

Bull ESCALA EPC400

Using the System

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Bull ESCALA EPC400

Using the System

Hardware

July 1998

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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.

Disconnect Device - Rack (Isolation from Primary Power)

To remove the primary power from the rack, unplug the PDU input plug from the power source.

Disconnect Device - CPU and PCI Expansion Drawers (Isolation from Primary Power)

To remove the primary power from the CPU and PCI expansion drawers, unplug the "Appliance Coupler" from the relevant PDU outlet.

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 system operators and people in charge of the system 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 helps you:

- Operate the system controls and features
- Startup and shutdown the system
- Operate and maintain the system devices
- Perform system configuration upgrading in terms of memory, CPU's, controllers and devices
- Maintain the system configuration.

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.
- *Site Preparation for Rack Systems*, details the environmental and electrical characteristics of the site where the rack must be installed.
- *Setting Up the System*, contains information about system setup, system startup and explains what to do when the system arrives.
- *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 drive settings.
- *Configuring the System*, provides information about the CPU drawer, the PCI expansion drawer and the rack configuration rules. Examples of SCSI configurations are included. This manual is addressed to system administrators and people trained to perform service tasks on the system, in charge of the system configuration.
- *CPU Drawer Service Guide*, provides the description of the CPU drawer hardware components and the instructions for their removal and installation. This guide is addressed to people trained to perform service tasks on the system.
- *PCI Expansion Drawer Quick Set Up*, contains the step by step hardware procedures for a quick set up of the PCI expansion drawer.
- *PCI Expansion Drawer Service Guide*, provides the description of the PCI expansion drawer hardware components and the instructions for their removal and installation. This guide is addressed to people trained to perform service tasks on the system.
- *Rack Service Guide*, includes the description of the supported drawers and the procedures to install and remove them. This guide is addressed to people trained to perform service tasks on the system.
- *Maintenance Guide*, provides information about the system initialization process, the system firmware and configuration variables, and the system features in terms of

reliability, availability and serviceability (RAS). It includes also information about the maintenance tools provided with the system for diagnostic purposes, such as offline tests, system status indicators (tracing and error codes), remote maintenance, both for the CPU drawer and the PCI expansion drawer. This guide is addressed to people trained to perform service tasks on the system.

- *AIX Installation Guide*, provides detailed instructions for the AIX installation.
- *AIX 4.3 System Management Guide: Operating System and Devices*, explains the use of the System Management Interface Tool (SMIT) program.

Chapter 1. Description of the System

This section contains information to help you become familiar with the system.

- System Presentation**
- CPU Drawer Presentation**
- PCI Expansion Drawer Presentation**

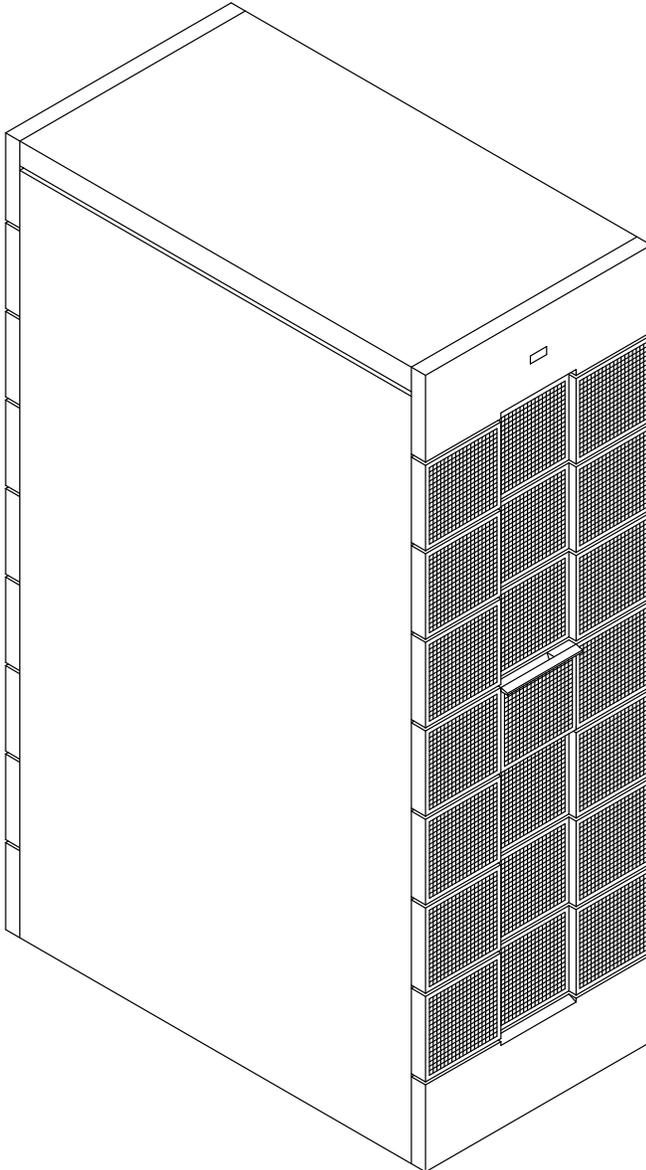
System Presentation

Your new system is a powerful PowerPC computer, rackmounted in a structure, the rack, which can house additional drawers, to expand the system configuration.

Please refer to the *Configuring the System* manual, for information on the rack configuration.

The rack has the following dimensions:

- **Height** 70 in. 1775 mm
- **Width** 22.8 in. 580 mm
- **Depth** 42.5 in. 1080 mm.



The rack is equipped with a front door which allows the access to the operator controls of the installed drawers and a rear door which allows the access to the back of the drawers for their maintenance.

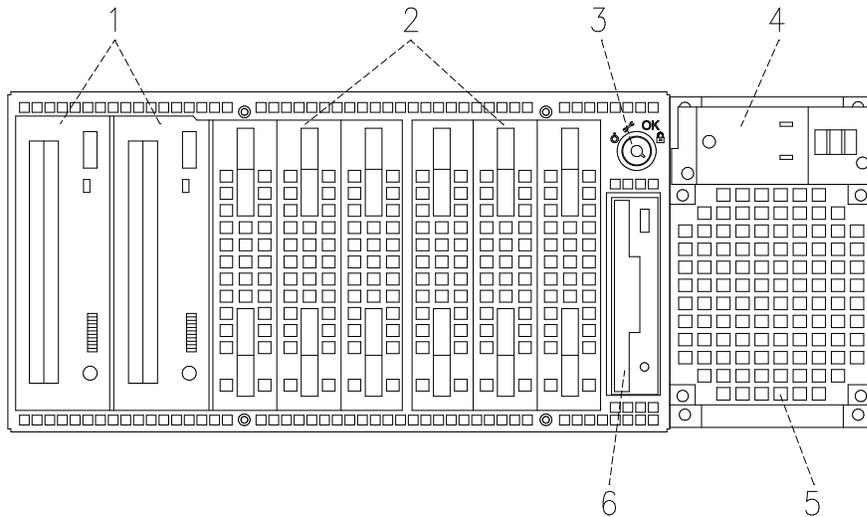
The rack is equipped with a Power Distribution Unit (PDU) which provides power to all the installed drawers.

CPU Drawer Presentation

This paragraph provides a brief description of the CPU drawer.

Front View

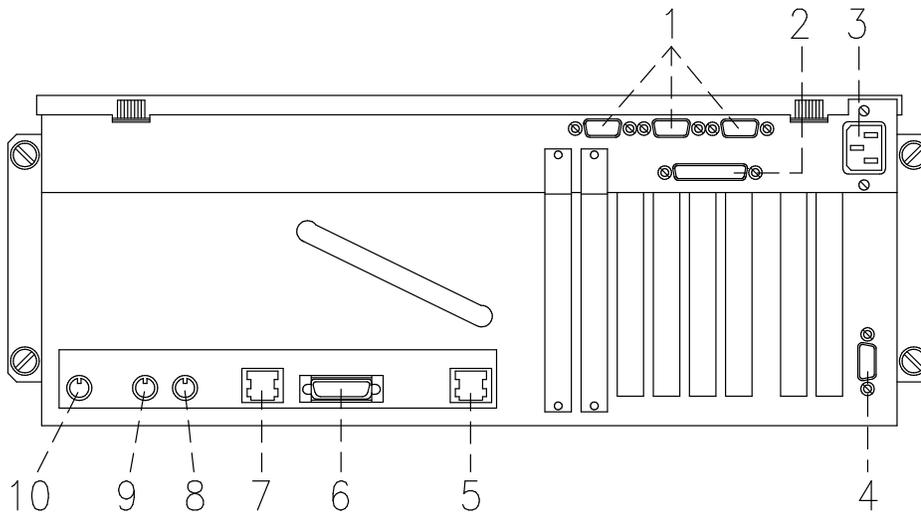
From the front of the CPU drawer, you can access to the following features and components.



- ① **Media Devices Area**
- ② **Hard Disk Devices Area**
- ③ **Key Mode Switch**
- ④ **Operator Panel**
- ⑤ **Power Supply Fan**
- ⑥ **3.5-inch. Diskette Drive**

Rear View

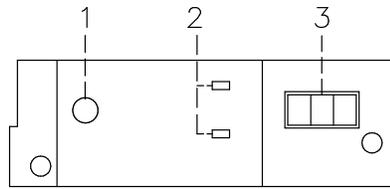
From the rear of the CPU drawer, you can identify the following connectors:



- ❶ **Three serial RS-232 ports:** 9-pin male, from right to left: COM1, COM2 and COM3
- ❷ **Parallel port:** 25-pin female
- ❸ **Power cord receptacle**
- ❹ **Video graphics:** SVGA 15-pin female
- ❺ **LAN 100 M-bit:** RJ-45
- ❻ **LAN AUI:** 15-pin female
- ❼ **LAN 10 M-bit:** RJ-45
- ❽ **Keyboard:** 6-pin mini-DIN female
- ❾ **Mouse:** 6-pin mini-DIN female
- ❿ **RS-485:** for expansion drawer connection

CPU Drawer Operator Panel

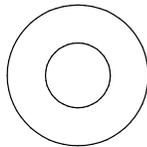
The operator panel is installed in the front of the CPU drawer.



- 1 **Reset Button**
- 2 **LEDs**
- 3 **3 x 1 Digit LED Hexadecimal Display**

Reset Button

The Reset Button is located on the operator panel and is used to reset the system. It is active when the Key Mode Switch is in the Normal or in the Service position. It is disabled when the Key Mode Switch is in the Secure or Power Off position.



Warning: Pressing the Reset Button can cause data to be damaged or lost if the operating system is still running.

The Reset Button is used to:

- Reset the system (double click) and cause a boot when the Key Mode Switch is set to the Normal or to the Service position
- Start the dump program (single click) when a manual dump is needed
- Start the system without executing the extended initialization tests (single click just before moving the Key Mode Switch from the Power Off position to the Normal position or Service position).

2 LEDs

The CPU drawer provides two LEDs which are located on the operator panel.

YELLOW

GREEN

Status Light States

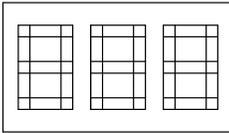
- The **Yellow LED**, when lit, indicates that the Power-on Self-Tests have been completed without errors and that the system is working under control of the operating system
- The **Green LED**, when lit, indicates that all voltages in the power supply are present and within specified limits and that all fans are running.

3 x 1 Digit LED Hexadecimal Display

The 3x1 Digit LED Hexadecimal Display, visualizes the status of the system (standby, testing, error, etc.).

If you want to have a description of the hexadecimal display codes, refer to **Hexadecimal Display Tracing and Error Codes**, in the *Maintenance Guide*. This guide is available at your supplier.

In case you are not maintaining the system on your own and encounter an error (a flashing code on the display), follow the instructions described in **Problem Solving**, on page 3-10.



What the hexadecimal display shows and the way it shows it (blinking, steady), depends on the system status:

- **Tracing:**
 - During the Power On phases the hexadecimal display shows, without blinking, the test code of the test under execution.
- **Fault Detection:**
 - In case of fault detected by the system, the code displayed on the hexadecimal display either flashes or remains steady on the display for more than two minutes.
- **Power On phase completed correctly:**
 - The hexadecimal display is cleared.

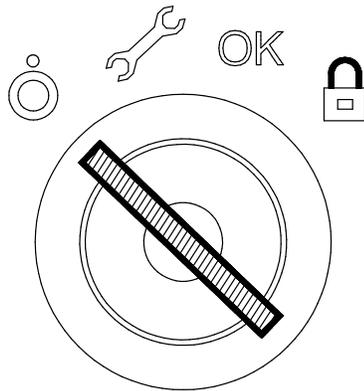
CPU Drawer Key Mode Switch

The Key Mode Switch provides four logical functions, which are enabled only when AC power is present in the system.

The four logical functions are:

-  **Power Off**
-  **Service**
-  **Normal**
-  **Secure**

The key can be removed only in the Power Off and Secure positions. The key is locked in the Normal and Service positions for safety reasons.



The following table summarizes the available operations for each Key Mode Switch position:

Note: During Remote Maintenance sessions the position of the key is not meaningful. All operations listed in the table can be performed.

| Operation | CPU Drawer Key Mode Switch Position | | | |
|---|-------------------------------------|--------------------|--------------------|--------|
| | Power Off | Service | Normal | Secure |
| Use of the BUMP Console | Yes | Yes | Yes | Yes |
| Access Open Firmware | No | Yes ⁽¹⁾ | Yes ⁽¹⁾ | No |
| Take a Dump | No | Yes | No | No |
| Reset | No | Yes | Yes | No |
| Do an Automatic Boot | No | Yes ⁽²⁾ | Yes | No |
| Do an Interactive Boot | No | Yes | Yes | No |
| Run a Remote Maintenance session ⁽³⁾ | Yes | Yes | Yes | Yes |

Notes:

1. During Power On phase only.
2. Enter the diagnostic menu under the Operating System.
3. The position of the key is not meaningful during Remote Maintenance session.



Power Off Position

This is the standby position. The system is not working but it is possible to call the standby menu for offline maintenance purposes.



Service Position

The Service position can be used either to do an automatic or an interactive power on, depending on the value of the Open Firmware `auto-boot?` variable (`true` by default, it performs an automatic boot). When the system is powered on with the key in this position, the operating system diagnostic mode is entered. Moreover, this position is used for some offline maintenance activities (e.g. offline test running).

OK

Normal Position

The Normal position is for normal system operations. It can be used either to do an automatic or an interactive power on, depending on the value of the Open Firmware `auto-boot?` variable (`true` by default, it performs an automatic boot).



Secure Position

The Secure position prevents the system from booting. If the system is already booted, this position does not lock the system console or block system network communication.

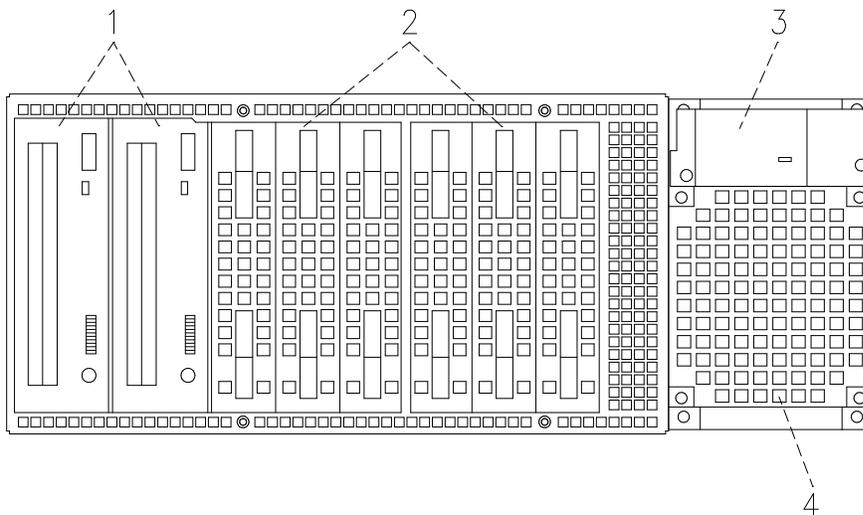
When the operating system is up, turning the key to the Secure position disables the Reset Button. With the Key Mode Switch in this position, a passerby cannot accidentally press the Reset Button and cause a loss of data.

PCI Expansion Drawer Presentation

This paragraph provides a brief description of the PCI expansion drawer.

Front View

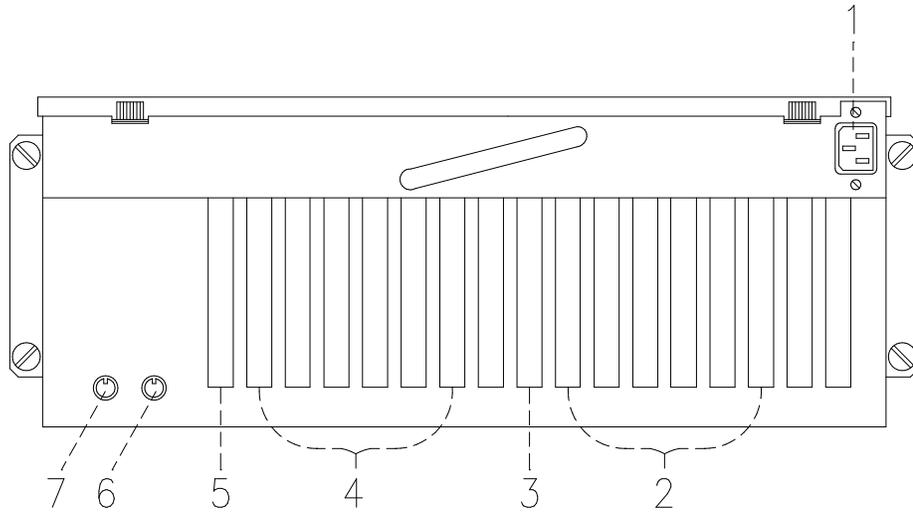
From the front of the PCI expansion drawer, you can access to the following features and components.



- ① **Media Devices Area**
- ② **Hard Disk Devices Area**
- ③ **Operator Panel**
- ④ **Power Supply Fan**

Rear View

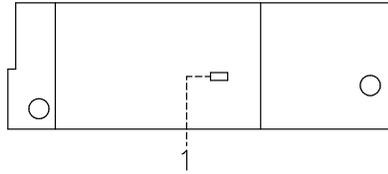
From the rear of the PCI expansion drawer, you can identify the following connectors and slots:



- ① **Power Cord Receptacle**
- ② **PCI Controller Slots, First KPE Planar**
- ③ **KXB Card Slot, First KPE Planar**
- ④ **PCI Controller Slots, Second KPE Planar**
- ⑤ **KXB Card Slot, Second KPE Planar**
- ⑥ **RS-485 Output, Connector**
- ⑦ **RS-485 Input, for PCI Expansion Drawer Interconnection**

PCI Expansion Drawer Operator Panel

The operator panel is installed in the front of the PCI expansion drawer.



1 LED

LED

It indicates the power on state of the PCI expansion drawer:

- When the **green** light is **on**, all voltages in the power supply are present and within specified limits
- When the light is **off**, the PCI expansion drawer is in standby state (that is, connected to PDU outlet but not powered on).

The LED is enabled only when AC power is present in the PCI expansion drawer.

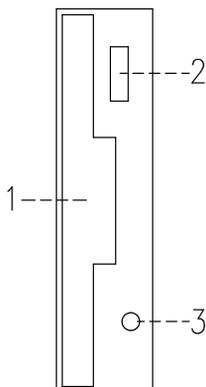
Chapter 2. Using Devices and Tools

This section gives a brief description of the supported devices and tools and explains how to work with them. For details on device characteristics, such as capacity, speed, transfer rate, please refer to the *Disks and Tapes Configuration Information* manual, delivered with the system.

- Using the 3.5-Inch Diskette Drive**
- Using the CD-ROM Drive**
- Using the QIC Tape Drive**
- Using the 8 mm Tape Drive**
- Using the 4 mm Tape Drive**
- Using Hard Disk Drives**
- Using the Keyboard**
- Using the Mouse**

Using the 3.5-Inch Diskette Drive

Functions



- ① **Diskette Slot**
Where the diskette is inserted.
- ② **Unload Button**
Used to unload the diskette from the drive.
- ③ **In-Use Light**
Lights when the system is accessing the drive.

Note: Do not stop the system or remove a diskette when the in-use light is on, or you may lose some of the data on the diskette.

