Bull ESCALA EPC430 and EPC450

Setup Guide

System Description, Setup, Use, Standard Maintenance, Configuration and Upgrading

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Hardware

June 2000

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Trademarks and Acknowledgements

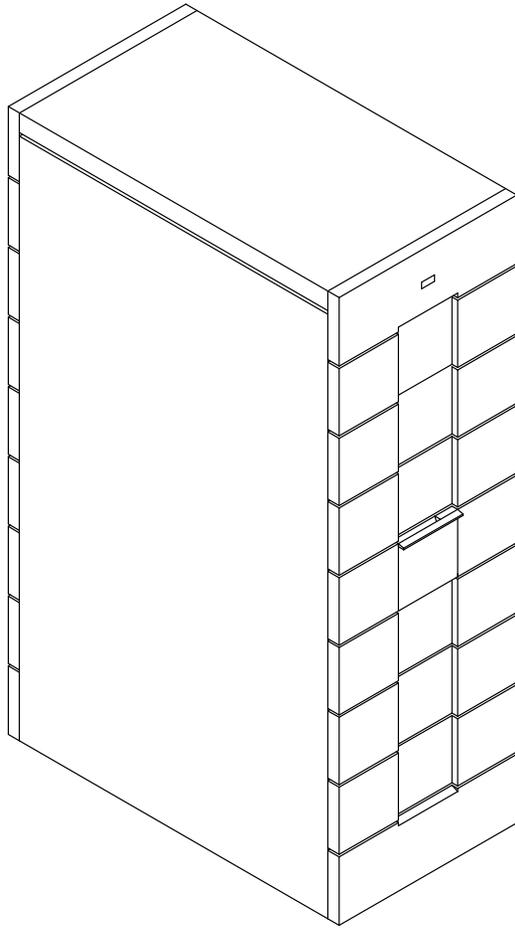We acknowledge the right of proprietors of trademarks mentioned in this book.

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Year 2000

The product documented in this manual is Year 2000 Ready.

