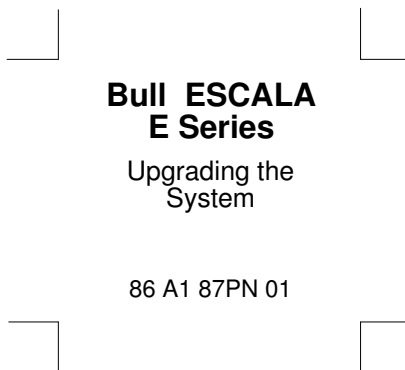
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