Loading and Unloading the 3.5-Inch Diskette

To load a diskette into the drive, first insert the diskette in the diskette drive with the labeled metal shutter facing leftward and with the bevelled corner on top.

Push the diskette into the drive until you hear a click. The click indicates that the diskette is securely positioned in the drive.

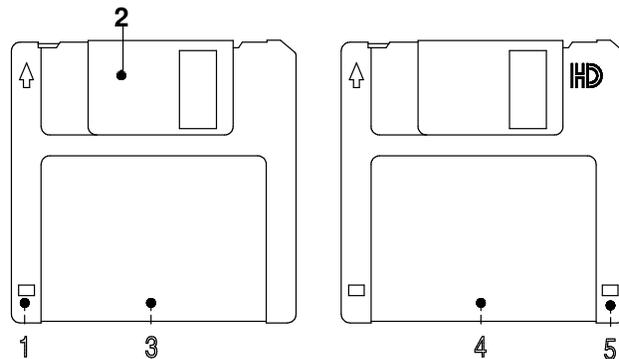
To unload the diskette, push the unload button. The diskette ejects partially so that you can pull it out.

Types of 3.5-Inch Diskettes

Warning: Diskette drives and diskettes must be the correct type to store data successfully. If you use the wrong diskette in your 3.5-inch diskette drive, the data on the diskette could be destroyed.

The diskette drive uses the following 3.5-inch diskettes:

- 1.0M-Byte capacity (stores approximately 720K Bytes of data)
- 2.0M-Byte capacity (stores approximately 1.44M Bytes of data).



- 1 Write-Protect Slot
- 2 Sliding Metal Shutter
- 3 1.0M-Byte diskette
- 4 2.0M-Byte diskette
- 5 Rectangular Cutout (only for 2.0M-Byte diskette)

Setting the Write-Protect Tab

Write-protecting diskettes is necessary to avoid data loss.

When diskettes are write-protected, you can read data from the diskettes, but you cannot write data on them.

There is a write-protect tab on the 3.5-inch diskette.

To locate the write-protect tab, turn the diskette over with the label facing down.

To prevent writing on a diskette, slide down the write-protect tab to open the protect slot.

To allow writing on a diskette, slide up the write-protect tab to cover the protect slot.

Handling 3.5-Inch Diskettes

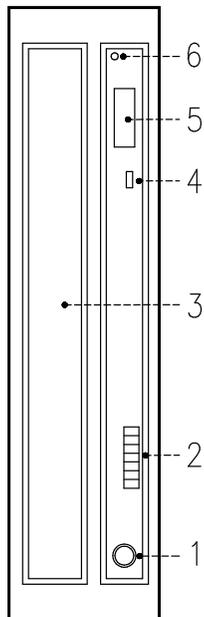
Be careful with your diskettes. Because each piece of information occupies such a small area on the diskette, small scratches, dust, food, or tobacco particles can make the information unusable. Be sure to remember the following:

- Do not touch the recording surfaces
- Keep diskettes away from magnets and magnetic field sources such as telephones, dictation equipment and electronic calculators
- Keep diskettes away from extreme heat and cold. The recommended temperature range is 10° C to 60° C (50° F to 140° F)
- Proper care helps prevent loss of data
- Make backup copies of your diskettes regularly.

Using the CD-ROM Drive

The internal CD-ROM drive is a read-only optical compact disk drive.

Functions



- 1 **Headphone Socket**
Used for connect headphones to your CD-ROM drive.
- 2 **Volume Control**
Used to control the level of the audio signal from the headphone socket.
- 3 **Drive Door**
Prevents dust from entering into the drive.
- 4 **Busy LED Indicator**
Used to indicate the condition of the drive.
- 5 **Unload Button**
Used to open the disk tray.
- 6 **Emergency Eject**
Used to manually open the disk tray.

When the CD-ROM is set to on, the LED indicates one of the several conditions. The LED states and the respective conditions of the CD-ROM are as follows:

| | |
|----------------------------|--|
| LED off | Drive idle or no disk. |
| LED on | During data access and during data transfer. |
| LED continuously on | Media problem. |
| Blinks slow | Disk is probably dirty, so clean the disk. |
| Blinks normal | During audio play back. |
| Blinks fast | After drive door is closed. |

Loading the CD-ROM

1. Press the unload button to open the disk tray. The disk tray slides out far enough to put in the disk. The disk holders are used to secure the disk into the tray.

Notes:

- a. If the CD-ROM is used with the disk not set properly, the disk and the laser lens may be damaged. Be sure to set the disk properly and use the device correctly.
 - b. Depending on the CD-ROM device model you are using, you may have either three or four disk holders. The procedures used to load or unload the disk are the same.
 - c. Always handle the disk by the edge to avoid fingerprints and scratches that could affect the readability of the data stored on the disk.
2. Put the disk on the tray.
 3. Gently push the tray. The tray slides into the drive and the disk is ready for reading.

Unloading the CD-ROM

Note: Always handle the disk by the edge to avoid fingerprints and scratches that could affect the readability of the data stored on the disk.

1. Push the unload button to open the disk tray.
2. Release the projections and gently pull the disk out of the holder.
3. Slide the disk out and store it in its protective case.

Handling CD-ROMs

When you are using the CD-ROM, the following recommendations should be considered:

- Keep CD-ROMs in their protective case when they are not in use
- Do not touch the surface of a CD-ROM, handle a CD-ROM by its edges only
- Do not store CD-ROMs in dusty, smoky, or salty areas
- Do not subject CD-ROMs to sudden temperature changes, which may cause condensation to damage them
- Do not expose CD-ROMs to heat, direct sunlight, strong magnetism or corrosive gas.

Cleaning the CD-ROM Drive

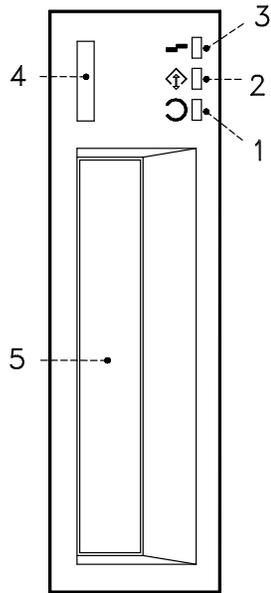
The drive optics can be cleaned using an audio CD lens cleaner.

Using the QIC Tape Drive

The QIC tape drive is a high capacity tape drive. This drive is compatible with existing 1/4-inch streaming tape subsystems, which use the QIC formats (Quarter-Inch Cartridge drive standards).

Functions

The QIC tape drive has two green status lights and one amber status light. The on/off combinations of the status lights indicate the conditions of the QIC tape drive.



- ① Ready LED (Green)
- ② Activity LED (Green)
- ③ Error LED (Amber)
- ④ Unload Button
- ⑤ Drive Door

Status Lights

The following table explains the meaning of the green and amber status lights.

| Ready LED | Activity LED | Error LED | Drive State: |
|-----------|--------------|-----------|--|
| On | On | On | LED-test (2 sec. at Power-on). The LEDs are turned on one-by-one |
| Flashing | Off | Off | Power-up self-test or diagnostic cartridge activity |
| Off | Off | Off | Cartridge/tape not loaded |
| Off | Off | On | Cartridge/tape not loaded, cleaning required |
| On | Off | Off | Tape loaded, no tape movement |
| On | Flashing | Off | Tape loaded, tape movement |
| On | Off | On | Tape loaded, no tape movement, cleaning required |
| On | Flashing | On | Tape loaded, tape movement, cleaning required |
| On | Flashing | Off | Tape loading or unloading, or cartridge unloading |
| On | Flashing | On | Cleaning required |
| Off | Flashing | On | Cleaning loaded tape |
| Off | Off | Flashing | Unrecoverable drive failure, cartridge failure or Microcode download failure |

Loading the 1/4-Inch Tape Cartridge

Before loading the tape cartridge, make sure the power is on and the write-protect tab on the tape cartridge is properly set. Refer to **Setting the Write-Protect Tab**, on page 2-8.

Once the cartridge has been inserted, it automatically rewinds to the beginning of the tape.

1. Grasp the edges of the QIC tape cartridge with the write-protect switch on top and the window side of the cartridge facing left.
2. Slide the tape cartridge into the opening on the front of the QIC tape drive until the loading mechanism pulls the cartridge into the drive and the drive door closes. The Ready LED will light if the load operation was successful.

The tape takes few seconds to load. When the Ready LED lights, the drive is ready for data operations.

Commands can be entered while the tape is loading. Any commands to the tape drive start running once the tape has finished loading. Commands not requiring the tape cartridge will run immediately.

Unloading the 1/4-Inch Tape Cartridge

Push the unload button. The drive will rewind the tape within the cartridge and eject the cartridge from the drive opening.

The time required for a tape to rewind and unload depends on the position of the tape when the unload button is pushed.

If the tape cartridge cannot unload and has to be removed manually from the drive, contact your Service Representative.

Setting the Write-Protect Tab

Setting the write-protect tab on a tape cartridge is necessary so that information is not accidentally lost. When the write-protect tab of a tape cartridge is set (pointing to SAFE or locked padlock), information can be read from the tape but cannot be written to it.

Use a small screwdriver to turn the arrow to the desired position. The arrow must be pointing to one of the two positions.

Handling QIC Tape Cartridges

Information in this paragraph describes operating and storage conditions including temperature, relative humidity, and maximum wet bulb data.

Warning: The manufacturer has specified a set of temperature and humidity ranges in which the 1/4-inch tape cartridge can operate with ease. Only regular cleaning procedures are required when operating the cartridge within this range. The risk of possible data loss is increased if 1/4-inch tape cartridges are operated, stored, or shipped outside the temperature or humidity ranges shown below.

Before using a cartridge, always let it adjust (acclimate) to the operating environment. Do this by placing the cartridge with its container in the operating environment for as long as it has been away from this environment or for 24 hours, whichever is less.

Acclimation is necessary for any data cartridge that has been exposed to a different humidity environment or a temperature change of 11 °C (20 °F), or more.

- Recommended Operating Environment:
 - Temperature 5 °C to 40 °C (41 °F to 104 °F)
 - Relative Humidity 20% to 80% non condensing
 - Wet Bulb 26 °C (79 °F).
- Recommended Storage Environment:
 - Temperature -30 °C to 60 °C (-22 °F to 140 °F)
 - Relative Humidity 5% to 90% non condensing.

Cleaning the QIC Drive

Clean the recording head of the tape drive after the first 2 hours of tape movement when you are using new tape cartridges. If you are using QIC-2GB, QIC-1000 cartridges and the cartridges are not new, clean the recording head after every 8 hours of tape movement.

Use the instructions and materials provided in the cleaning kit to ensure proper operation of the tape drive.

Warning: The drive must be cleaned with a dry process cleaning cartridge. The wet cleaning cartridges used on old QIC models are prohibited and may damage the drive.

Tape Cartridge Data Efficiency

Note: For maximum efficiency, operate the 1/4-Inch tape drive in the streaming mode whenever possible.

The 1/4-Inch tape cartridge efficiency is defined as the amount of data that can be stored on the cartridge and the rate at which the data can be read from the tape cartridge. When in use, the tape in the cartridge is moved at a constant speed of 72 inches per second. The speed for the QIC-2GB is 70.9 inches per second.

The following variables affect the amount of data that can be stored on a tape cartridge:

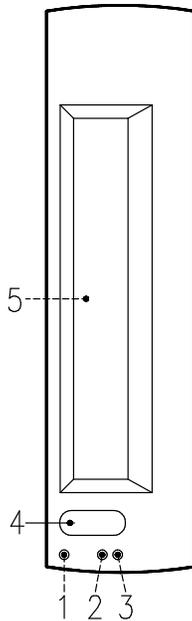
- Streaming mode or non-streaming mode
- Size of the data file
- Number of file marks per file
- Tape length
- Size of post/preamble.

Using the 8 mm Tape Drive

The 8 mm tape drive, is a high capacity tape drive. It is typically used as backup drive.

Functions

The 8 mm tape drive has one amber status light and two green status lights. The on/off combinations of the status lights indicate the conditions of the 8 mm tape drive.



- ❑ 1 Error LED (Amber)
- ❑ 2 SCSI LED (Green)
- ❑ 3 Motion LED (Green)
- ❑ 4 Unload Button
- ❑ 5 Drive Door

Status Lights

The following table describes various LED combinations that occur during normal tape drive operation.

| Error LED | SCSI LED | Motion LED | What Has Occurred: |
|-------------------------|-------------------------|-------------------------|-------------------------------|
| On | On | On | Power-On Self-Test is running |
| Flashing ⁽²⁾ | Flashing ⁽¹⁾ | Off | Failed Power-On Self-Test |
| Off | Flashing ⁽¹⁾ | Off | Ready (no tape loaded) |
| Off | Flashing ⁽¹⁾ | On | Ready (tape loaded) |
| Off | Flashing ⁽¹⁾ | Flashing ⁽³⁾ | Normal tape motion |
| Off | Flashing ⁽¹⁾ | Flashing ⁽²⁾ | High Speed tape motion |
| On | Flashing ⁽¹⁾ | On | SCSI Bus reset |
| Flashing ⁽³⁾ | n/a | Off | Error |
| Flashing ⁽²⁾ | n/a | Flashing ⁽²⁾ | Time to clean |
| Off | Flashing ⁽¹⁾ | Flashing ⁽³⁾ | Cleaning in progress |

The LED is flashing:

- (1) irregular
- (2) fast = 4 flashes/second
- (3) slow = 1 flash/second

Note: If a fault or an error condition occurs, first try to recover by pressing the unload button. If the condition continues, call your Service Representative.

Loading the 8 mm Tape Cartridge

Before loading the tape cartridge, make sure the power is on and the write-protect tab on the tape cartridge is properly set. Refer to **Setting the Write-Protect Tab**, on page 2-12.

1. Grasp the edges of the 8 mm tape cartridge with the write-protect switch towards you and the window side of the cartridge facing left.
2. Slide the tape cartridge into the opening on the front of the 8 mm tape drive until the loading mechanism pulls the cartridge into the drive and the drive door closes. The Motion LED will light if the load operation was successful.

The tape takes about 25 seconds to load. When the Motion LED lights, the drive is ready for data operations.

Commands can be entered while the tape is loading. Any commands to the tape drive start running once the tape has finished loading. Commands not requiring the tape cartridge will run immediately.

Unloading the 8 mm Tape Cartridge

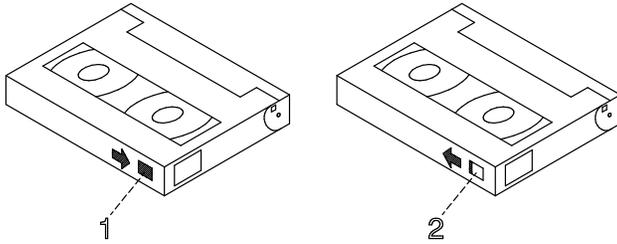
Push the unload button. The drive will rewind the tape within the cartridge and eject the cartridge from the drive opening.

The time required for a tape to rewind and unload is between 18 seconds and 3 minutes, depending on the position of the tape when the unload button is pushed.

If the tape cartridge cannot unload and has to be removed manually from the drive, contact your Service Representative.

Setting the Write-Protect Tab

The window on the tape cartridge controls write-protection. When the write-protect tab of a tape cartridge is set (window closed), information can be read from the tape, but cannot be written to it. When the write-protect tab of a tape cartridge is not set (window open), information can be both written to and read from the tape. Trying to write to a 8 mm data cartridge with the window closed causes an error.



❶ **Window Closed:** Write-Protect Tab Set

❷ **Window Open:** Write-Protect Tab Not Set

Handling 8 mm Tapes

When loading a tape in the drive, the cartridge should be removed from the case very close to the front panel of the drive to minimize accumulation of air-borne dust and dirt particles. The same process should be followed when removing the tape from the drive.

Do not permit smoking near the tape drive, as smoke particles can cause data errors.

Do not use excessive force when inserting or removing the cartridge from the drive. If it seems to hang up, gently repeat the load or unload process.

If the cartridge is placed inside a briefcase, and kept from moving around, it may be possible to safely transport it through hostile environments.

The case should be carried directly to the storage area and not be exposed to long periods of high or low temperatures.

It must never be left in a car window where sunshine can rapidly heat the air, and never left in a car overnight.

It should be noted that airport-style metal detectors and hand held scanners will not affect the data stored on the 8 mm tape.

- Recommended Operating Environment:
 - Temperature 5 °C to 40 °C (41 °F to 104 °F)
 - Relative Humidity 20% to 80% non condensing
 - Wet Bulb to 26 °C (79 °F).
- Recommended Storage Environment:
 - Temperature -40 °C to 60 °C (-40 °F to 140 °F)
 - Relative Humidity 10% to 90% non condensing.

Note: Before using a data cartridge, allow it to acclimate to the operating environment (24 hours or the amount of time it has been exposed to dissimilar conditions).

Cleaning the Tape Path on the 8 mm Tape Drive

Warning: Do not use video cleaning cartridges in the 8 mm tape drive. Video cleaning cartridges can damage the 8 mm tape drive. Some video cleaning cartridges are extremely abrasive. An 8 mm tape drive may be permanently damaged after only a few cleaning operations using an abrasive-type cleaning cartridge.

When the tape drive requires cleaning, the Error and the Motion LEDs flash. You should clean the tape drive as soon as possible after the LEDs begin flashing. Use the **Exabyte Premium 8 mm Cleaning Cartridge** to clean your 8 mm tape drive.

The 8 mm tape path should be cleaned either approximately every 30 hours of tape motion or once a month.

More frequent cleaning may be required if the drive is operated in a dusty environment or in humid conditions. If dust is allowed to accumulate, the drive has to perform more reads and writes. That can cause a data loss. This can be prevented by regularly scheduled cleaning of the drive.

The cleaning cartridge can clean the drive up to 12 times before being discarded. If you attempt to use an 8 mm cleaning cartridge more than 12 times, the tape drive automatically detects the error and ejects the cleaning cartridge with the disturbance status light remaining on.

Before loading the 8 mm cleaning cartridge, make sure the power to the 8 mm tape drive is on.

Archive Life

If proper storage conditions are maintained, quality 8 mm tapes can have a recorded data archive life of over 30 years:

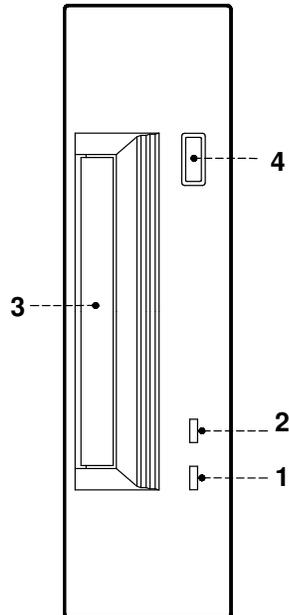
- Use tapes with 4 to 20 passes on them. In the first few passes, new tapes shake off or shed excess magnetic media and binder deposited during the tape manufacturing process, these may result in higher soft error rates during the first few passes
- Pre-condition the tapes:
 - Write/Read tape to measure error statistics (from BOT to EOT)
 - Do this a minimum of 4 passes and a maximum of 20 passes
 - Do this on a known good drive
 - Physically examine the tape pack for correct winding
 - Use only tapes that have been temperature stabilized.
- Maintain constant environment:
 - Best environment is 18° C (65° F) at 40% Relative Humidity
 - Control environment while transporting tapes
 - Ensure no chemical conditions exist
 - No dust
 - Have positive air pressure.
- Long Term Archiving Conditions:
 - 5° C to 32° C (41° F to 90° F)
 - Relative Humidity 20% to 60% non condensing
 - Wet bulb 26° C (79° F) maximum.
- Local Archiving Conditions Range:
 - 18° C to 40° C (65° F to 104° F)
 - Relative Humidity 40% to 60% non condensing.
- Store on edge in their protective enclosures and do not stack anything on top of them
- Keep the drive clean
- Store data in a streaming (not Start/Stop) mode; run the tape from BOT to EOT at normal speed
- Exercise the tapes once every 12 months by reading the entire tape, to remove any stress which has built up in the tape pack during the storage interval; this interval can be lessened at lower temperature conditions, and should be increased at higher temperature conditions.

Using the 4 mm Tape Drive

The 4 mm tape drive, is a high capacity tape drive. It is typically used as a backup drive.