System Setup Roadmap

1

ASCII terminal

RS-232

Serial printer

RS-485

Parallel printer

LAN 10/100 Mb/s

Mouse

Additional drawers

Keyboard

Graphic monitor

2

OK
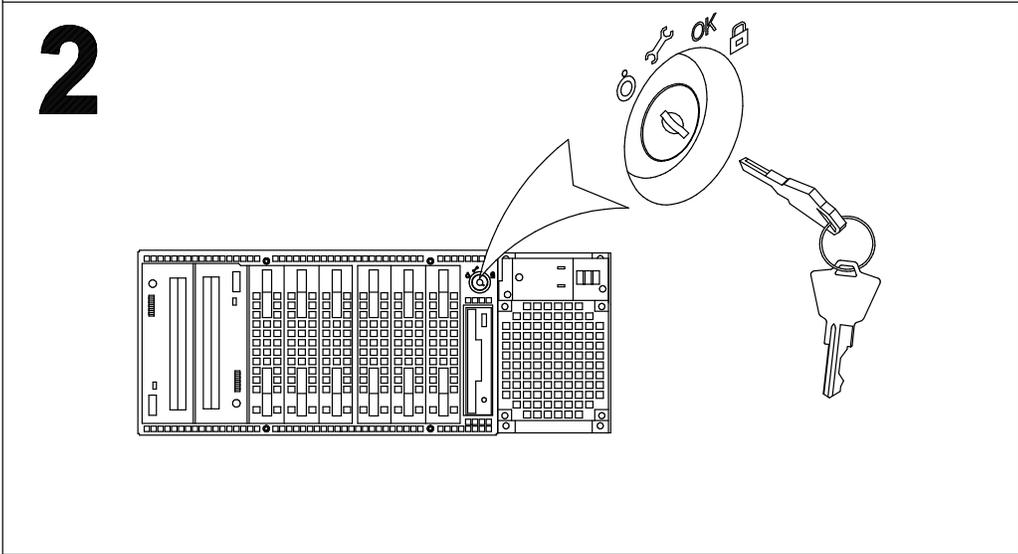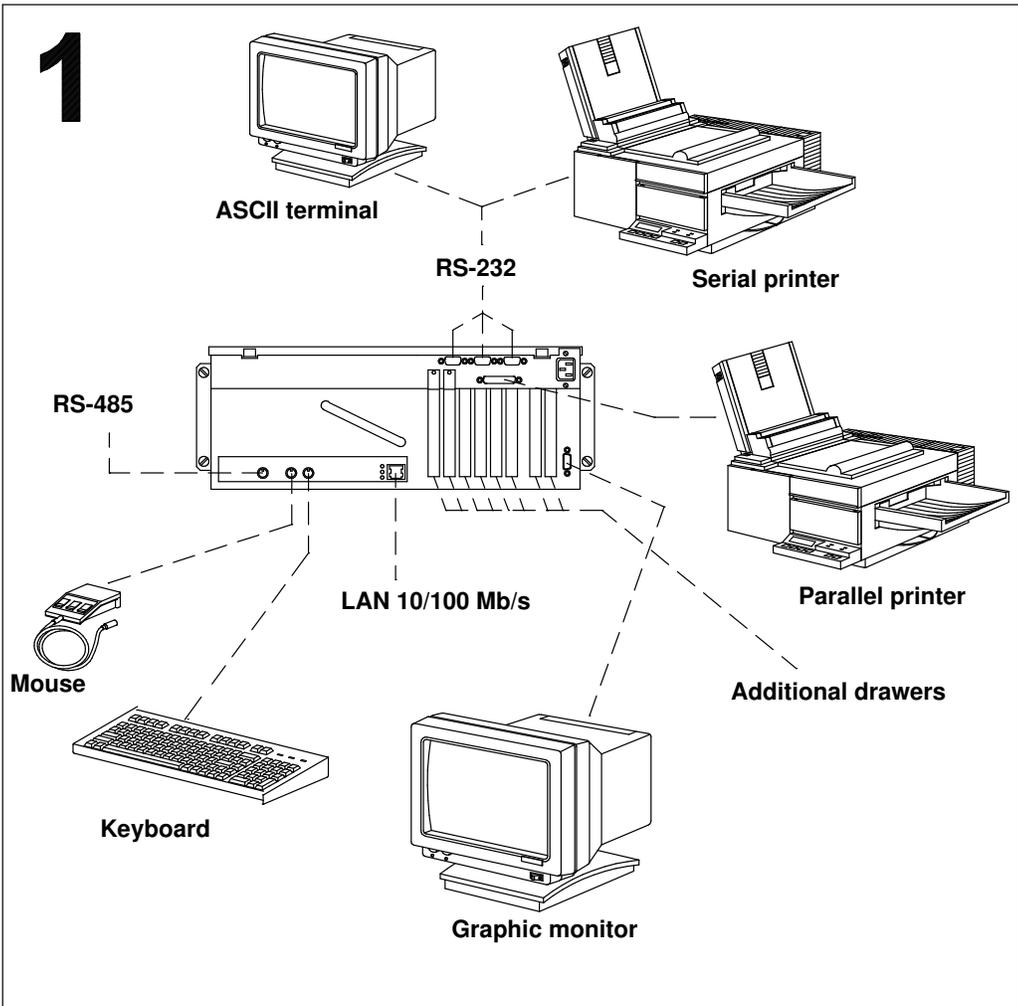
1 Reference information: **Connecting Devices**, on page 2-1

2 Reference information: **Inserting the Key**, on page 2-6

3
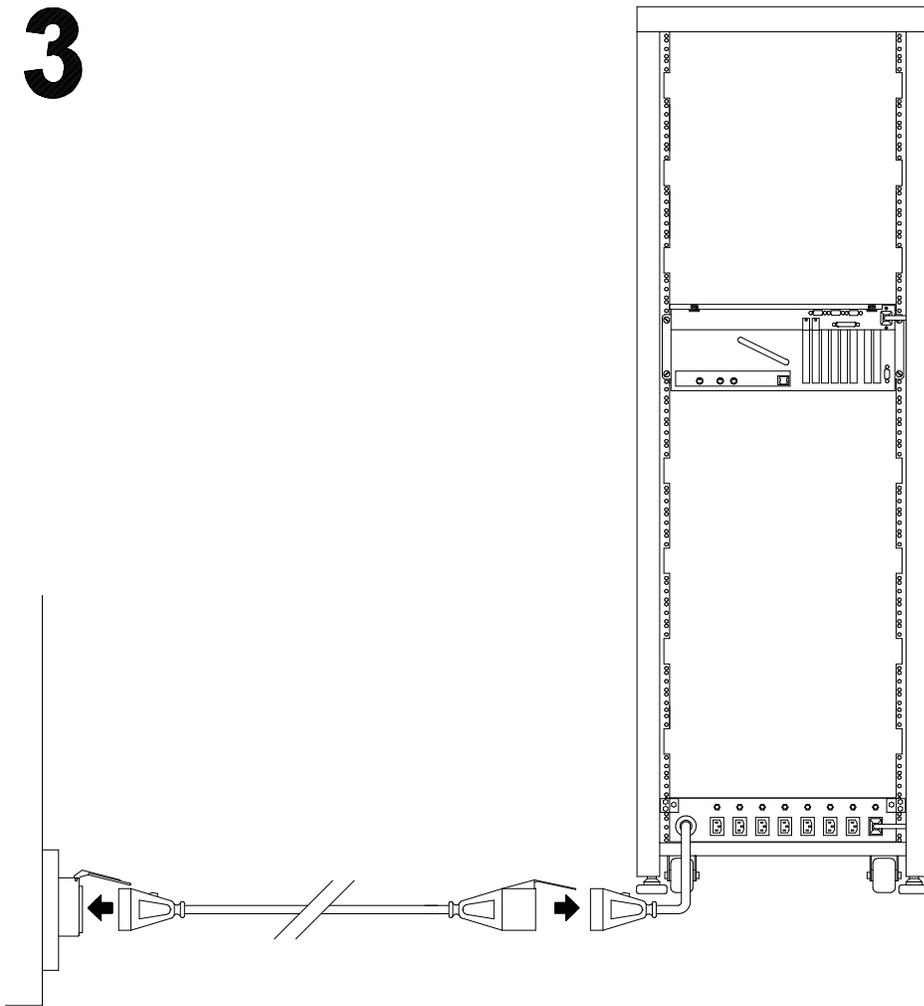
4 Check the software status for your
system (pre-installed, not-installed).