Functions

The 4 mm tape drive has one green status light and one amber status light. The on/off combinations of the status light indicate the conditions of the 4 mm tape drive.



- ① **Tape LED (Green)**
- ② **Clean/Attention LED (Amber)**
- ③ **Drive Door**
- ④ **Unload Button**

Status Lights

Tape LED (Green)

Flashes green to show activity (loading, unloading, reading and writing). Steady green means a cartridge is loaded.

Clean/Attention LED (Amber)

Flashes amber to indicate head cleaning is needed or a cartridge is near the end of its life. Steady amber indicates a serious fault.

The following table explains the meaning of the green and amber status lights.

| Green | Amber | Status |
|----------------------|--------------|--|
| Flashing | Off | Load or unload |
| Fast Flashing | Off | Read or write |
| On | Off | Cartridge loaded |
| On, Off, or Flashing | Flashing | Cleaning needed signal |
| On, Off, or Flashing | On | Fault |
| Flashing | Off | Power-on (starts with two steady lights) |

Loading the 4 mm Tape Cartridge

Before loading the tape cartridge, make sure the power is on and the write-protect tab on the tape cartridge is properly set. Refer to **Setting the Write-Protect Tab**, on page 2-16.

To load the 4 mm tape cartridge, do the following:

1. Grasp the edges of the 4 mm tape cartridge with the write-protect tab towards you and the window side of the cartridge facing left.
2. Slide the tape cartridge into the opening on the front of the 4 mm tape drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.

The 4 mm tape drive is ready for data operations when the tape cartridge is inserted. After the cartridge is inserted into the tape drive, the tape takes about 15 seconds to load.

Unloading the 4 mm Tape Cartridge

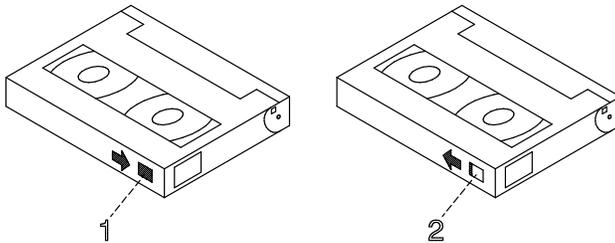
Before performing the unload operation, make sure the power to the 4 mm tape drive is on.

To unload and eject the tape cartridge, press the unload button. The 4 mm tape drive rewinds the tape and then ejects the tape cartridge from the tape drive.

The time required for a tape to rewind and unload is between 10 seconds and 1.5 minutes, depending on the position of the tape when the unload button is pushed.

Setting the Write-Protect Tab

The window on the tape cartridge controls write-protection. When the write-protect tab of a tape cartridge is set (window open), information can be read from the tape, but cannot be written to it. When the write-protect tab of a tape cartridge is not set (window closed), information can be both written to and read from the tape. Trying to write to a 4 mm data cartridge with the window open causes an error.



- 1 **Window Closed:** Write-Protect Tab Not Set
- 2 **Window Open:** Write-Protect Tab Set

Handling 4 mm Tapes

Information in this section describes operating and storage conditions including temperature, relative humidity, and maximum wet bulb data.

Warning: The manufacturer has specified a set of temperature and humidity ranges in which the 4 mm data cartridge can operate with ease. Only regular cleaning procedures, as described in **Cleaning the Tape Path on the 4 mm Tape Drive**, on page 2-18, are required when operating the cartridge within this range. The risk of possible data loss is increased if 4 mm tape cartridges are operated, stored, or shipped outside the temperature or humidity ranges shown below.

Before using a cartridge, always let it adjust (acclimate) to the operating environment. Do this by placing the cartridge with its container in the operating environment for as long as it has been away from this environment or for 24 hours, whichever is less.

Acclimation is necessary for any data cartridge that has been exposed to a different humidity environment or a temperature change of 11°C (20°F), or more.

- Recommended Operating Environment:
 - Temperature 16°C to 32°C (60°F to 90°F)
 - Relative Humidity 20% to 80% non condensing
 - Wet Bulb to 26°C (79°F).
- Recommended Storage Environment:
 - Temperature 5°C to 32°C (40°F to 90°F)
 - Relative Humidity 20% to 80% non condensing.

Operating in Harsh Environments

The 4 mm tape drive is ideally suited to streaming operations, as opposed to tape movement operations involving multiple stop/starts and random searches. When the tape is used for frequent stop and start operations, streaming movement is beneficial and should be used whenever possible. This can be accomplished by ensuring that any save or restore operation is the only active operation performed by a device connected to this SCSI I/O controller.

Any tape that has been used outside the ranges specified in the previous table for an extended period of time (50 passes in 40 hours of non-stop operation) should not be used as an archival tape. Exposure to the environment will deteriorate the magnetic and physical strength of the tape. Do not store important data on a tape that has been used outside the specified ranges; transfer the data to a new tape for reliable archiving.

Cleaning the Tape Path on the 4 mm Tape Drive

The 4 mm tape path should be cleaned either approximately every 30 hours of tape motion or once a month, whichever occurs first. The 4 mm tape drive monitors the recording quality of the tape cartridge and indicates that the tape path requires cleaning when the clean/attention light (amber) is flashing.

More frequent cleaning may be required if the drive is operated in a dusty environment or in humid conditions. If the dust is allowed to accumulate, the drive has to perform more reads and writes which can cause data loss. This can be prevented by regularly scheduled cleaning of the drive.

The cleaning cartridge can clean the 4 mm tape drive 50 times before it needs to be discarded. If you attempt to use a 4 mm cleaning cartridge more than 50 times, the tape drive automatically detects the error and ejects the cleaning cartridge with the clean/attention light (amber) remaining on.

Before loading the cleaning cartridge, make sure the power to the 4 mm tape drive is on.

To load the 4 mm cleaning cartridge, do the following:

1. Grasp the edges of the 4 mm cleaning cartridge with the window side of the cartridge facing up.
2. Slide the cleaning cartridge into the opening on the front of the 4 mm tape drive until the loading mechanism pulls the cartridge into the drive.

After the 4 mm cleaning cartridge has been fully inserted into the 4 mm tape drive, the following cleaning operations are performed automatically:

1. The cleaning tape is loaded into the tape path.
2. The drive is cleaned by moving the cleaning tape forward for approximately 30 seconds.
3. The tape is unloaded and the cleaning cartridge is ejected from the tape drive when the cleaning operation is complete.
4. A successful cleaning operation is indicated when the clean/attention light (amber) goes off, see page 2-15 (if it was activated before the cleaning operation).

Using Hard Disk Drives

The hard disk drives are located in the disk devices area on the left side of the CPU drawer front.

The working status of each hard disk drive installed on your system is given through two LEDs (green and amber lights) that are visible looking at the front of the system.

The meaning of the LED status depends on your disk configuration. If the disk belongs to a RAID array, the amber LED light on and steady indicates a fault condition, the green LED light indicates disk activity.

If the disk does not belong to a RAID array, the amber LED is not meaningful and the green LED indicates if the disk is powered on (green LED light on and steady) or is powered off (green LED light off).

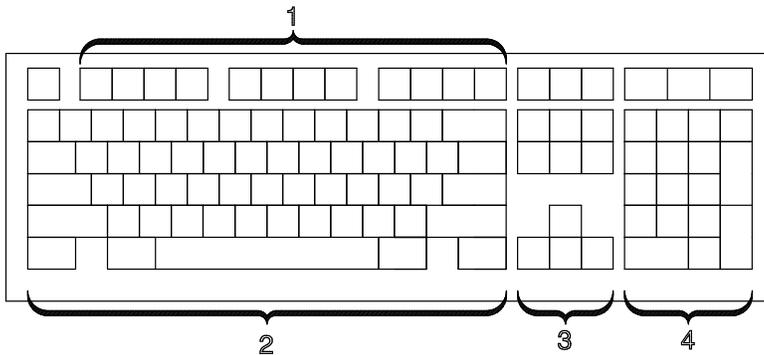
If you need to install or remove the disk devices, refer respectively to **Hard Disk Drive Upgrading**, on page 4-13, or **Hard Disk Drive Removal**, on page 4-20.

Using the Keyboard

There are several keyboards available with the system. The keyboards have various keys that enter data and control the cursor location.

The keyboards can be engraved for the languages of different countries. National languages can be set through the Open Firmware Graphic Menu. For further information, please refer to **Open Firmware Menu**, on page 3-7.

The functions of each keyboard depend on the software used. The character sets for the keyboards are explained in your operating system documentation.



The keyboard is divided into four sections:

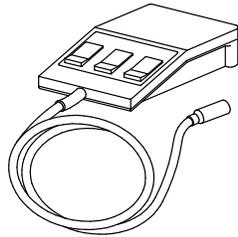
- ① **Function keys**
Are multipurpose keys and their function is controlled by the operating system.
- ② **Typewriter keys**
Are similar to a standard typewriter. Their function is controlled by the software.
- ③ **Control keys**
Move the cursor on the screen and do programmed control functions. The movement and functions depend upon the application used.
- ④ **Numeric**
Keypad is arranged like a calculator to help when typing numbers.

On all of the keyboards, you can adjust the tilt position for typing comfort. To tilt the keyboard, pull out the keyboard legs. The legs will snap into position. To decrease the tilt of the keyboard, rotate the keyboard legs until they snap into the bottom of the keyboard case.

Note: The keyboard plugged into the connector at the rear of the CPU drawer, can be used only with the system graphic monitor.

Using the Mouse

The mouse is a hand-operated locating device. A two or three button mouse is available for use with the system.



Consult your application publication for the exact use of the mouse.

You can use the mouse to perform such functions as positioning a cursor, selecting items from a menu, or moving around in your document much easier and faster than if you used only the keyboard. The cursor moves exactly as you move the mouse on a flat surface, such as a desktop.

When you move the mouse around on a flat surface the cursor moves on the display screen; the movement changes the position of the cursor.

With the mouse buttons, you can perform functions such as selecting and deselecting options, extending your selection, or choosing a command. The precise functioning of your mouse depends on the software you are using.

Note: The mouse plugged into the connector at the rear of the CPU drawer, can be used only with the system graphic monitor.

Handling the Mouse

For best operation, handle the mouse with care. Incorrect handling can damage the mouse.

- Do not operate the mouse on cloth, unfinished wood, newspaper, or carpet
- Do not drop or hit the mouse
- Do not carry the mouse by holding onto the cable
- Do not expose the mouse to extreme temperatures or direct sunlight
- Do not place the mouse in liquid spills.

Cleaning the Mouse

1. Remove the retaining ring by turning it counterclockwise, in the direction of the arrow.
2. Remove the ball.
3. Inspect the ball for contaminants. Wipe it clean with a dry, lint-free cloth.
4. If the ball is dirty, wash it in warm, soapy water. Rinse and wipe the ball with a lint-free cloth until dry.
5. Inspect the ball cavity in the mouse for foreign materials. If there are any foreign materials, remove them.
6. Replace the ball.
7. Replace the retaining ring on the mouse and align it with the open slots in the ball cavity.
8. Turn the retaining ring clockwise until the open slots are covered and you hear the ring snap into place.

Care of the Mouse

The operating surface for the mouse should be smooth, clean, and flat. For example, you can operate the mouse on the following surfaces:

- Finished wood
- Glass
- Enamel
- Plastic
- Paper (except newspaper)
- Metal.

Rough surfaces collect contaminants that can be transferred to the interior of the mouse by the ball. The surface you use should be free from spills, dirt, dust, lint, wax, eraser dust, and other foreign matter. Rough surfaces can also cause the pads located on the bottom of the mouse to prematurely wear. A deeply pitted surface could cause erratic operation of the mouse.

- Inspect the work surface for spills or other contaminants
- Dust the work surface
- If you are using a paper pad, inspect it for wear and replace it if necessary.

Chapter 3. Maintaining the System

- Starting and Stopping the System
- Maintaining System Configuration Variables
- Problem Solving

Starting and Stopping the System

This section describes the steps for the power on and power off procedures for normal operation of your system.

- Initial Startup**
- Starting the System**
- Logging into the System**
- Stopping the System**
- Rebooting the System**

Initial Startup

If you have just received your system and need to start it up for the first time, please refer to **Starting the System for the First Time**, in the *Setting Up the System* manual.

Starting the System

CAUTION:

For proper cooling and safe operation of the computer, all the covers must be in place before you power up the system.

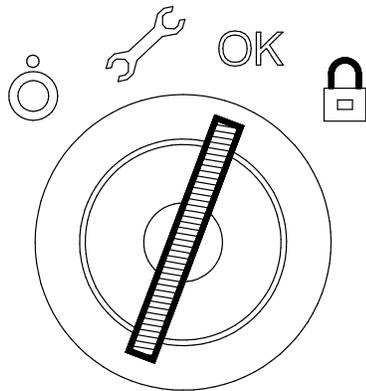
Follow these steps to power up the system for your daily operation.

1. Make sure that the power cord of any external devices, like terminals and printers, are connected to the proper power outlets.
2. Make sure that all the rack drawers are connected to the PDU outlets.

Warning: Do not connect the CPU drawer and the PCI expansion drawer to a power source other than the PDU.

3. Switch on the external devices, if connected.
4. Switch on the system console.
5. Set the CPU drawer Key Mode Switch to the Normal position to power on the entire system.

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



Note: Powering on the system by setting the CPU drawer Key Mode Switch to the Service position, you enter the operating system diagnostic mode.

6. Now go to **Logging into the System**.

Logging into the System

Warning: After you have started the system, it may take a few minutes for your login prompt to appear on the display. This amount of time depends on your system configuration. Do not press any keys while you are waiting, as this may cause unexpected results.

When the login prompt appears on the display:

1. Type your login name and press the Enter key or click on the OK button.
2. If a *password* is required (the related prompt appears), type your password and press the Enter key or click on the OK button (the screen does not display your password as you type it).

If the password prompt does not appear, you have no password defined and you can begin working on the operating system.

If the system displays:

login incorrect

Log in again, and enter the correct login name and password. If you still have problems, ask your system administrator.

Stopping the System

Warning: When using the shutdown procedure for your system, enter the correct command before you stop the system. Failure to do so, may result in loss of data. Please refer to your operating system documentation.

1. Exit any applications that are running. Consult the application manuals for instructions.
2. Make sure that the media drives, if any, do not contain any media.
3. Exit the operating system using the appropriate **shutdown** command.
 - a. It is possible to execute the shutdown procedure from the system console (local or remote line) with the CPU drawer key set to the Secure position. Remember, before rebooting the system, to set the CPU drawer Key Mode Switch to the Normal or the Service position.
 - b. When the shutdown program is executed, a warning message is sent to all connected terminals. You can specify the time period between the sending of the warning message and the system shutdown.

Here is an example:

```
shutdown -h +5x  
represents a period of 5 minutes.
```

Warning: This period should allow all the users sufficient time to finish their sessions and save their data. The amount of time can vary from a few seconds (allowing the user to exit the vi editor, for example) to several minutes (allowing the user to properly finish the update of a database). In the case of a user updating a database, if the system is shutdown before the user has properly finished his update session, there can be loss of important data.

4. Set the CPU drawer Key Mode Switch to the Power Off position.

Note: If nobody needs to use the system, set the CPU drawer Key Mode Switch to the Secure position and remove the key, to prevent unauthorized reset of the system.

5. Switch off the external devices, if connected.

Note: The external devices and drawers connected to the PCI expansion drawer must not be powered off if they are shared in a High Availability configuration.

Rebooting the System

A system reboot recopies the operating system from disk to memory and starts it without turning the system completely off. Reboot is also known as a system reset. It re-initializes the operating system by repeating the Initial Program Load (IPL) operation.

The **reboot** command synchronizes the hard disks and performs some other shutdown activities without halting the system. Use the **reboot** command to reboot the operating system when it is accessed by only one user. The **shutdown** command is used instead of the **reboot** command when the system is running and multiple users are logged on.

Reboot to cause the system to recognize newly installed software, to reset peripheral devices or to recover from a system crash.

To reboot the system you must have root user authority.

At the prompt, enter:

```
reboot
```

The system reboots.

Maintaining System Configuration Variables

The system configuration variables can be displayed and modified in a controlled and interactive mode, through the user interface provided by the Open Firmware menu.

Notes:

1. **The modifications applied to the configuration variables do not take effect until a CPU drawer restart.**
2. **The configuration variables must be modified with care to avoid compromising the system's behavior.**

Accessing Open Firmware

Open Firmware features are addressed to personnel trained to perform service tasks on the system. The user should have a good knowledge of the system architecture and hardware design.

For more information about Open Firmware features, please refer to the *Maintenance Guide* manual.

How to Enter the Open Firmware

The Open Firmware menu can be accessed through a graphic terminal connected to the SVGA port (default Open Firmware console port) or a terminal connected to the COM1 port (BUMP console).

You can enter the Open Firmware menu:

- Typing any key before completion of boot image loading, or
- Configuring the `auto-boot?` variable = `false`; for details, see the **Boot options** description, on page 3-8.

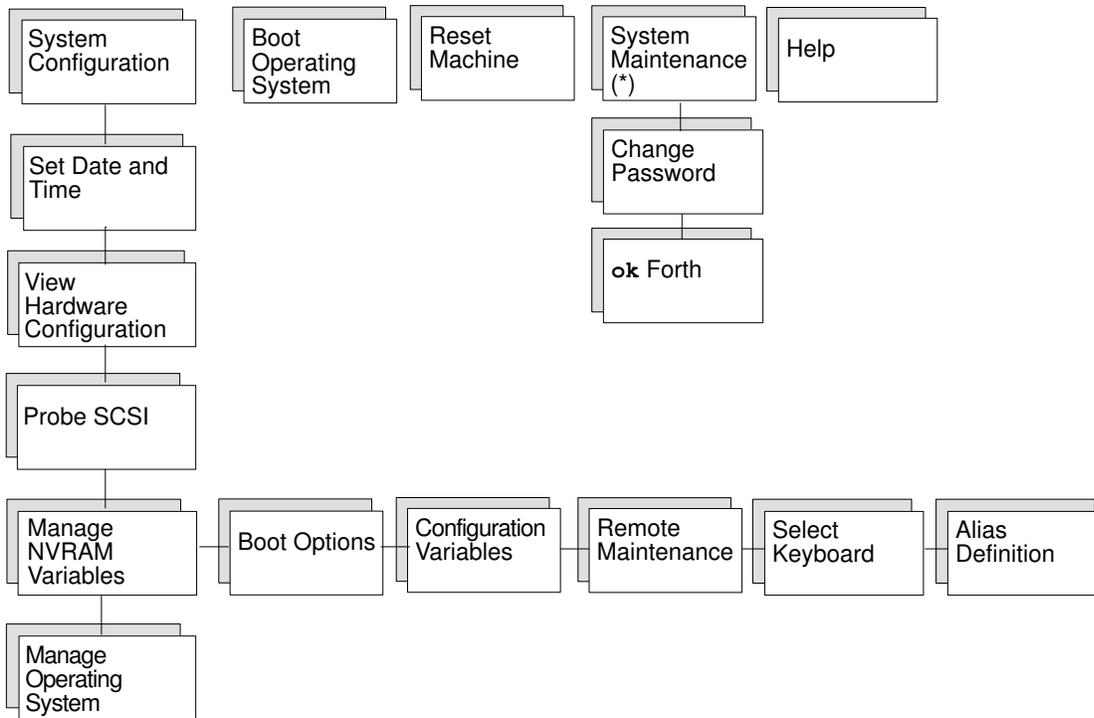
Operating Procedures

The following operating procedures are common to all screens in the menu tree:

- From the graphic console:
 - Use the arrows or *Tab* key or mouse click to move inside the screen
 - Use the *Enter* key or mouse click to select an item.
- From the BUMP console:
 - Enter the number identifying one item to select it
 - Press the *Enter* key to confirm the selection.

Open Firmware Menu

The following table summarizes the Open Firmware menu available features.



(*) For security reasons, this option must be password protected.

Open Firmware Menu Description

The Open Firmware menu options are described below.

System Configuration

- **Set Date and Time:** to display and/or update the date and time of the system.
- **View Hardware Configuration:** to display the system device tree. Each device is identified by a unique name representing the type of device and where the device is located within the system device tree.

The device path name consists of a series of node names separated by slashes (/). The following example shows a full device path name: `/pci@feff0090/scsi@2/disk@0,0:1`.

The device path names can also be represented by device alias names. For more information, refer to the [Alias definition](#) description, on page 3-9.

- **Probe SCSI:** to list the devices connected to all the SCSI busses installed in the system.
- **Manage NVRAM Variables:** to display and/or update the common user Open Firmware variables stored in NVRAM.
 - **Boot options:** to display and/or modify the system boot options, such as:
 - auto-boot?**, determines the system boot phase:
 - **true**, an automatic system boot is performed after power on or reset, else
 - **false**, the Open Firmware menu is called.
 - boot-device**, identifies the device(s) from which to the system boots.
 - Note:** The boot device can also be set when the Operating System is up and running using the command `bootlist`. For details, refer to the Operating System documentation.
 - diag-switch?**, assumes the value of the CPU drawer Key Mode Switch position:
 - **false**, if the key is set to the Normal position, else
 - **true**, if the key is set to the Service position.
 - diag-device**, identifies the device(s) from which to the system boots in diagnostic mode (for maintenance purposes).
 - **Configuration variables**
 - To display and modify the parameters of the configuration variables, such as:
 - input-device**, identifies the console input device (usually **keyboard**, **com1** or **com2**)
 - output-device**, identifies the console output device (usually **screen**, **com1** or **com2**)
 - pci0a-probe-list**, lists which PCI bus device numbers to probe and in what order (the assumed value is system dependent and includes all available slots)
 - pci0b-probe-list**, same as above.
 - **Remote maintenance:**
 - To configure the remote maintenance flags, such as:
 - sp-d-in**, set to **true** gives remote maintenance authorization
 - sp-d-out**, set to **true** sends an automatic notification to the Service Center, in case of system power on failure
 - sp-line**, identifies the service line on which the remote connection will be established (by default COM2 port).

- **Select keyboard:** to adopt the more suitable keyboard language.
- **Alias definition:** to list, create or delete device aliases. A device alias is the short representation of the full device path name. The following example shows an alias name: **disk**.
Also, this option allows to create or modify a network-boot alias. The following details are requested:
 - **Alias name**, alias name definition (by default, the alias **net** definition is displayed)
 - **Device name**, the name of the network device (by default, the device path-name of alias name is displayed)
 - **Server IPAddr**, the IP address of the server system, where the boot file resides
 - **boot-file**, the path-name of the boot file to be loaded from the server system (i.e. **/tftpboot/boot-file**)
 - **Client IPAddr**, the IP address of the client system
 - **GatewayIPAddr**, the IP address of the gateway.

The most common used devices have a predefined alias name.

- **Manage Operating System:** to display the first available boot device and/or select a different boot device.

To select a different boot device, position on the device path displayed and edit it accordingly. The list of all the present devices is shown through **View Hardware Configuration** menu option.

Select **OK**, to modify the boot device variable permanently.

Select **Cancel**, to cancel the operation.

Select **Boot (*)**, to perform an immediate system boot from the defined boot device.

The modification is valid for the next system initialization only and the first default value is automatically restored at the next system power on.

Select **Default**, to restore the value of the first available default boot device.

Boot Operating System (*)

This option executes a system boot from the first available default device.

Reset Machine

This option performs a system reset.

System Maintenance

This option is reserved to the personnel who has a good knowledge of the system architecture and hardware design. For security reasons, this option must be password protected.

- **Change Password:** to modify the security password configuration variable.

Warning: If the password is forgotten, and the security level defined by the System Administrator is set to a value other than none, the user is locked out of the system. A Service Personnel intervention is required.

- **OK Forth:** to access the Open Firmware command interpreter (**ok** prompt).

Warning: This option must be used by people having a deep knowledge of the Open Firmware based language interpreter (Forth).

- (*) The boot options could be conditioned by the security level defined by the system administrator. A password could be requested.

Problem Solving

In case of system problems, you can consult **What To Do When a Problem Occurs**, in the *Setting Up the System* manual.

If you decide to ask for assistance from your Service Representative, note that the following information might be required:

- Any message displayed on the operator panel display
- Any message displayed on the system console
- Description of the symptoms
- Your system serial number.

Remember to record this information before calling.

Identifying the System Serial Number

The system serial number is written on a label placed on the rear side of the CPU drawer and the PCI expansion drawer.

Its format is *XAN - Kxx - Mnnnnn*, where:

| | |
|--------------|--|
| <i>Kxx</i> | is the system run code defined by the manufacturer |
| <i>M</i> | is a character that identifies the system model |
| <i>nnnnn</i> | is the system serial number (5 digits). |

Note: XAN changes into XBH for the systems shipped to Brazil.

Chapter 4. Expanding Your System Configuration

Note: The upgrading procedures described in this chapter must be executed carefully following the configuration rules given in the *Configuring the System* manual.

You can expand your system configuration by adding:

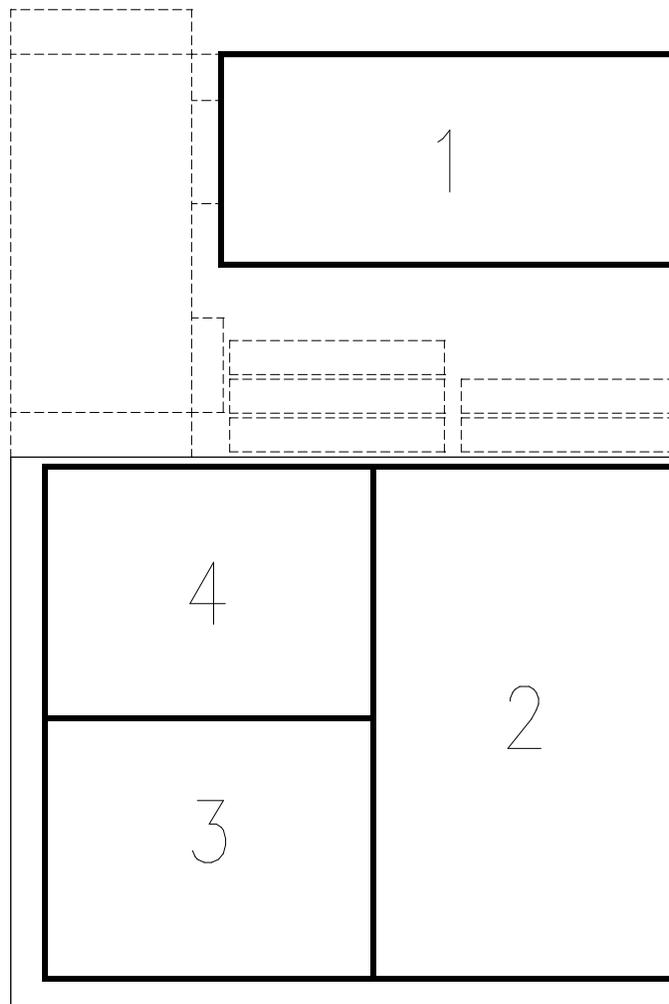
- memory, CPU's, controllers and devices to the CPU drawer
- controllers and devices to the PCI expansion drawer.

Note: One PCI expansion drawer can be connected to each CPU drawer.

For each component, the installation and removal procedures are provided.

The upgradable components, located in the CPU drawer, are shown in the figure.

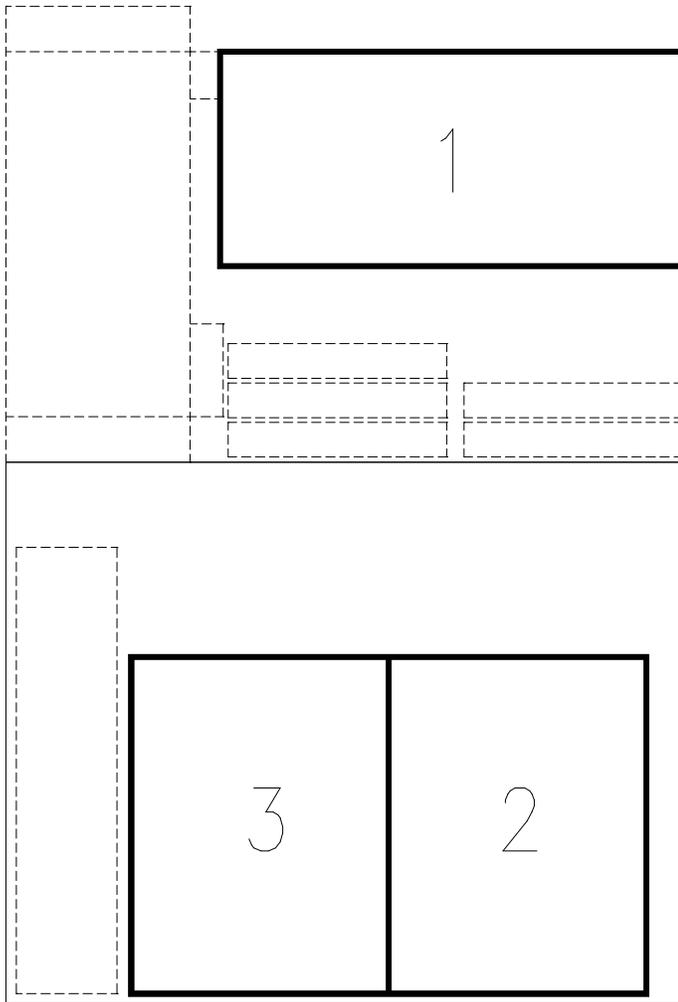
Top View of the CPU Drawer



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

The upgradable components, located in the PCI expansion drawer, are shown in the figure.

Top View of the PCI Expansion Drawer



- ① Device Area
- ② PCI Controller Area, First KPE Planar
- ③ PCI Controller Area, Second KPE Planar

Preparing Your System for an Upgrade

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

- How to Handle Hardware Components**
- Preliminary Operations**
- Partial Removal / Installation of the Drawer**
- Drawer Top Cover**
- Restart Operations**

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 screwdriver for cross-slotted screws
- A torx screwdriver (Ø 6 mm.)
- 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 1 m 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 in a position that does not block your working area or movements.

Preliminary Operations

These preliminary operations must be performed whenever you upgrade the CPU drawer and/or the PCI expansion drawer.

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 the **Device Hot Swapping**, on page 4-24.

1. Exit any applications that are running. Consult the application manuals for instructions.
2. Accessing the rack from the front, check that the media drives, if any, do not contain any media.
3. If the system is running, perform a system shutdown.
4. Power off the system by turning the Key Mode Switch of the CPU drawer to the Power Off position.
5. Make sure the power switches for all the external devices and drawers connected to the CPU drawer and/or PCI expansion drawer, if any, are set to OFF.

Note: Do not power off any drawers and external devices included in High Availability configurations.

6. Switch off the circuit-breaker(s) of the PDU outlet(s) where the CPU drawer and/or the PCI expansion drawer is connected.
7. Unplug the power cord from the CPU drawer and/or from the PCI expansion drawer.

CAUTION:

To remove the primary power from the CPU drawer and/or from the PCI expansion drawer, unplug the “Appliance Coupler” on the rear side.

8. Disconnect the RS-485 cable and the PCI cable(s) connecting the PCI expansion drawer to the CPU drawer, if any. Keep trace of these connection(s).

Note: In case any other cables connected to the CPU drawer or to the PCI expansion drawer make the drawer sliding operation difficult, record which connector attaches to which cable and disconnect the cables.

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 CPU drawer or PCI expansion drawer, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all drawer(s) power cables 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.

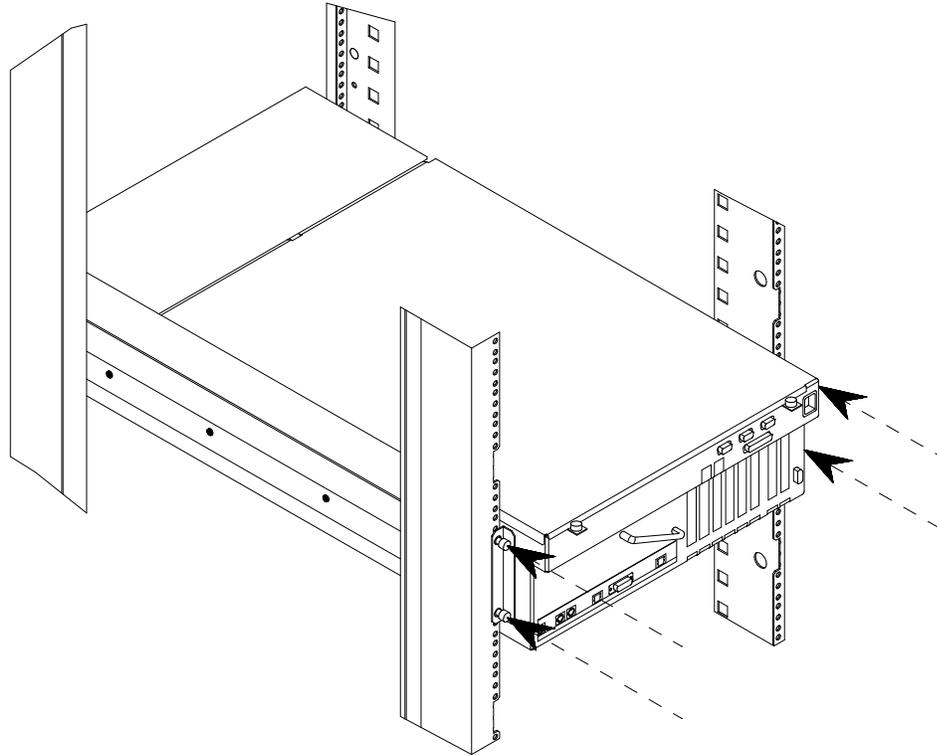
During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

Partial Removal / Installation of the Drawer

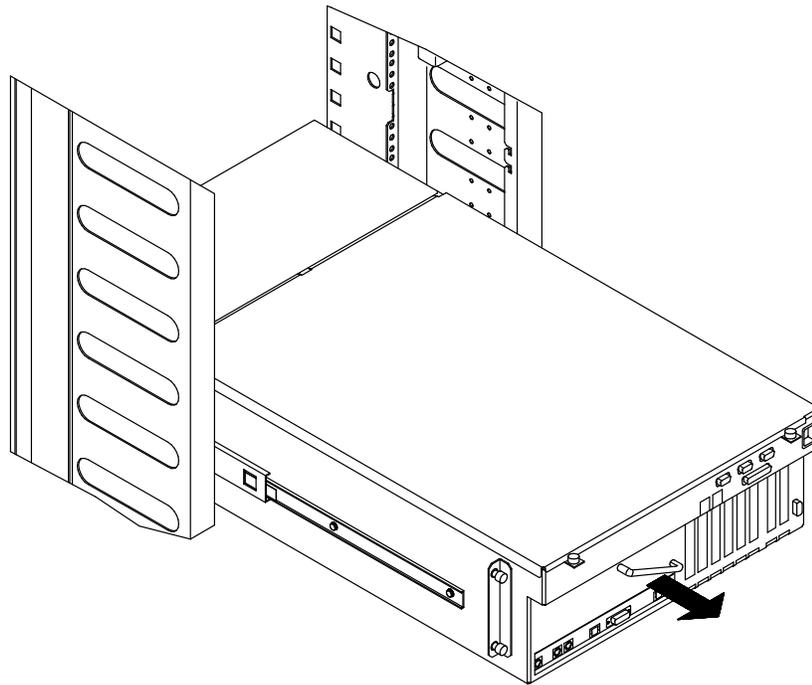
Note: These procedures apply both to the CPU drawer and to the PCI expansion drawer. The figures show the CPU drawer, as an example.

Partial Removal

1. Accessing the drawer from the rear, loosen the screws securing the drawer to the chassis.



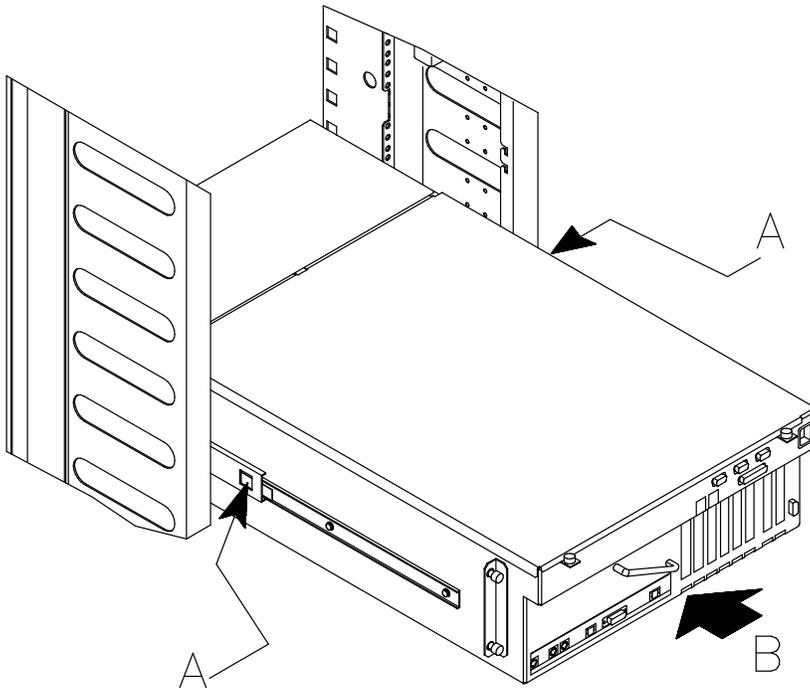
2. Using the handle at the rear of the drawer, slide the drawer out until it is well locked.



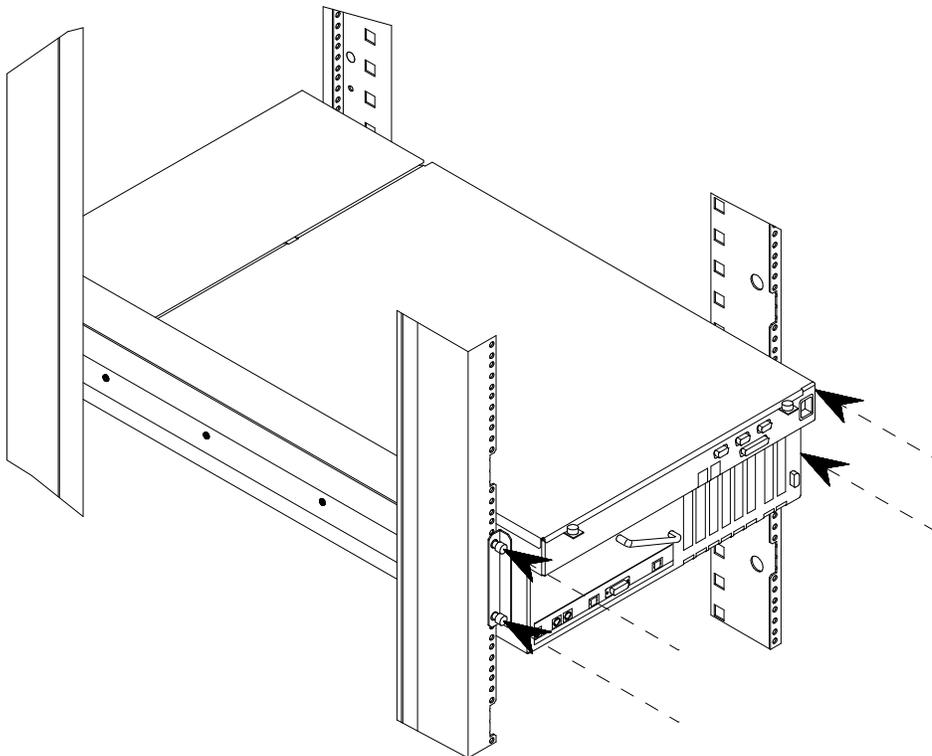
Note: In case cables connected to the drawer make the drawer sliding operation difficult, record which connector attaches to which cable and disconnect the cables.

Installation

1. Unlock the drawer telescopic rails, pushing simultaneously the metal tongues at sides of the drawer (as indicated at A) and firmly push the drawer inside the rack, using the handle, until it is well seated (as indicated at B).