● If the *Preload Report* sheet has
been supplied with the system,
the software is pre-installed.
Skip to step 5.

●● If the *Preload Report* sheet
is not supplied with the
system, the software is
not-installed. Refer to the
AIX Installation Guide.

5

OK

3 Reference information: **Connecting the Power Cords**, on page 2-7

4 Reference information: **Checking the Software Status**, on page 2-10

5 Reference information: **First Startup of a Pre-Installed System**, on page 2-11

Table of Contents

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 Réglement 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 Guide

System safety notices which do not refer to a specific situation are included in these pages. Any specific safety notices are mentioned inside this guide 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.

> **CLASS 1 LASER PRODUCT**
> **LASER KLASSE 1**
> **LUOKAN 1 LASERLAITE**
> **APPAREIL A LASER DE CLASSE 1**
>
> **TO IEC 825:1984/CENELEC HD 482 S1**

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.

What We Do to Protect the Environment

Your new computer system is implemented following some principles aimed to reduce risks and harm to the environment, considering the impact that products can have during their life cycle: production, transport, installation, use at customer site and disposal at end of life.

- Only materials free from dangerous or polluting additives are used (e.g. polybrominated free material)

- All plastic parts are marked in order to correctly address the recycling operations

- The unit is designed taking into account the requirements for disassembly, largest parts are made of homogeneous material to facilitate recycling and, where possible, sub-assemblies are designed to be reused

- Packing is designed with the intent to reduce environmental impacts

- The unit itself does not produce polluting or dangerous emissions (lubricant, solvent, or other dangerous/polluting substances are not present in the unit)

- Production processes use water-based materials (e.g. paint); for electronic sub-assemblies, either hydro-soluble fluxes (Freon free) or no clean processes are used.

About This Guide

Audience

This guide is addressed to people in charge of the setup of the system and its daily operations.

Note: The upgrading procedures described in this guide (chapter 6) must be performed by people trained to perform service tasks on the system and must be executed carefully following the given instructions. The system supplier will not be liable for any problems deriving from incorrect handling or wrong installation of the upgradings.

Overview of the Contents

Notes:

1. Unless otherwise specified, the information provided in this guide is common to the system models ESCALA EPC430 and EPC450.

2. Being this guide conceived for the setup of several system models and their never-stopping evolution, it does not include model-specific information, if this is not relevant to the described procedures. All model-specific characteristics, like CPU type and speed, model configuration and performances are available on our internet site at *www.bull.com*, within the UNIX product description pages.

- Chapter 1, **Knowing the System**, presents the system features.

- Chapter 2, **CPU Drawer Setup Procedure**, includes any procedures needed to setup the system and start it for the first time.

- Chapter 3, **Using Devices and Tools**, explains how to use system devices and tools such as CD-ROM, tapes and mouse.

- Chapter 4, **Maintaining the System**, describes system starting and stopping procedures and use of configuration variables; it also includes a simple problem solving table.

- Chapter 5, **Configuring the System**, describes the configuration rules of the rack (e.g., installation priority of the different drawers inside the rack) and those of the CPU and PCI expansion drawers, in terms of disk and media devices, controllers, CPU's and memory.