2. Accessing the drawer from the rear, tighten the retaining screws, securing the drawer to the chassis.

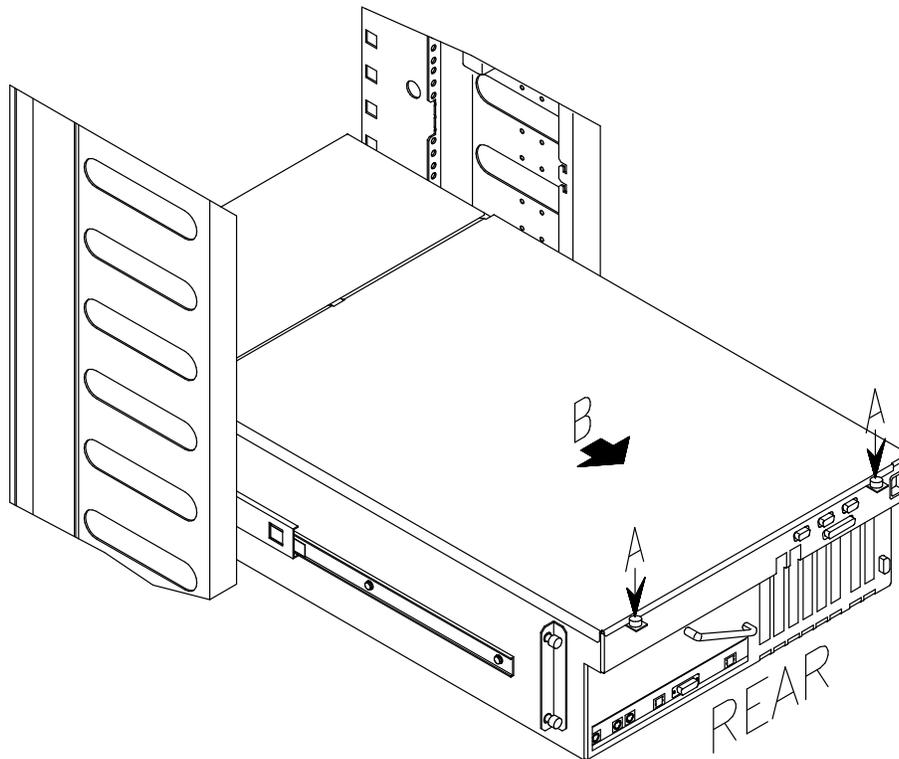


Drawer Top Cover

Note: These procedures apply both to the CPU drawer and to the PCI expansion drawer. The figures show the CPU drawer, as an example.

Removal

1. Loosen the retaining screws located on the rear of the drawer top cover (as indicated at A).
2. Remove the drawer top cover sliding it towards you (as indicated at B).



Installation

1. Accessing the system from the rear, hook the retaining bracket on the top cover with the corresponding retainer on the drawer.
2. Tighten clockwise the retaining screws located on the drawer top cover.

Restart Operations

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

CAUTION:

For proper cooling and safe operation of the system, all the covers must be in place before you power up the system.

1. Restore the KBR-KXB and RS-485 cable connectors, if any.
2. Connect any other external cables to the drawer(s) rear.
3. Plug the drawer(s) power cord to the dedicated receptacle at the drawer(s) rear.

Warning: Do not connect the CPU drawer and the PCI expansion drawer to a power source other than the PDU.

4. Switch on the circuit-breaker of the PDU outlet(s) where the drawer(s) are connected.
5. Make sure the power switches for all the external devices and drawers connected to the system, if any, are set to ON.
6. Power on the system by turning the Key Mode Switch of the CPU drawer to the Normal or Service position (use the Service position, if you want to enter the Operating System diagnostic mode).

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). Refer to your Operating System documentation.

Devices

Note: The upgrading and removal procedures apply to devices in the CPU drawer and in the PCI expansion drawer.

- Device Upgrading
- Device Removal
- Device Hot Swapping

Device Upgrading

- Media Drive Upgrading
- Hard Disk Drive Upgrading

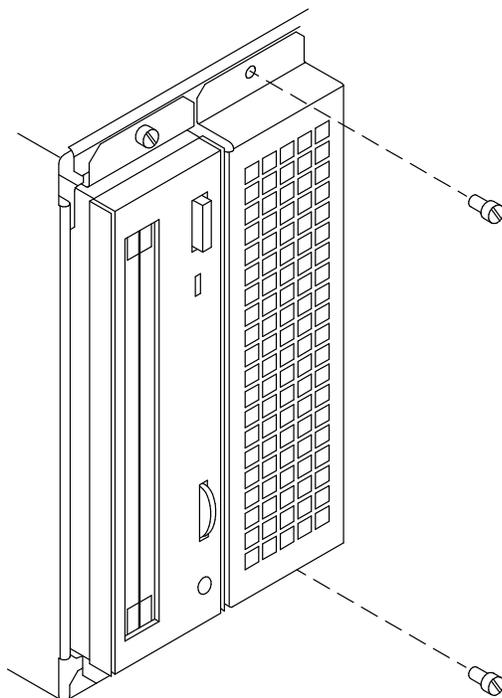
Media Drive Upgrading

Warning: Before handling any device, be sure you know the configuration rules described in the *Configuring the System* manual.

1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel and connector (for details, if needed, see **How to Handle Hardware Components**, on page 4-3).

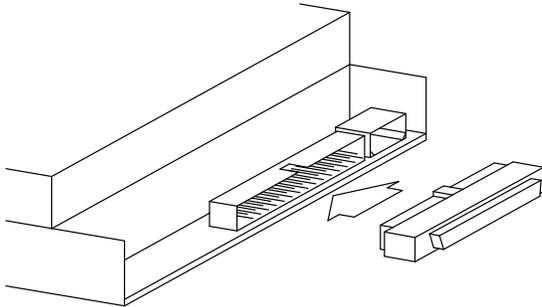
Note: The figures in this section illustrate a CD-ROM device. The procedures apply to any media drive model. In particular, all media drives must be installed with the **same installation orientation** (the key on the SCSI connector, looking at the drive rear, must be positioned on the right side of the connector).

3. If you are installing a new media, access the drawer from the front and remove the metal blank from the designated slot by loosening the screws used to secure the blank to the chassis.

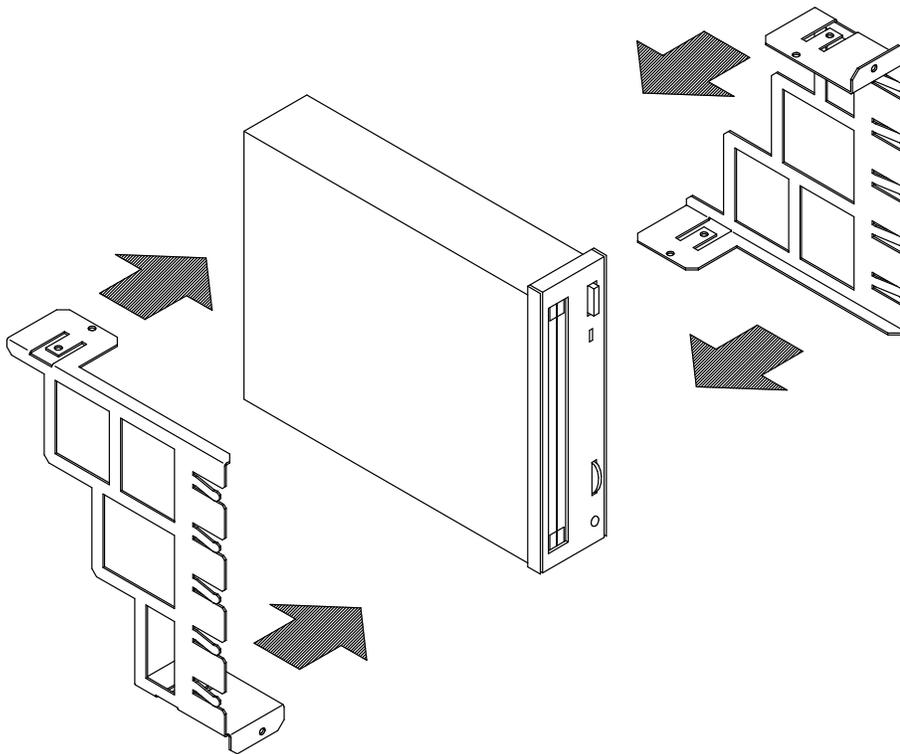


Warning: It is recommended to store the metal blank and screws for possible future re-installation.

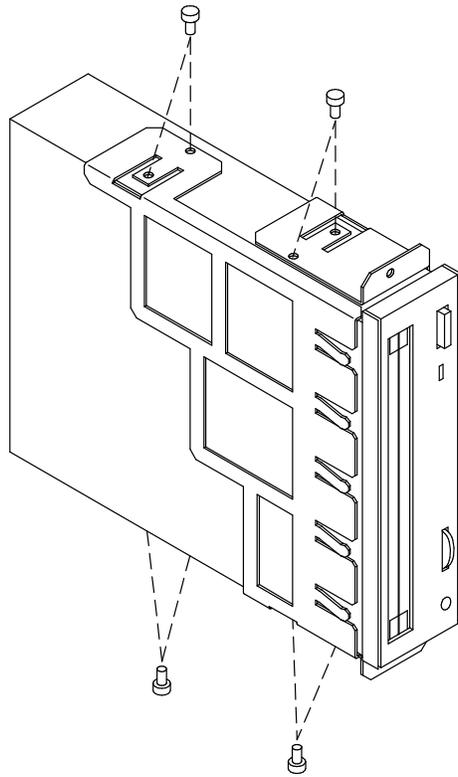
4. Set the SCSI-ID of the media drive according to **Media Drive SCSI-ID** rules, described in the *Configuring the System* manual.
5. Install the SCSI adapter on the SCSI connector of the media drive. This SCSI adapter is needed to adapt the SCSI connector of the media drive to the connector present on the SCSI cable.



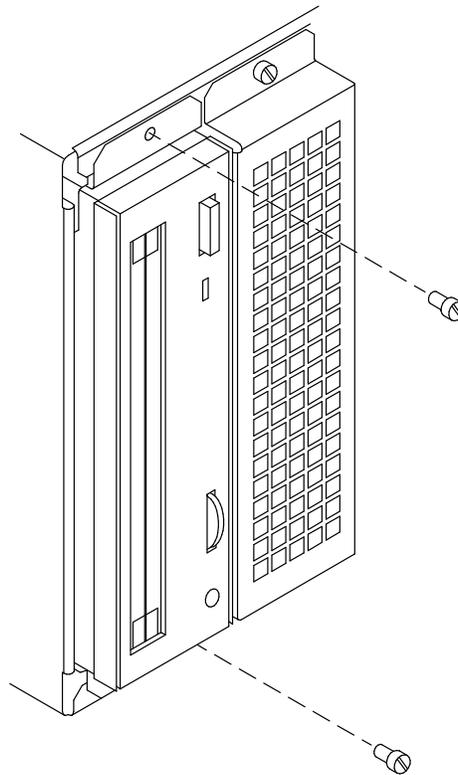
6. Assemble the media drive mounting kit at the sides of the media drive, as indicated in the figure.



7. Secure the mounting kit tightening the screws.



8. Align the device in the designated slot and then slide it inside the system. Secure then the media tightening the corresponding screws.



9. Perform all the steps described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.

10. If not already done, remove the top cover as described in **Drawer Top Cover, Removal**, on page 4-7.
11. Connect a connector of the split power cable and the SCSI cable to the media drive rear.
12. Re-install the top cover as described in **Drawer Top Cover, Installation**, on page 4-7.
13. Re-insert the drawer(s), as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.

CAUTION:

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

14. Perform the instructions described in **Restart Operations**, on page 4-8.
15. When the Operating System is up and running, check that the new device is recognized 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

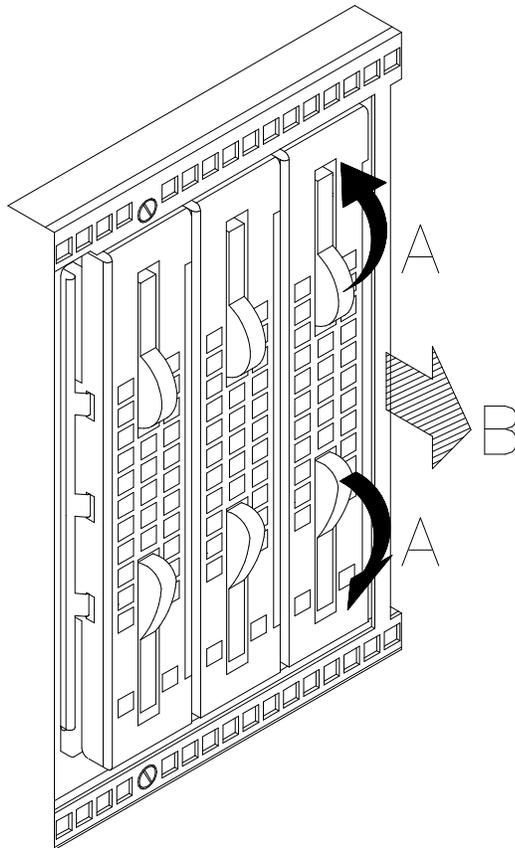
Add a Hard Disk Drive to a Disk Cage

Add a Disk Cage

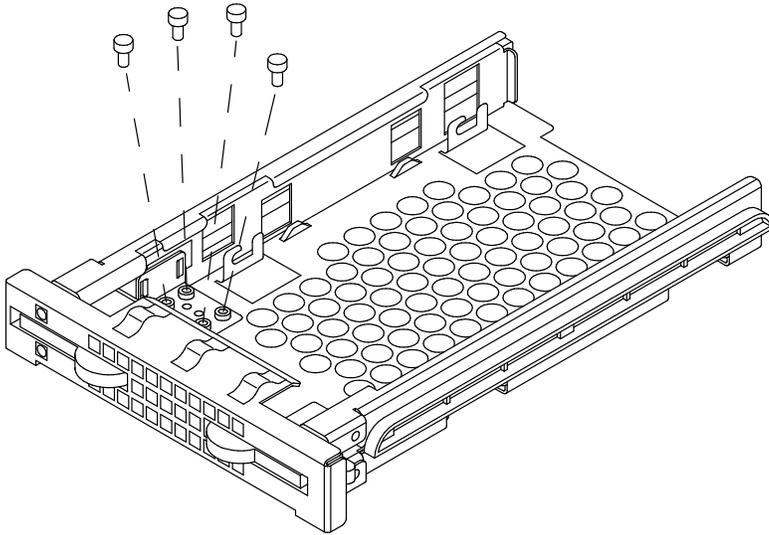
Add a Hard Disk Drive to a Disk Cage

Warning: Before handling any device, be sure you know the configuration rules described in the *Configuring the System* manual.

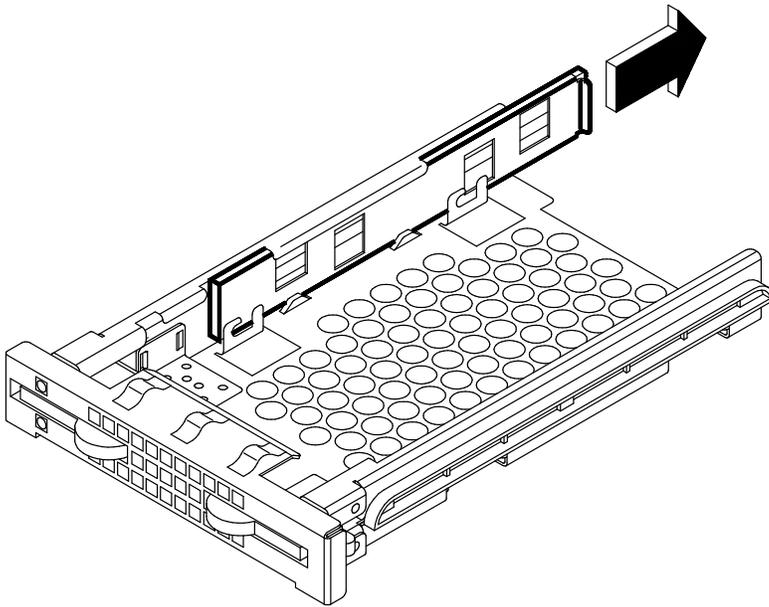
1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel and connector (for details, if needed, see **How to Handle Hardware Components**, on page 4-3).
3. Access the drawer from the front and release the disk carrier from the disk cage by opening the latches on the front side (A).
4. Remove the disk carrier from the disk cage (B). **It is recommended to lay it on a flat surface.**



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

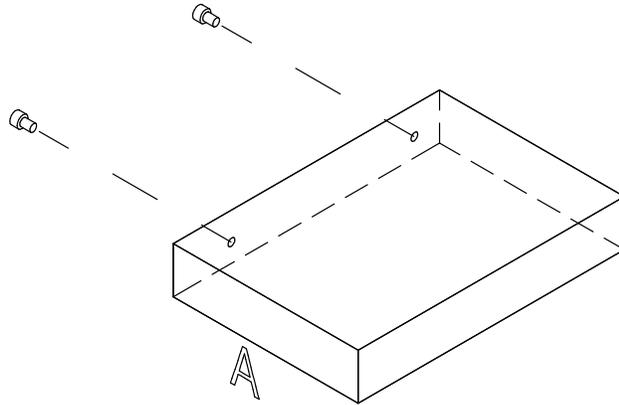


6. Grip the metal support of the light ducts and pull it out of the disk carrier.

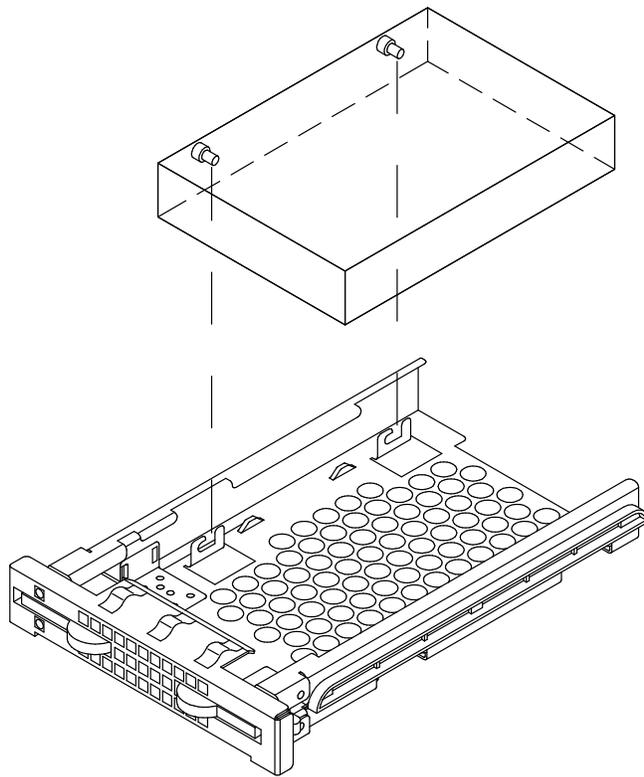


7. If you purchased the hard disk drive from a supplier other than your system supplier, be sure that the device itself has no SCSI-ID set, no SCSI terminator and no motor delay jumper. Refer to the documentation delivered with the device.

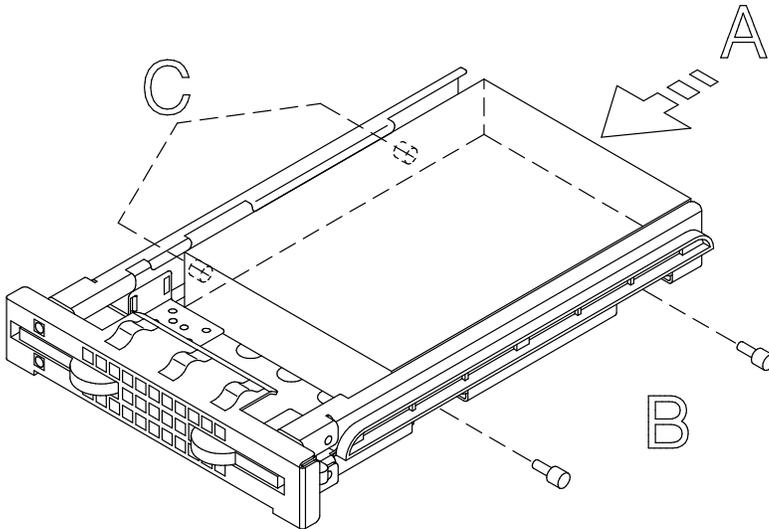
8. Insert two screws into the holes on the left side of the hard disk drive and screw them partially. In the illustration, the front side of the hard disk is identified by character **A** (the SCSI connector is on the opposite side).



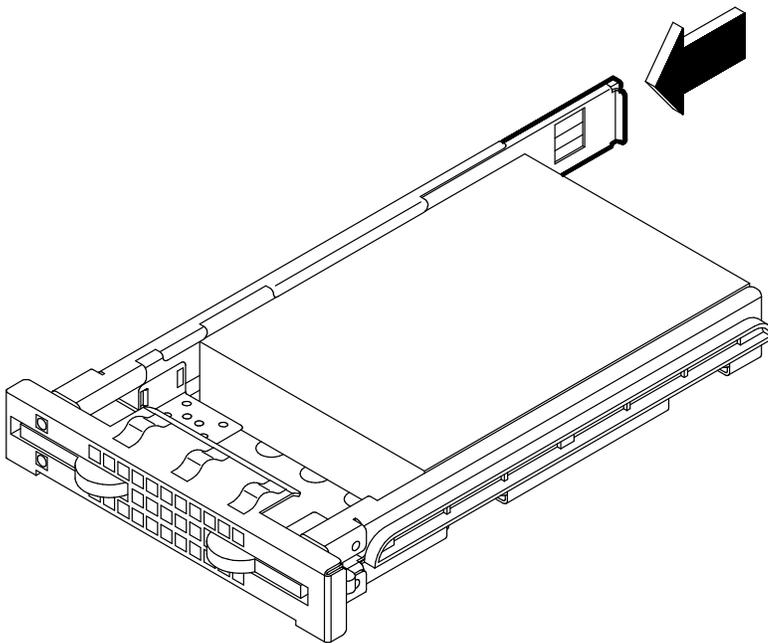
9. Slide the hard disk drive into the disk carrier making sure that the screw threads fit into the locking brackets of the disk carrier. The SCSI connector of the hard disk drive must be kept towards the rear of the disk carrier.



10. 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 side-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** in the *Configuring the System* manual, to know the SCSI-ID identification that the hard disk drive will acquire.
15. Perform the instructions described in **Restart Operations**, on page 4-8.
16. 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 CPU drawer and/or to the PCI expansion drawer 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 *CPU Drawer Service Guide* and/or the *PCI Expansion Drawer Service Guide* manual. Otherwise, call your Service Representative for assistance.

Device Removal

- Media Drive Removal
- Hard Disk Drive Removal

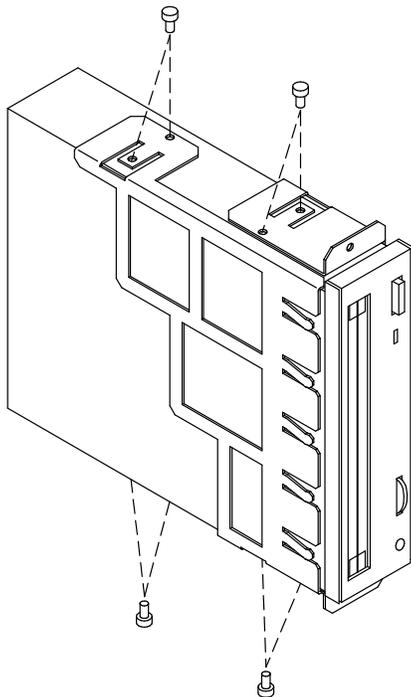
Media Drive Removal

Warning: Before handling any device, be sure you know the configuration rules described in the *Configuring the System* manual.

1. Before executing a system shutdown, check that the media drive does not contain any media.
2. Perform the instructions described in **Preliminary Operations**, on page 4-4.
3. Perform all the steps described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
4. Remove the top cover as described in **Drawer Top Cover, Removal**, on page 4-7.
5. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel and connector (for details, if needed, see **How to Handle Hardware Components**, on page 4-3).

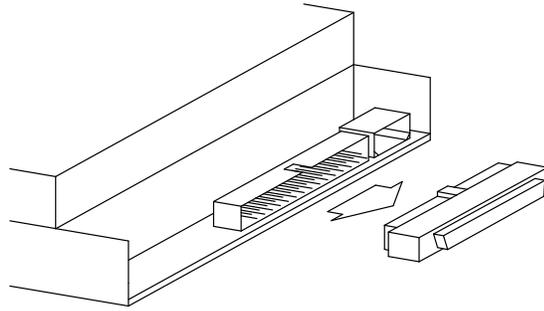
Note: The figures in this section illustrate a CD-ROM device. The procedures apply to any media drive model.

6. Access the drawer from the rear and disconnect the split power cable and the SCSI cable from the device rear.
7. Re-insert the drawer(s), as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.
8. Accessing the drawer(s) from the front, loosen the screws retaining the device.
9. Slide the media drive out of the slot.
10. Loosen the screws retaining the mounting kit and remove it from the media.



Warning: It is recommended to store the mounting kit for possible future re-installation.

11. Remove the SCSI adapter from the SCSI connector of the device.



Warning: It is recommended to store the SCSI adapter 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**, on page 4-9.

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

12. Store the removed device in an antistatic envelope.

13. Grip the metal blank by the edges and position it in the corresponding free slot.

CAUTION:

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

14. Secure the metal blank to the chassis by tightening its retaining screws.

15. Perform all the steps described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.

16. Re-install the top cover as described in **Drawer Top Cover, Installation**, on page 4-7.

17. Re-insert the drawer(s), as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.

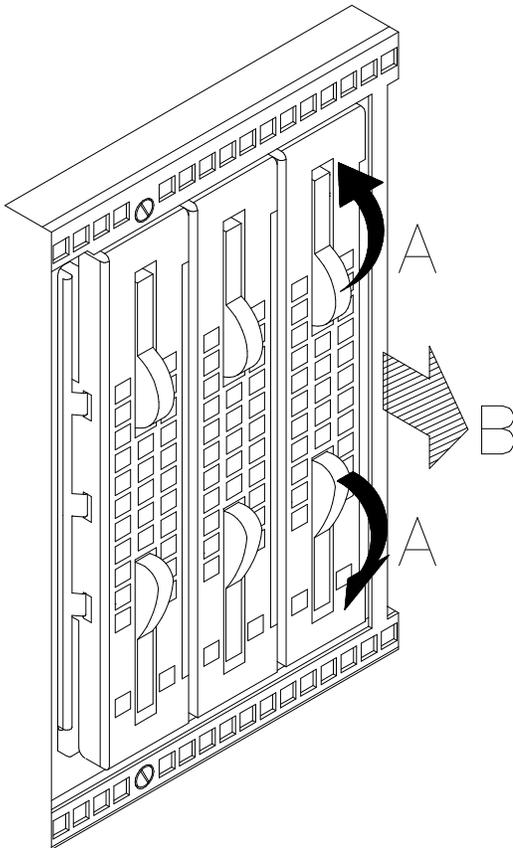
18. Perform the instructions described in **Restart Operations**, on page 4-8.

Hard Disk Drive Removal

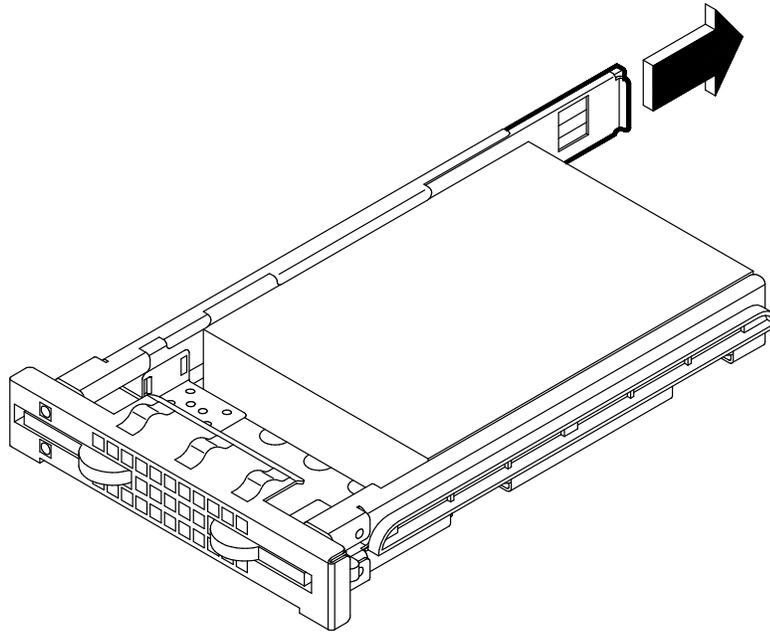
Warning: Before handling any device, be sure you know the configuration rules described in the *Configuring the System* manual.

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 4-24.

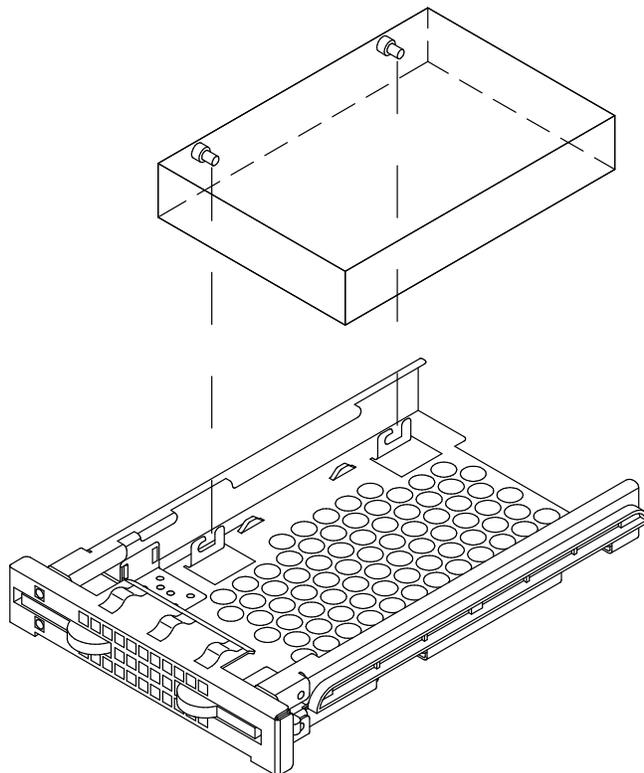
1. Before powering off the system, you may need to perform some software operations (e.g. unmount the file system(s) created on the hard disk). Refer to your Operating System documentation.
2. Perform the instructions described in **Preliminary Operations**, on page 4-4.
3. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel and connector (for details, if needed, see **How to Handle Hardware Components**, on page 4-3).
4. Access the drawer from the front and release the disk carrier from the disk cage by opening the latches on the front side (**A**). Slide it out of the disk cage (**B**) and lay it on a flat surface.



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

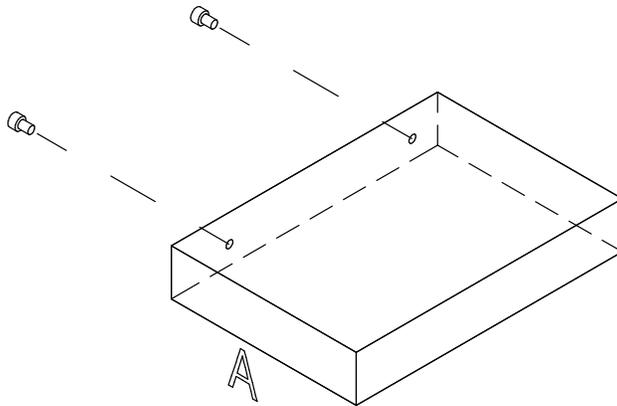


6. Unscrew the screws on the right side of the disk carrier and remove them.
7. Partially loosen the screws on the left side of the disk carrier.
8. Move the hard disk drive out of the locking brackets in the disk carrier and slide it out.



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

10. 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).

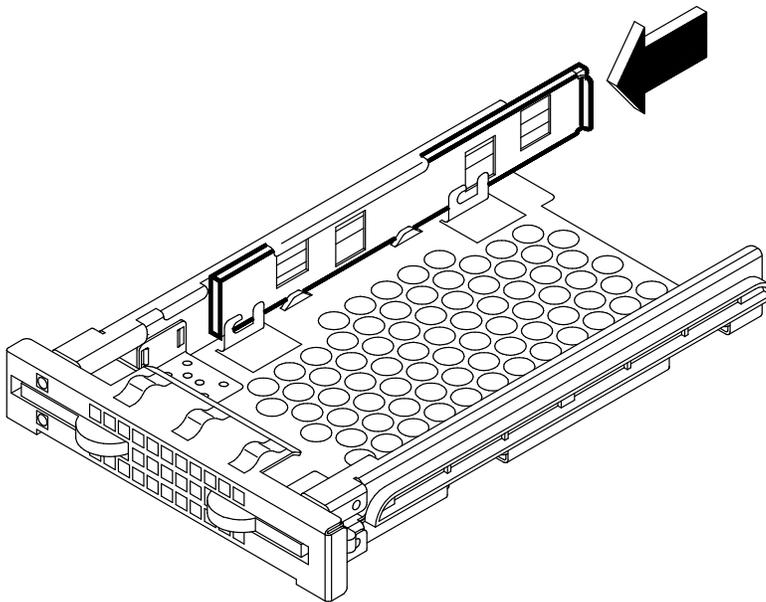


11. Store the removed device in an antistatic envelope.

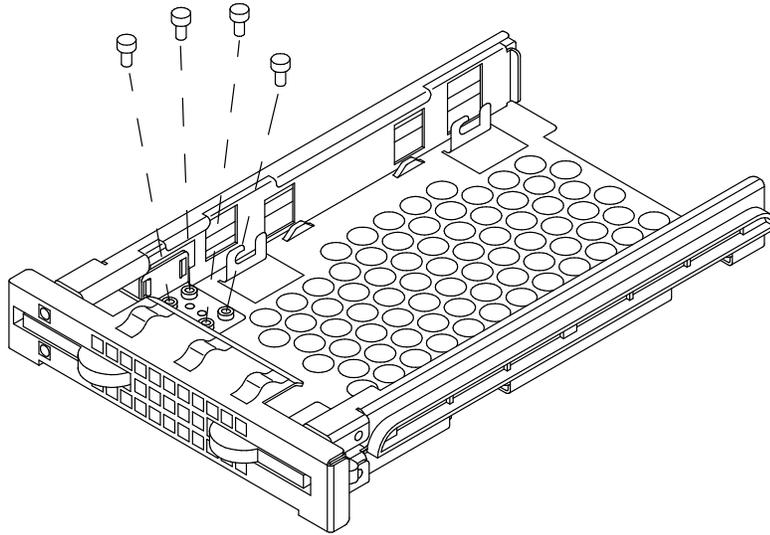
If you replace the hard disk drive with a new one, skip to **Add a Hard Disk Drive to a Disk Cage**, on page 4-13.

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

- 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.
- Perform the instructions described in **Restart Operations**, on page 4-8.

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 configuration rules described in the *Configuring the System* manual.

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 4.3 System Management Guide: Operating System and Devices* manual, in the *Logical Volumes* and *System Management Interface Tool* chapters.

3. Accessing the drawer from the front, identify the faulty hard disk drive through the green LED light off.
4. Physically remove the hard disk drive according to the instructions described in **Hard Disk Drive Removal**, on page 4-20.
5. Replace the hard disk drive with a new one according to the instructions described in **Hard Disk Drive Upgrading**, on page 4-13.
6. Configure the new hard disk drive through the *SMIT* program (*System Management* → *Devices* → *Add a Disk*) and restore the original device configuration.
7. Check the green LED is on; this means that the swapping procedure is successfully completed.

Hot Swapping under RAID Configuration

Warning: Before handling any device, be sure you know the configuration rules described in the *Configuring the System* manual.

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

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

1. Accessing the drawer from the front, identify the faulty hard disk drive through the amber LED light on and steady.
2. Physically remove the hard disk drive according to the instructions described in **Hard Disk Drive Removal**, on page 4-20.
3. Replace the hard disk drive with a new one according to the instructions described in **Hard Disk Drive Upgrading**, on page 4-13.
4. 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.

5. Check that the amber LED light is off; this means that the swapping procedure is successfully completed and the RAID configuration is restored.

Controllers

Note: The upgrading and removal procedures apply to controllers in the CPU drawer and in the PCI expansion drawer.

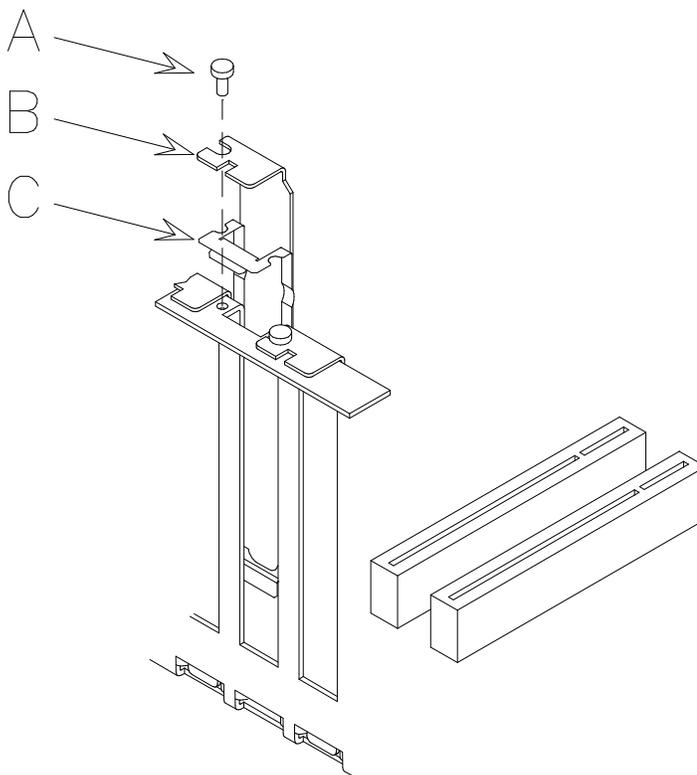
- Controller Installation**
- Controller Removal**
- SCSI Controller for Internal Devices**

Controller Installation

Warning: Before handling any controller card, be sure you know the configuration rules described in the *Configuring the System* manual.

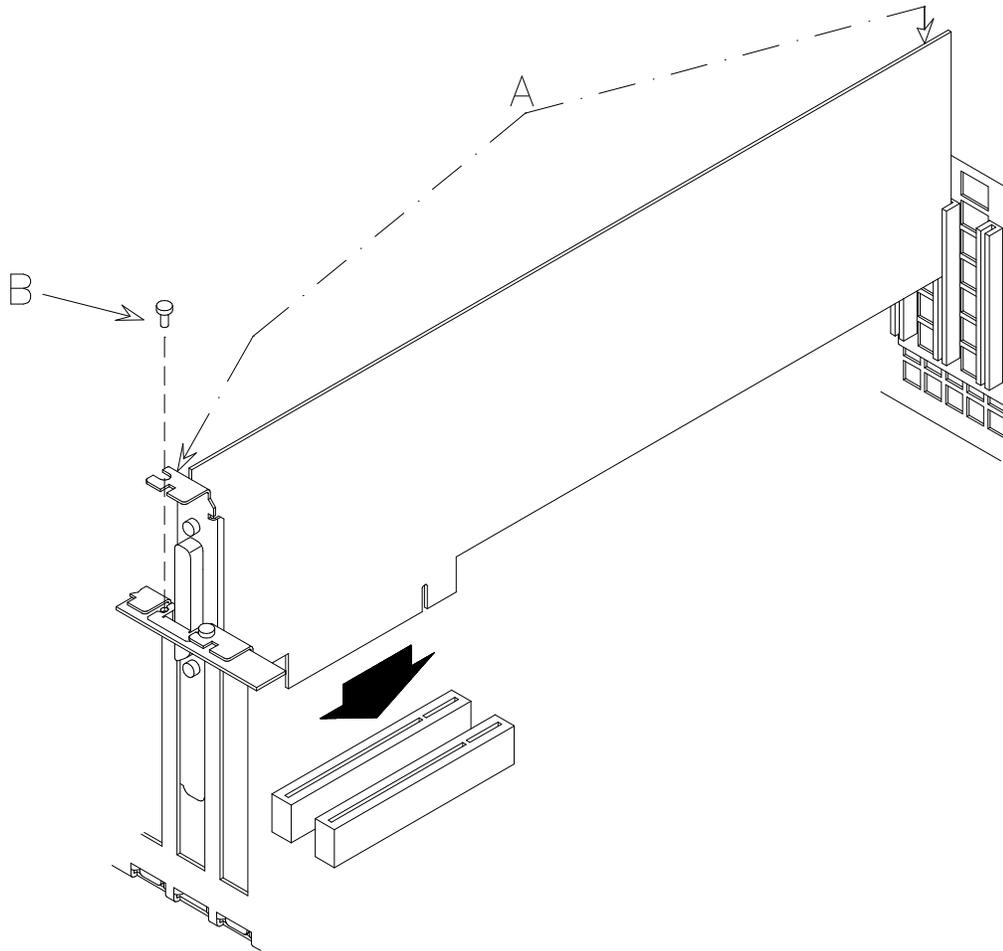
1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Extract the drawer(s), as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
3. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
4. Wear the 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 4-3).
5. Loosen the PCI/ISA slot cover retaining screw (A) of the designated controller card slot and slide it.