- Chapter 6, **Expanding the System Configuration**, describes how to upgrade the system in terms of devices, controllers, CPU's and memory.

- Appendix A, **System Specifications**, summarizes the system specifications and standards.

- Appendix B, **System Devices Location Map**, provides and correlates the different identifications of the system devices (Open Firmware nodes, physical and logical location codes).

Related Publications

- *Site Preparation for Rack Systems* (86 A1 30PX), details the environmental and electrical characteristics of the site where the rack must be installed.

- *Rack Service Guide* (86 A1 20PX), 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* (86 A1 43PX), provides the description of the system hardware components and the instructions for their installation and/or replacement. A section is dedicated to the SCSI cables description and connection. The spare part list is also included. Moreover, this guide provides information about the system initialization process, 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 online and offline tests, system status indicators (tracing and error codes), remote maintenance. This guide is addressed to people trained to perform service tasks on the system.

- *AIX 4.3 Installation Guide* (86 A2 43GX), provides detailed instructions for the AIX installation.

- *AIX 4.3 System Management Guide: Operating System and Devices* (86 A2 99HX), explains the use of the System Management Interface Tool (SMIT) program.

- *Disks and Tapes Configuration Information* (86 A1 88GX), describes the setting of addresses and switches for both disk and tape drives. It also includes information on CD-ROM drive settings.

- *Terminals and Printers Configuration Guide* (86 A1 22WE), describes how to configure terminals, printers and LAN terminal concentrators.

- *AIX Problem Solving Guide and Reference* (86 A2 32JX), provides information to help you investigate and fix problems with the operating system installed on the system. In particular the system dump facility and the error log identifiers are described in this guide.

- *AIX Messages Guide and Reference* (86 A2 33JX), provides procedures to help you investigate the causes of an error message and how to recover from that error.

- *RSF Field Guide* (86 A7 96AQ), describes the remote service facilities.

- *Bull ESCALA PowerCluster & HA Solutions Setup Guide* (86 A2 79HX), describes how to set up PowerCluster and High Availability solutions; it discusses both the hardware and software aspects.

In addition, if a PCI expansion drawer is connected to the CPU drawer, the relevant information can be found in the PCI Expansion drawer specific documentation.

- *PCI Expansion Drawer Quick Set Up* (86 A1 32PX), contains the step by step hardware procedures for a quick set up of the PCI expansion drawer.

- *PCI Expansion Drawer Service Guide* (86 A1 33PX), 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.

Adapters Related Publications

The adapters installed in the system are described in separate guides:

- *Ethernet 10 & 10/100 Mbps PCI Adapters Installation and Configuration Guide* (86 A1 18GX)

- *FDDI Adapters Installation and Configuration Guide* (86 A1 53GX)

- *PCI High–Resolution Graphics Adapter Installation and Configuration Guide* (86 A1 43HX)

- *Token Ring PCI Adapters Installation and Configuration Guide* (86 A1 31GX)

- *PCI Asynchronous Serial Communications Adapters Installation and Configuration Guide* (86 A1 47AT)

- *ISA Internal Modem Installation and Configuration Guide* (86 A1 05HX)

- *PCI 1Port & 4Port Multi–protocol Serial I/O Adapters Installation & Service Guide* (86 A1 42HX)

- *SCSI RAID Adapter Installation and Configuration Guide* (86 A1 44HX)

- *PCI Fibre Channel Adapters Installation and Configuration Guide* (86 A1 95HX)

- *PCI 155 Mbps ATM Adapter Installation and User's Guide* (86 A1 86HX).

Chapter 1. Knowing the System

Unpacking and Inspecting the System

CAUTION:
To avoid possible injury while moving the system, ask another person to help you.

Move the system to the area you have chosen, according to the required environmental and technical characteristics.

Note: It is assumed that the site has already been properly prepared, as described in the *Site Preparation for Rack Systems* guide. If it is not so, check the instructions given in the guide and execute any required operations, before proceeding with the system setup.

If not yet done, carefully unpack the system and components, following the instructions on the shipping box. Save all packing materials so that you can repack the system in case you ever need to move or ship it.

Your system was checked and carefully packed before it left the manufacturer.

Contact your authorized supplier or marketing representative if any items seem to be damaged or missing.

System Documentation

The system is shipped with a set of hardware and software manuals, which lead users in setting up, operating, configuring, upgrading the system and installing software. These guides constitute the basic documentation set.

Additional documentation is delivered according to the specific products the system is equipped with.

Some guides are on paper only, some ones are both on paper and on CD-ROM, while other ones are on CD-ROM only.

Online documentation offers several advantages:

- You can find the information you need quickly, automatically jumping from one documentation topic to the others, simply clicking with your mouse on the desired topic

- You can access the information you need from any workstation or terminal connected to the system, with no need to have paper documentation at hand

- In case you need it, you can print the selected topic.

Refer to the documentation CD-ROM booklet for information on online documentation use.

Maintenance Kit

A maintenance kit including a specific set of paper documentation is available at any authorized supplier. It is addressed to both service people and trained customers who are in charge of the system maintenance.

Where Do I Find the Information I Need?

A documentation task roadmap is provided below to help you find the task related information inside the documentation kit. For each task, the title of guides and sections are given.

Documentation Task	Reference
System Setup, Drawers Configuration and Description	Environment and Safety Considerations *Site Preparation for Rack System,* **Overview of Site Preparation** Rack Drawers Configuration *Setup Guide,* **Configuring the System** CPU and PCI Expansion Drawer Presentation and Features *Setup Guide,* **Knowing the System**, → **System Features** System Specifications *Setup Guide,* **System Specifications** CPU Drawer Setup *Setup Guide,* **CPU Drawer Setup Procedure** CPU Drawer Installation / Removal *Rack Service Guide,* **Installation and Removal Procedures**
Operator's Controls	Operator Panel Description and Key Usage *Setup Guide,* **Knowing the System**, → **CPU Drawer Presentation** and/or **PCI Expansion Drawer Presentation** Inserting the Key *Setup Guide,* **CPU Drawer Setup Procedure** Starting and Stopping the System *Setup Guide,* **Maintaining the System**
Drawer Covers, Front and Rear Doors	Drawer Top and Front Covers *Setup Guide,* **Expanding the System Configuration**, → **Preparing the System for an Upgrade** Front and Rear Doors *Rack Service Guide,* **Installation and Removal Procedures**
Media and Disk Devices	Device Areas Description *Setup Guide,* **Configuring the System**, → **Drawers Configuration** Devices Configuration and SCSI-ID *Setup Guide,* **Configuring the System,** → **SCSI-ID Configuration** SCSI Connection and Configuration (maintenance task) *Maintenance Guide,* **SCSI Cables Description and Connection** Disks and Drives Description, Usage and Preventive Maintenance *Setup Guide,* **Using Devices and Tools** Upgrading / Removal *Setup Guide,* **Expanding the System Configuration** 3.5-Inch Diskette Installation and Removal (maintenance task) *Maintenance Guide,* **Hardware Maintenance** Disk Cage Installation and Removal (maintenance task) *Maintenance Guide,* **Hardware Maintenance**

Documentation Task	Reference

Peripherals	Keyboard / Mouse:
	
	• Connection
	  Setup Guide, **System Setup Procedure**, → **Connecting Devices**
	• Usage
	  Setup Guide, **Using Devices and Tools**
	• Problems with the Keyboard / Mouse
	  Setup Guide, **Maintaining the System**, → **Problem Solving**
	
	Terminal / Printer:
	
	• Connection
	  Setup Guide, **System Setup Procedure**, → **Connecting Devices**
	• Setup
	  Terminals and Printers Configuration Guide and *Terminal and Printer Connections*
	• Problems with the Terminal / Printer
	  Setup Guide, **Maintaining the System**, → **Problem Solving**

Memory	Description / Configuration *Setup Guide*, **Configuring the System**, → **Drawers Configuration** Upgrading *Setup Guide*, **Expanding the System Configuration** Handling of Single Memory Errors (maintenance task) *Maintenance Guide*, **Handling of Single Memory Errors**
CPU Cards	Description / Configuration *Setup Guide*, **Configuring the System**, → **Drawers Configuration** Upgrading / Removal *Setup Guide*, **Expanding the System Configuration**
Controllers	Description / Configuration *Setup Guide*, **Configuring the System**, → **Drawers Configuration** Installation / Removal *Setup Guide*, **Expanding the System Configuration** PCI/ISA Busses and Devices Description and Location *Setup Guide*, **System Devices Location Map**, → **PCI/ISA Busses and Devices** PCI/ISA Controllers Supported by the System *Setup Guide*, **Configuring the System**, → **PCI/ISA Controller List**