Warning: While removing the PCI/ISA slot cover (B), the spring (C) may shift. Re-install it, making sure it is well seated.



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

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 upper edges (A).
8. Align and slide the controller card into the designated controller card connector as indicated in the figure.
9. Firmly push the controller card until its finger connector is plugged in securely.
10. Secure the controller card in the slot by tightening clockwise its retaining screw (B).



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 4-30.

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

12. Re-install the top cover, as described in [Drawer Top Cover, Installation](#), on page 4-7.
13. Re-install the drawer(s), as described in [Partial Removal / Installation of the Drawer, Installation](#), on page 4-6.
14. Perform the instructions described in [Restart Operations](#), on page 4-8.
15. 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.

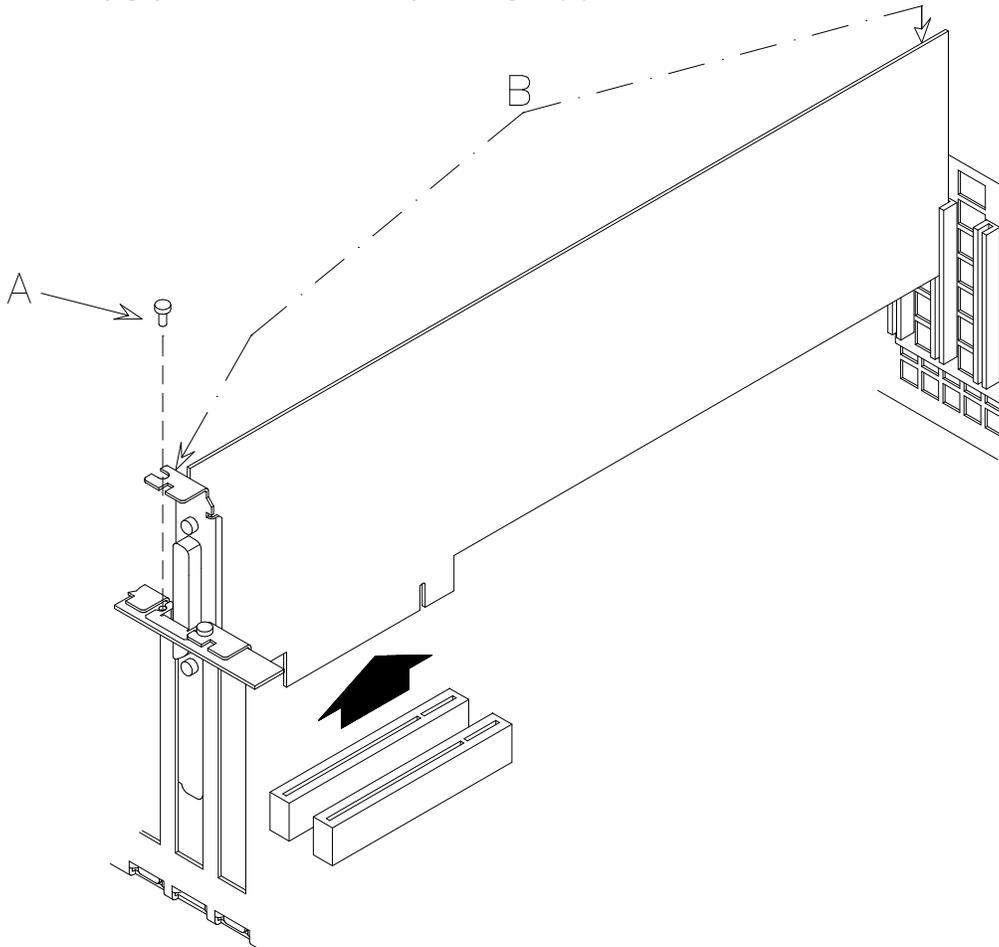
Controller Removal

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. Power off the system and perform the instructions described in **Preliminary Operations**, on page 4-4.
3. Extract the drawer(s), as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
4. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
5. 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 4-3).
6. 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 4-30.

7. Loosen the retaining screw used to lock the controller card (A).
8. Firmly grip the controller card by the edges (B) and slide it out of the slot.

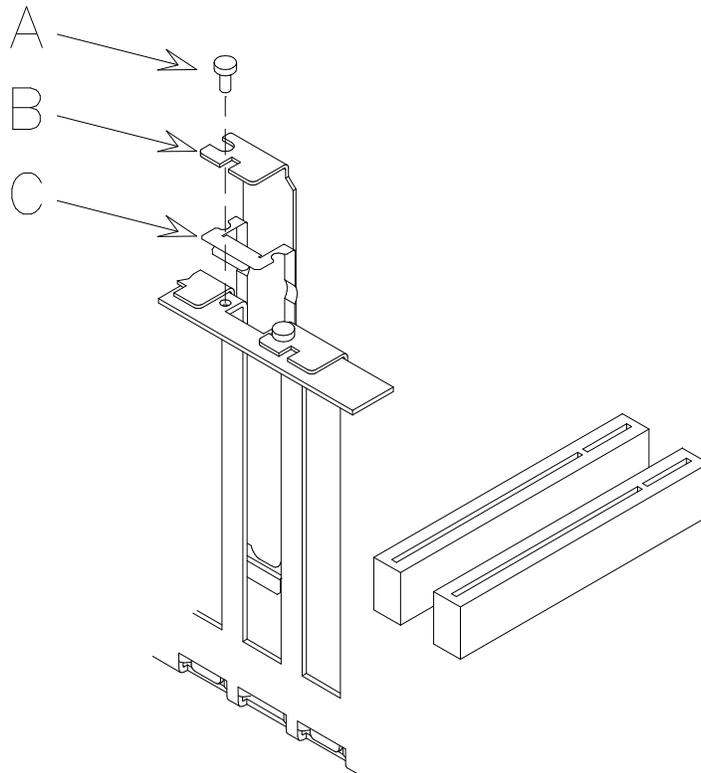


9. Store the removed controller card in an antistatic envelope.

If the controller card just removed will be replaced with another one, skip to the **Controller Installation**, on page 4-26, otherwise continue with the following steps.

Warning: While removing the controller card, the spring (C) may shift. Re-install it, making sure it is well seated.

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



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

11. Re-install the top cover, as described in **Drawer Top Cover, Installation**, on page 4-7.

12. Re-install the drawer(s), as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.

13. Perform the instructions described in **Restart Operations**, on page 4-8.

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**, on page 4-26, you need to use the internal controller cable(s) to connect the internal connector(s) of the controller to a disk cage. This operation requires an overall knowledge of the system SCSI configuration.

If you are doing this operation on your own, you can find some SCSI connection examples in the *Configuring the System* manual. Otherwise, call your Service Representative for assistance.

The same applies to the SCSI controller removal.

Memory

Note: The upgrading and removal procedures apply to memory banks in the CPU drawer.

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.

- Memory Upgrading on System Planar**

- You have a memory bank plugged directly on the System Planar and you want to add other memory banks.

- Memory Upgrading on Memory Risers**

- You have memory risers already installed and you want to add memory banks.

- Adding a Memory Bank on Memory Risers**

Warning: Before handling any memory bank, be sure you know the configuration rules described in the *Configuring the System* manual.

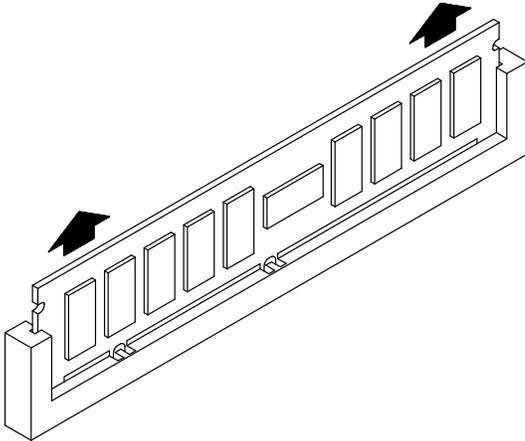
Memory Upgrading on System Planar

1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Extract the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
3. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
4. 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 4-3).

Warning: The keys of the memory connectors (0 - 1) are reversed with respect to the keys of the memory connectors (2 - 3).

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

1. Grip one memory DIMM and firmly pull it out of the memory connector.



2. Repeat the steps for each of the 4 memory DIMM's.
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 vertically 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. Be sure that the finger connector of the memory DIMM is completely inserted in the memory connector.
3. Repeat the steps for each of the 4 memory DIMM's.

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

1. Re-install the top cover, as described in **Drawer Top Cover, Installation**, on page 4-7.
2. Re-install the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.
3. Perform the instructions described in **Restart Operations**, on page 4-8.
4. When the Operating System is up and running, check that the system memory configuration is updated.

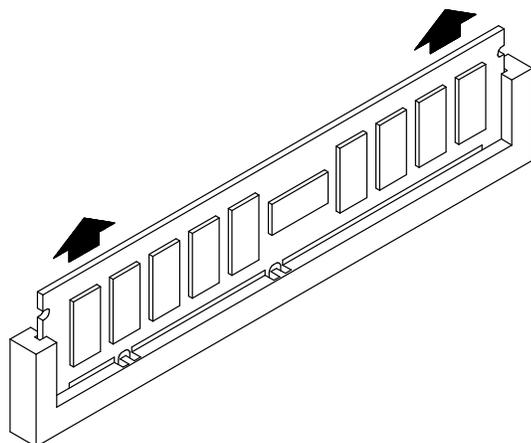
If not, check that the memory DIMM's are well installed and that you did not break any of the memory configuration rules described in the *Configuring the System* manual. If the problem persists, refer to the *Maintenance Guide* manual for memory test execution or call your Service Representative for assistance.

Memory Upgrading on Memory Risers

1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Extract the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
3. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
4. 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 4-3).

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

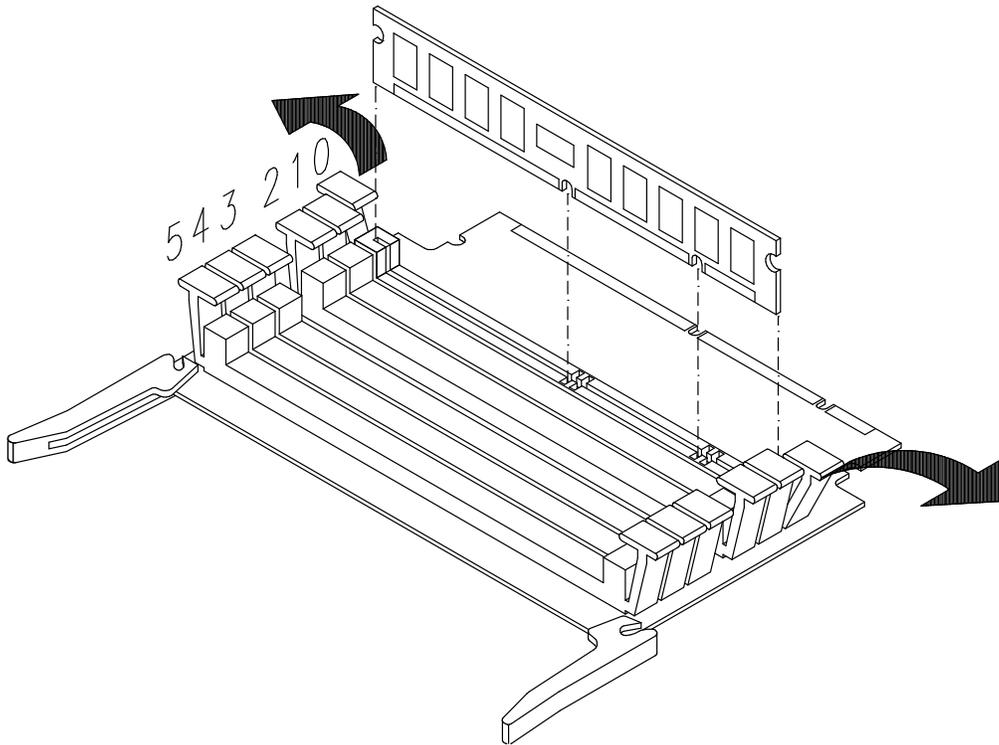
1. Grip one memory DIMM and firmly pull it out of the memory connector.



2. Repeat the steps for each of the 4 memory DIMM's.
3. Store the removed memory DIMM's in an antistatic envelope.

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

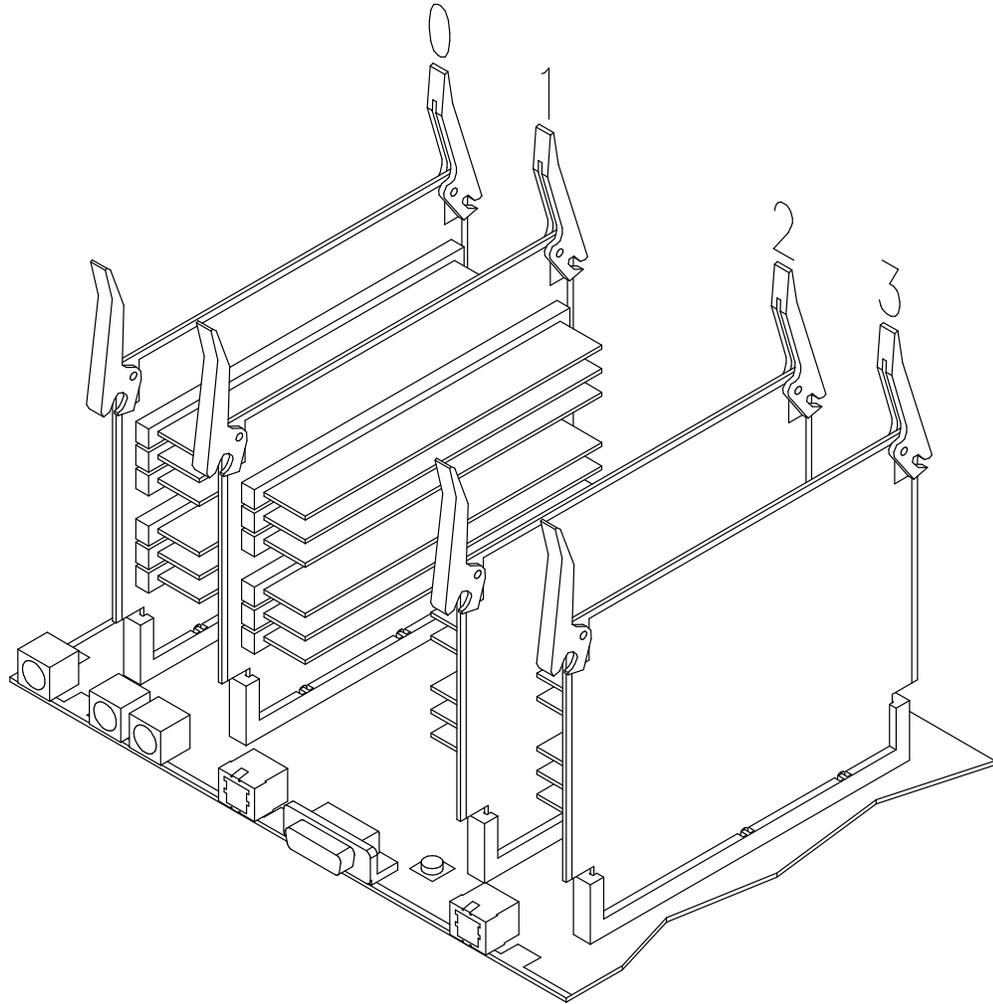
1. Grip a memory riser by the hooked clips and lay it down on an antistatic envelope until all operations on it are concluded.
2. Open the little levers at side of the memory DIMM connector.



3. 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.**
4. Firmly push the memory DIMM down until it is seated into the memory DIMM connector and the two levers automatically close.
5. Make sure that all the little levers of the memory riser are well closed, in particular the ones that are left empty.
6. Repeat the steps for each of the 4 memory risers.

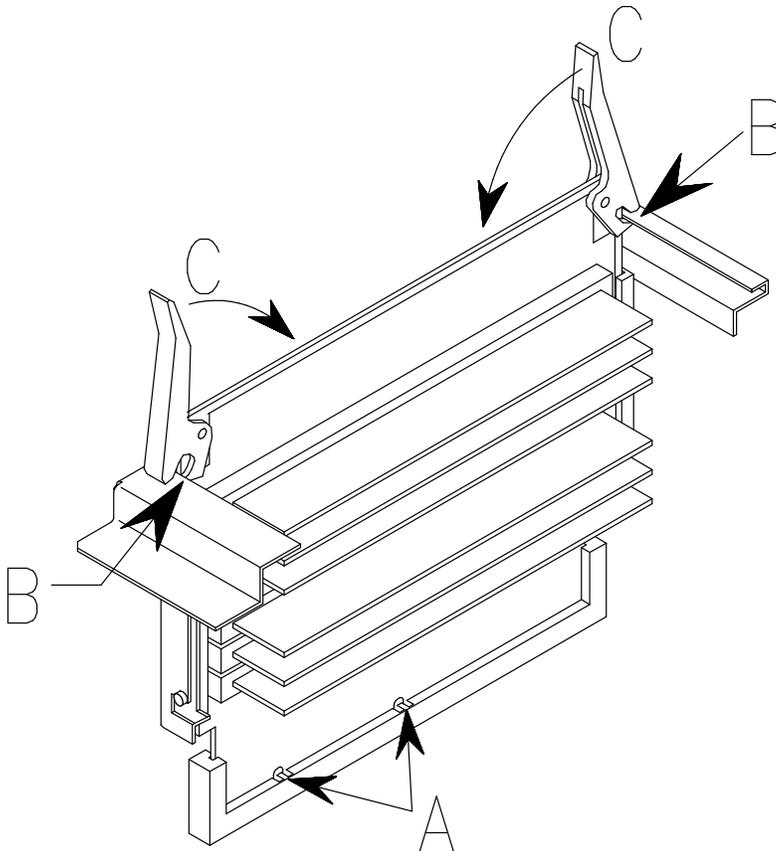
3rd step: Memory risers installation

Note: The memory risers must be installed on the System Planar as shown in the figure.



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, **making sure that the two keys on the memory riser fit the two keys on the System Planar (A)**.
3. Tilt the hooked clips until these are anchored to the metallic frame and push the memory riser until the finger connector is firmly seated into the memory connector on the System Planar (B).
4. Push the hooked clips (C).



5. Repeat the steps for each of the 4 memory risers.

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

1. Re-install the top cover, as described in **Drawer Top Cover, Installation**, on page 4-7.
2. Re-install the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.
3. Perform the instructions described in **Restart Operations**, on page 4-8.
4. When the Operating System is up and running, check that the system memory configuration is updated.