Documentation Task	Reference
General Maintenance Features	How to Handle Hardware Components *Maintenance Guide*, **Hardware Maintenance**, → **Preliminary and Restart Operations** Running Offline Tests *Maintenance Guide*, **Offline Diagnostics** Running Online Tests *Maintenance Guide*, **AIX Online Diagnostics** *Maintenance Guide*, **Some Useful AIX Commands** System States, Operator Panel Codes and System Messages *Maintenance Guide*, **System Status Indicators** Remote Maintenance *Maintenance Guide*, **Remote Maintenance** Service Lines *Maintenance Guide*, **System Initialization Process Overview** Firmware Updating *Maintenance Guide*, **Firmware Updating** System Configuration Variables and Flags *Setup Guide*, **Maintaining the System** (Open Firmware) *Maintenance Guide*, **System Configuration Variables and Flags** (Stand-By Menu and Open Firmware) Handling of a Dead System *Maintenance Guide*, **Handling of a Dead System** Handling of Power and Fan Errors *Maintenance Guide*, **Handling of Power and Fan Errors** Handling of Memory Errors *Maintenance Guide*, **Handling of Single Memory Errors** Spare Parts List *Maintenance Guide*, **Spare Parts**
Specific Maintenance for the CPU Drawer	Description of the Hardware Components and Internal Connectors, Replacement of Faulty Component *Maintenance Guide*, **Hardware Maintenance**, → **List of the Hardware Components** SCSI Connections and Configuration Examples *Maintenance Guide*, **SCSI Cables Description and Connection**
Specific Maintenance for the PCI Expansion Drawer	Description of the Hardware Components and Internal Connectors *PCI Expansion Drawer Service Guide*, **PCI Expansion Drawer Hardware Components** Adding a PCI Expansion Drawer *PCI Expansion Drawer Quick Set Up* Faulty Component Replacement *PCI Expansion Drawer Service Guide*, **Hardware Maintenance** SCSI Connections and Configuration Examples *PCI Expansion Drawer Service Guide*, **SCSI Cables Description and Connection**

Rack Presentation

Your new system is a powerful computer, rackmounted in a structure, the rack, which can house additional drawers, to expand the system configuration.
Please refer to **Rack Configuration**, on page 5-2.

The rack has the following dimensions:

Height	69.8 in.	1775 mm
Width	22.8 in.	580 mm
Depth	42.5 in.	1080 mm
Weight	1089 lbs*	490 kg*

* This value corresponds to a maximum system configuration; i.e. including a max. number of cards and devices.
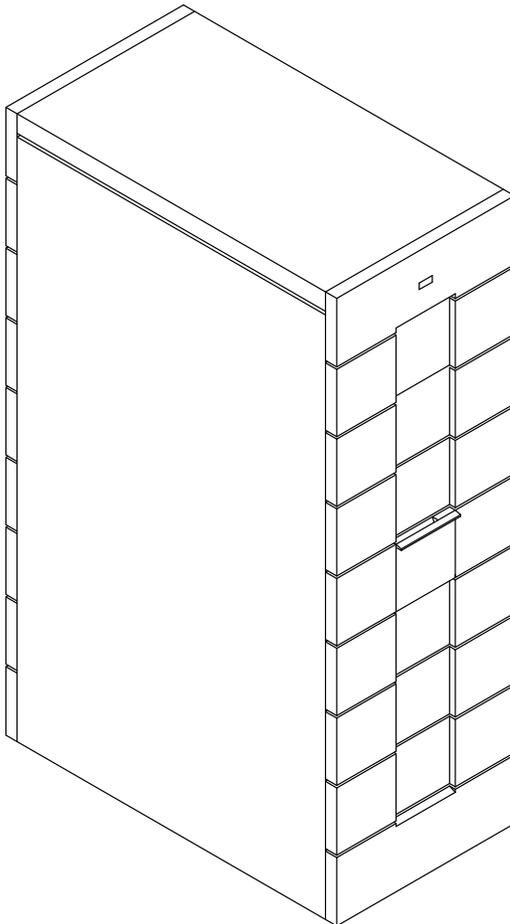
The rack is equipped with a front door which allows the access to the operator controls of the installed drawers and a rear door which allows the access to the back of the drawers for their maintenance.

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

CPU Drawer Presentation

- **CPU Drawer Physical Dimensions**, below
- **CPU Drawer Front View**, below
- **CPU Drawer Rear View**, on page 1-8
- **CPU Drawer Operator Panel**, on page 1-10
- **CPU Drawer Key Mode Switch**, on page 1-12.

CPU Drawer Physical Dimensions

The CPU drawer has the following dimensions:

Height	6.8 in.	175 mm
Width	17.4 in.	444 mm
Depth	32.4 in.	825 mm
Weight	99.1 lbs	45 kg

CPU Drawer Front View

From the front of the CPU drawer, you can access to the following features and components.
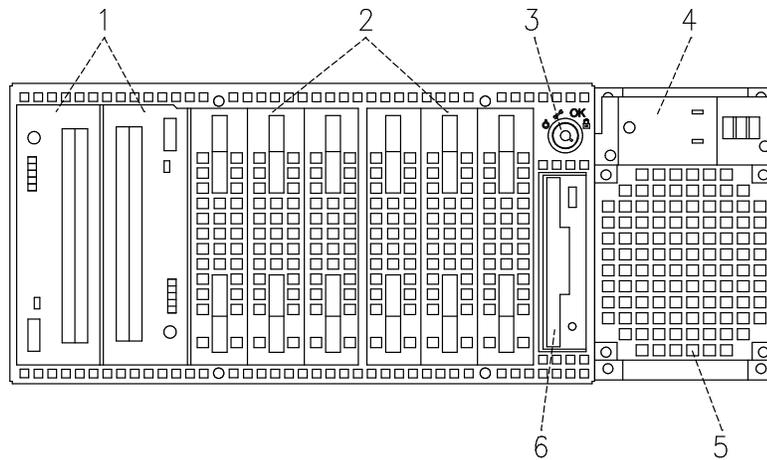
1	Media devices area
2	Hard disk devices area
3	Key mode switch
4	Operator panel
5	Power supply fan
6	3.5-inch diskette drive

CPU Drawer Rear View

From the rear of the CPU drawer, you can identify the following connectors:
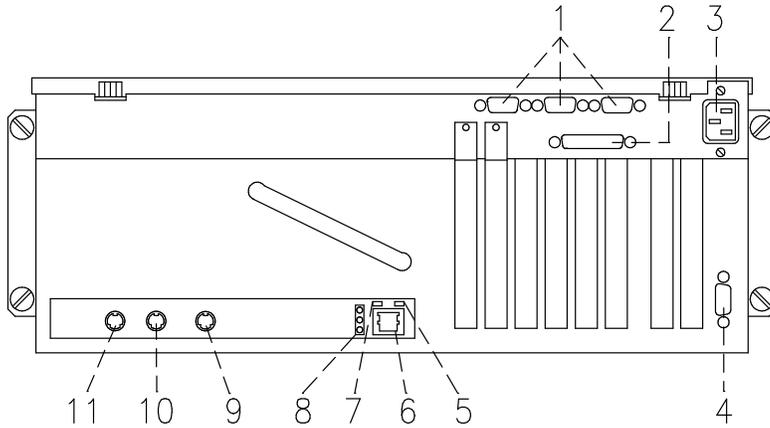
1	Three serial RS-232 ports: 9-pin male, from right to left: COM1, COM2 and COM3
2	Parallel port: 25-pin female
3	Power cord receptacle
4	Video graphics: SVGA 15-pin female
5	Receive data (green) LED
6	LAN 10/100 M-bit: RJ-45
7	Transmit data (green) LED
8	Three (green) LAN LED's, from top to bottom: speed, link and half or full duplex connection
9	Keyboard: 6-pin mini-DIN female
10	Mouse: 6-pin mini-DIN female
11	RS-485: for PCI expansion drawer connection

Three LAN LED's, Transmit Data and Receive Data LED's

- 100Mb
  - Light on: 100 M-bit connection
  - Light off: 10 M-bit connection.
- LINK
  - Light on: cable plugged in the RJ-45 connector
  - Light off: no cable in the RJ-45 connector.
- FDX
  - Light on: full duplex connection
  - Light off: half duplex connection.
- TX
  - Light on or blinking: transmit data activity
  - Light off: no transmit data activity.
- RX
  - Light on or blinking means: receive data activity
  - Light off: no receive data activity.

CPU Drawer Operator Panel

The operator panel is installed in the front of the CPU drawer.
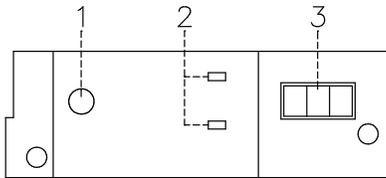
1	**Reset Button**, on page 1-10
2	**LED's**, on page 1-11
3	**Hexadecimal Display**, on page 1-11

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).

LED's

The CPU drawer provides two LED's 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.

Hexadecimal Display

The hexadecimal display visualizes the status of the system (standby, testing, error).
If you want to have a description of the hexadecimal display codes, refer to **System Status Indicators**, 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 4-16.
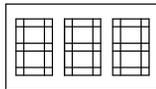
What the hexadecimal display shows and the way it shows it (blinking, steady), depends on the system status:

- **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).

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

- **PCI Expansion Drawer Front View**, below
- **PCI Expansion Drawer Rear View**, on page 1-15
- **PCI Expansion Drawer Operator Panel**, on page 1-16.