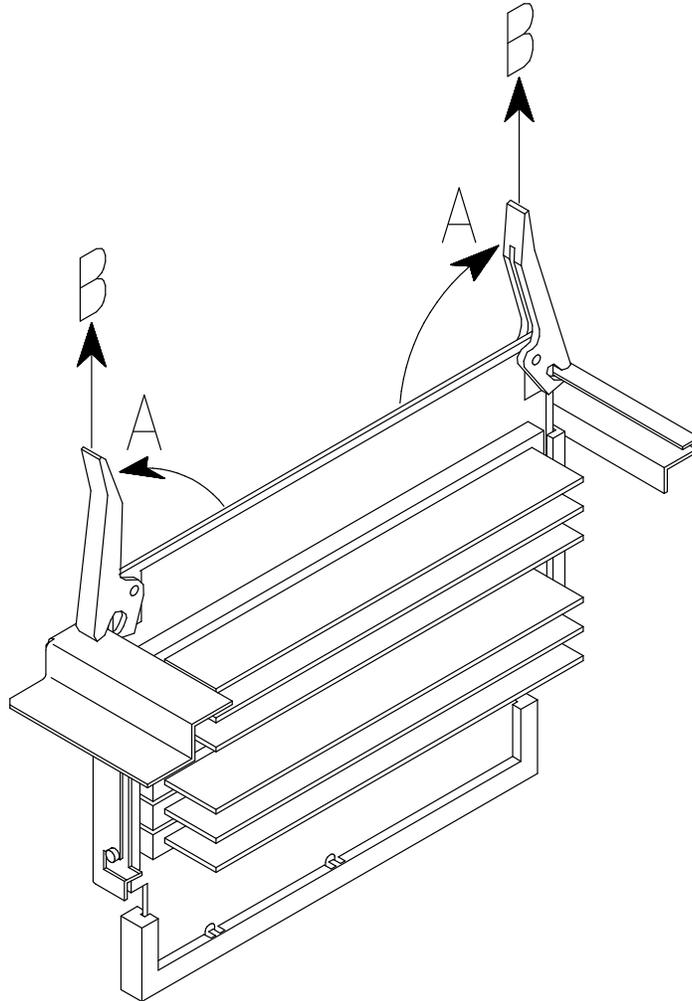
If not, check that the memory DIMM's are well installed and that you did not break any of the memory configuration rules described in the *Configuring the System* manual. If the problem persists, refer to the *Maintenance Guide* manual for memory test execution or call your Service Representative for assistance.

Adding a Memory Bank on Memory Risers

1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Extract the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
3. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
4. 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 4-3).

1st step: Memory risers removal

1. Opening the hooked clips of the memory riser (A), unplug one memory riser and slide it out of the metallic frame (B).

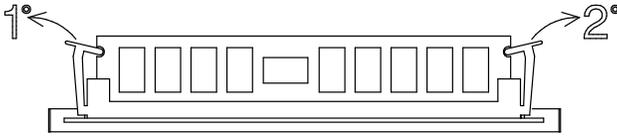


2. Lay it down on an antistatic envelope until all operations on it are concluded.
3. Repeat the steps for each of the 4 memory risers.

If you need to reorganize the memory bank configuration according to the **Configuration Rules**, described in the *Configuring the System* manual, you may need to remove the memory bank(s) already installed, following the instructions below; if this is not the case, skip to the **Installation of a memory bank on memory risers** step, on page 4-38.

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

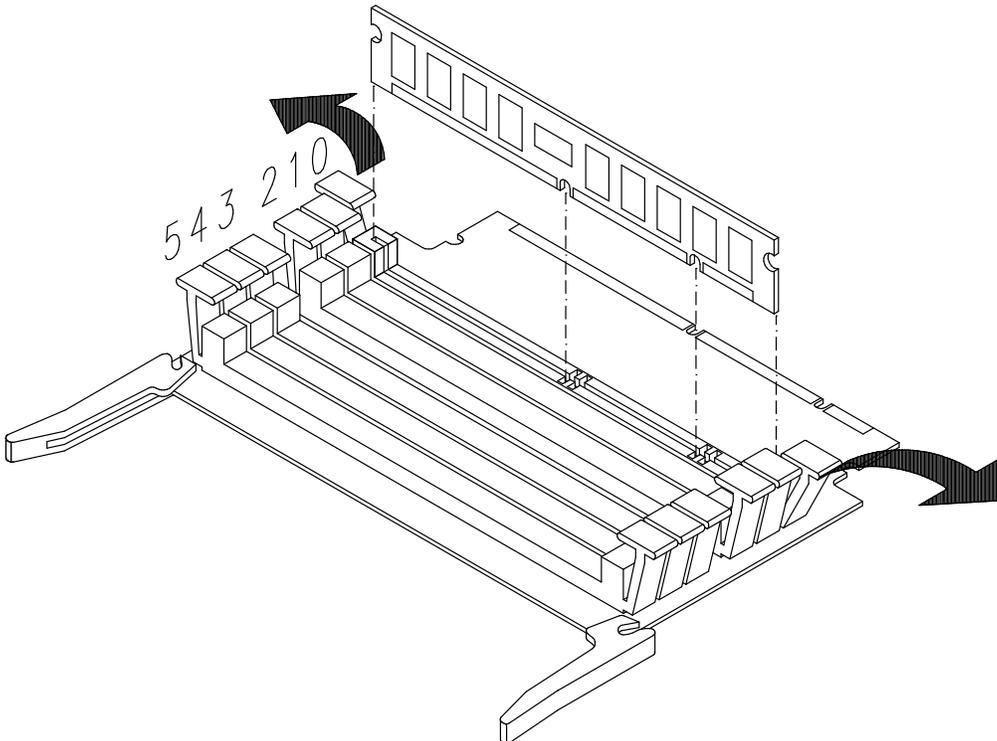
1. Open by pressing, one a time, the little levers at the sides of the memory DIMM connector.



2. Grip the memory DIMM by the edges and firmly pull it out of the memory riser.
3. Repeat the steps for each of the 4 memory DIMM's (one per memory riser).
4. 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

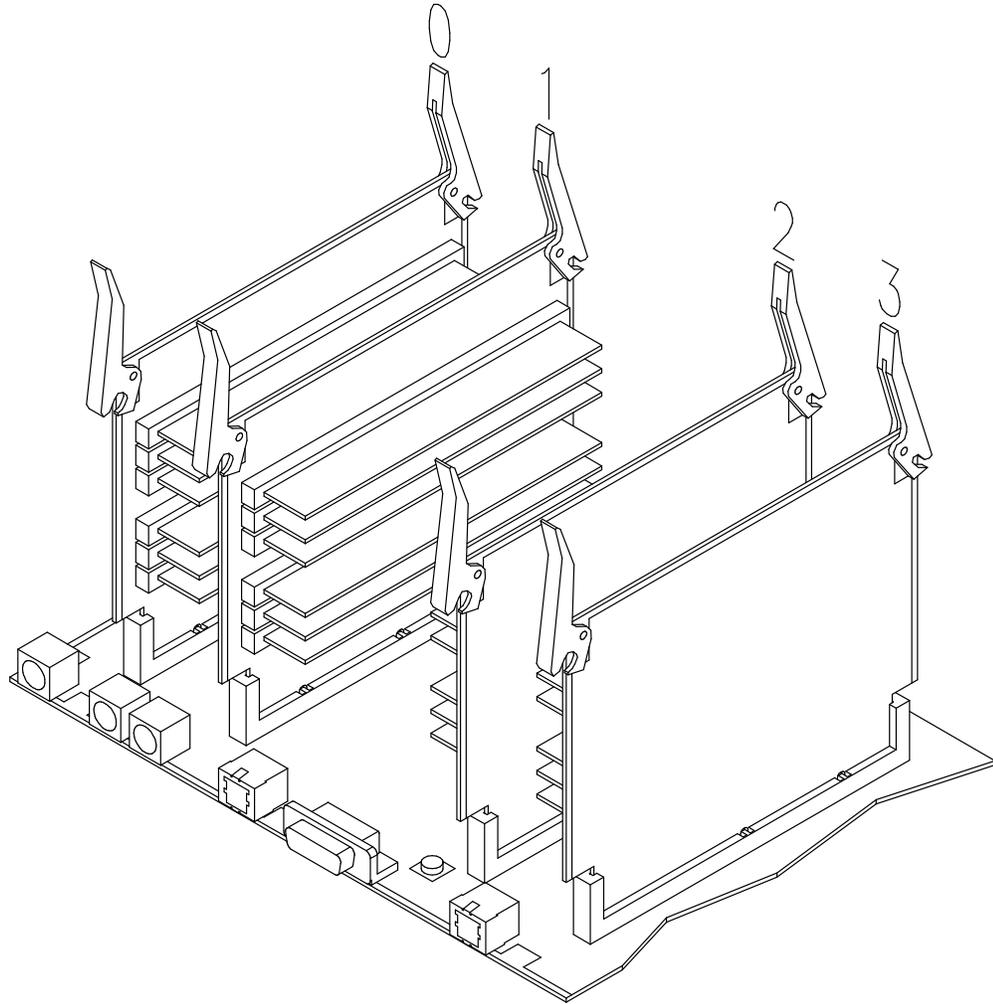
1. Open the little levers at the sides of the memory DIMM connector.



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 two levers automatically close.
4. Make sure that all the little levers of the memory riser are well closed, in particular the ones that are left empty.
5. Repeat the steps for each of the 4 memory DIMM's (one per memory riser).

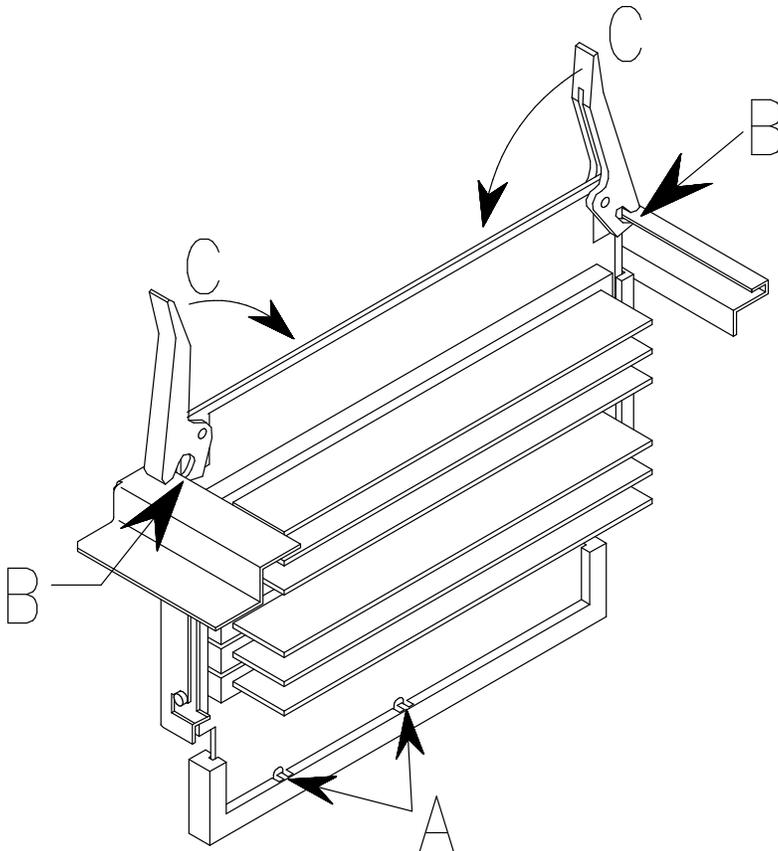
4th step: Memory risers installation

Note: The memory risers must be installed on the System Planar as shown in the figure.



1. Open outward the two hooked clips of the memory riser.

2. Grip the memory riser by the hooked clips and align it with the designated memory connector on the System Planar, **making sure that the two keys on the memory riser fit the two keys on the System Planar (A)**.
3. Tilt the hooked clips until these are anchored to the metallic frame and push the memory riser until the finger connector is firmly seated into the memory connector on the System Planar (B).
4. Push the hooked clips (C).



5. Repeat the steps for each of the 4 memory risers.

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

1. Re-install the top cover, as described in **Drawer Top Cover, Installation**, on page 4-7.
2. Re-install the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.
3. Perform the instructions described in **Restart Operations**, on page 4-8.
4. 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 memory configuration rules described in the *Configuring the System* manual. If the problem persists, refer to the *Maintenance Guide* manual for memory test execution or call your Service Representative for assistance.

CPU's

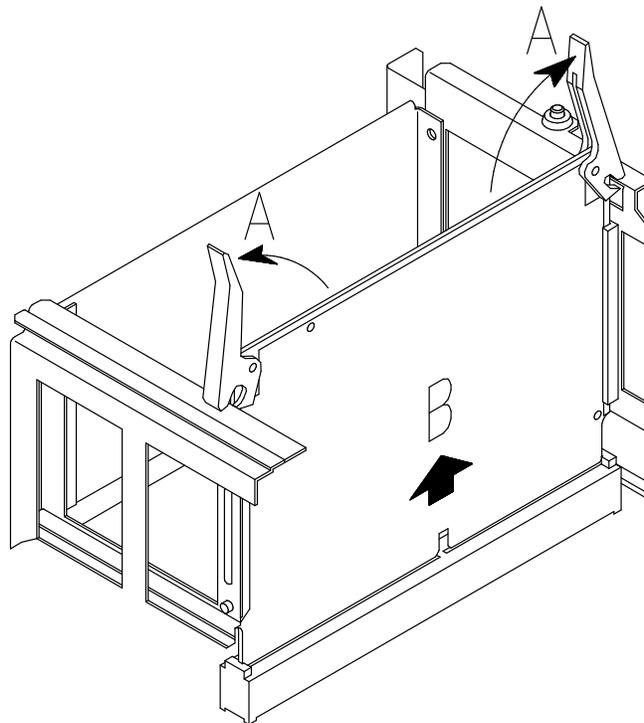
Note: The upgrading and removal procedures apply to CPU cards in the CPU drawer.

- CPU Removal
- CPU Upgrading

CPU Removal

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

1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Extract the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
3. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
4. 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 4-3).
5. Open the hooked clips of the CPU card to unlock it (A), unplug the CPU card and slide it out of the metallic frame (B).



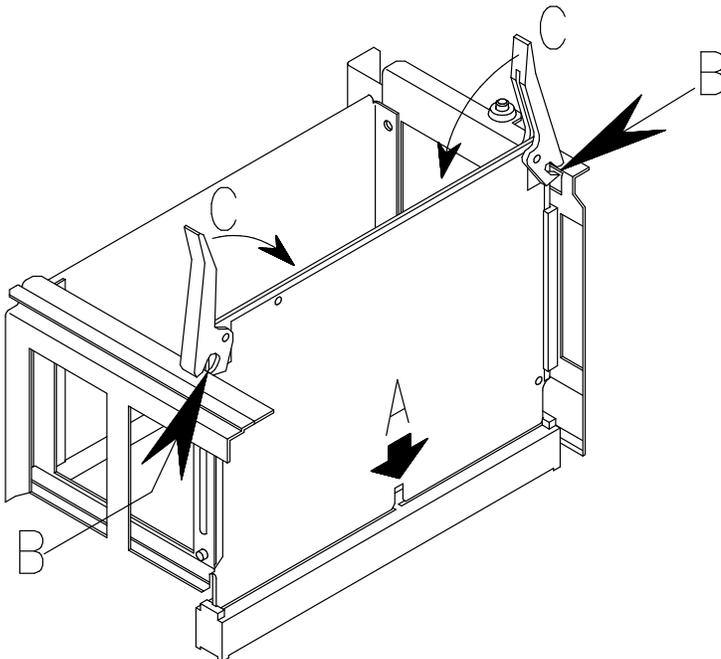
6. Store the removed CPU card in an antistatic envelope.
7. Re-install the top cover, as described in **Drawer Top Cover, Installation**, on page 4-7.
8. Re-install the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.
9. Perform the instructions described in **Restart Operations**, on page 4-8.

CPU Upgrading

Warning: Before handling any CPU card, be sure you know the configuration rules described in the *Configuring the System* manual.

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

1. Perform the instructions described in **Preliminary Operations**, on page 4-4.
2. Extract the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Partial Removal**, on page 4-5.
3. Remove the top cover, as described in **Drawer Top Cover, Removal**, on page 4-7.
4. 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 4-3).
5. Open outward the two hooked clips of the CPU card.
6. Grip the CPU card by the hooked clips and align it with the designated CPU card connector on the System Planar, **making sure that the key on the CPU card fit the key on the System Planar (A)**.
7. Tilt the hooked clips until these are anchored to the metallic frame (B) and push them (C).



8. Re-install the top cover, as described in **Drawer Top Cover, Installation**, on page 4-7.
9. Re-install the CPU drawer, as described in **Partial Removal / Installation of the Drawer, Installation**, on page 4-6.
10. Perform the instructions described in **Restart Operations**, on page 4-8.
11. 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 Guide* manual for CPU test execution or call your Service Representative for assistance.

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 drawer rear side.

ASCII: American Standard Code for Information Interchange.

AUI: Attachment Unit Interface.

B

bank: See memory bank.

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

DAS: Disk Array Subsystem. A RAID disk drawer, available in different models.

DC: Direct Current generated by the power supply.

DDS: Digital Data Storage.

device areas: See media and disk device areas.

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.

DPCI: Dual Port PCI host bridge.

DRAM: Dynamic Random Access Memory.

drawer: Each system or subsystem installed in a rack is a drawer. There are several types of drawers, such as CPU drawers, expansion drawers, DAS drawers.

E

ECMA: European Computer Manufacturers Association.

EEPROM: Electrically Erasable Programmable Read-Only Memory. An EPROM that can be reprogrammed while it is in the system.

EIA: Electronic Industries Association.

EMI: Electromagnetic Interference.

EPROM: Erasable Programmable Read-Only Memory.

ESD: Electrostatic Discharge. An undesirable discharge of static electricity that can damage equipment and degrade electrical circuitry.

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.

FEPRM: Flash Erasable Programmable Read-Only Memory. An EPROM containing the system firmware.

firmware: 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.

Forth: The Open Firmware based language interpreter.

FW: Firmware. See firmware.

G

GUI: Graphical User Interface.

H

high availability: A particular configuration which shares resources between two CPU drawers, so that if one CPU drawer fails, the other one takes the control without interrupting any activity.

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

I

I2C: Inter Integrated Circuit.

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

IEC: International Electrotechnical Commission.

I/O: Input/Output.

ISA: Industry Standard Architecture (Bus).

J

JBOD: Just a Bunch Of Disks.

K

KBB: It is a card that provides three RS-232 lines and one parallel line. It is also connected to the KSB card by means of a dedicated flat cable.

KBR: A card dedicated to the connection of a PCI expansion drawer.

KDD: A card installed in the PCI expansion drawer and interconnecting all the expansion drawer resources. It manages also the input and output RS-485 connection between the CPU drawer and the PCI expansion drawer.

KDK Complex: It is composed by the KDK card and two flat cables connected to it. Its main functionality is to define the hard disk drive SCSI-ID.

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

KHS: An optional card to be installed in presence of a RAID configuration. It interfaces the RAID controller card.

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.

KPE: The planar hosting the PCI controllers in the PCI expansion drawer. Up to two KPE planars can be installed in each PCI expansion drawer.

KPL: See System Planar.

KPS: See Power Supply.

KSB: It is a card housing the BUMP logic. Also, it holds two dedicated connectors which interconnect the KSB card to the KBB card and to the KHS card, if this is installed.

KXB: A card installed in the PCI expansion drawer, dedicated to the connection to the CPU drawer.

L

LAN: Local Area Network.

LED: Light-Emitting Diode.

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 four memory DIMM's. See also DIMM and riser.

MFG: Manufacturing.

MP: MultiProcessor.

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: See Open Firmware.

OP: 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.

Operator Panel: The system panel where the 3-Digit Hexadecimal Display, two LEDs and the Reset button are located.

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

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.

PDU: Power Distribution Unit. The rack power distribution system for the installed drawers.

PowerPC: A standard RISC microprocessor family.

Power Supply: The CPU drawer and the PCI expansion drawer are equipped with one power supply module. See Redundant Power Supply.

PPI: Parallel Port Interface.

Q

No entries.

R

rack: The metallic frame which houses the drawers and provides them power through its Power Distribution Unit (PDU).

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

RAM: Random Access Memory.

Redundant Power Supply: The power supply composed by two modules in redundant configuration. They are the same and work in parallel. In case of a power supply fault, the second module takes over automatically providing the needed power.

riser (SRC): A card which can host up to six memory DIMM's. It is used to expand the system memory capacity.

RMS: Recovery Management Support.

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: A line for drawer interconnection. It is used for the connection of expansion drawers.

RSF: Remote Services Facilities.

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.

SID: System Identifier.

slot cover: A metallic plate that covers free PCI/ISA controller card slots.

SRC: Six-DIMM Riser Card.

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 (KPL): The planar which interconnects all the system resources.

SVGA: Super Video Graphics Array.

T

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

U

U: Unit. Racks and drawers are measured in Units. Each U corresponds to 44.45 mm (1.75 inches).

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.

VCCI: Voluntary Control Council for Interference.

VGA: Video Graphics Array.

W

No entries.

X

No entries.

Y

No entries.

Z

No entries.

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