PCI Expansion Drawer Front View

From the front of the PCI expansion drawer, you can access to the following features and components.
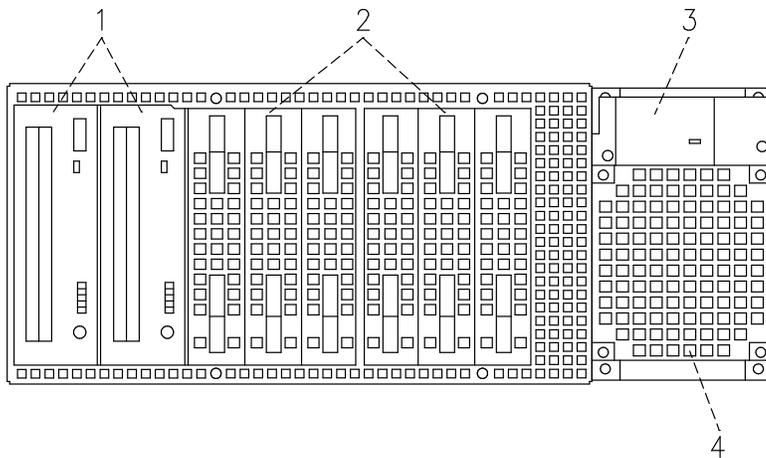
1	Media devices area
2	Hard disk devices area
3	Operator panel
4	Power supply fan

PCI Expansion Drawer Rear View

From the rear of the PCI expansion drawer, you can identify the following connectors and slots:
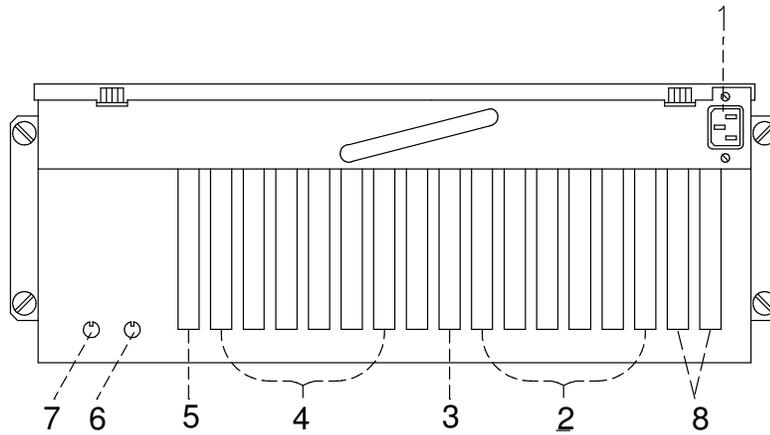
1	Power cord receptacle
2	PCI controller slots, first KPE planar
3	KXB card slot, first KPE planar
4	PCI controller slots, second KPE planar
5	KXB card slot, second KPE planar
6	RS-485 output connector
7	RS-485 input, for PCI expansion drawer interconnection
8	Slots for the rear to disk cage internal SCSI-LVD cable

PCI Expansion Drawer Operator Panel

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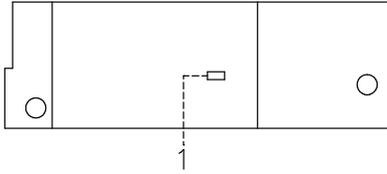
1 LED

LED

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

- When the 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.

System Features

- **CPU Drawer Features**, below
- **PCI Expansion Drawer Features**, on page 1-18.

CPU Drawer Features

The following list summarizes the features provided by the CPU drawer:

Integrated Features

- Two native SCSI busses
    - One ULTRA/SE bus (for media drives)
    - One ULTRA-2/LVD bus (for hard disk drives).
- One LAN (RJ-45) controller at 10M bits and 100M bits
- One video graphics adapter (SVGA) with internal power save control and 2M bytes of video memory
- Three RS-232 standard communication lines
- One parallel port
- One mouse port
- One keyboard port
- One EIA-485 communication line
- One redundant power supply
- Support for an integrated modem using the ISA slot.

Hard Disk Drives

- Up to six 1-inch ULTRA-2/LVD hard disks.

Media Drives

- One floppy diskette drive
- Up to two media devices, such as CD-ROM, 4 mm/8 mm tape, MLR tape.

PCI / ISA Controllers

- Up to eight PCI cards
- One ISA card.

Memory

- From 256M bytes to 8G bytes.

CPU's

- Up to four CPU cards.

Operating System

- AIX 4.3 or higher.

PCI Expansion Drawer

- Up to one PCI expansion drawer.

PCI Expansion Drawer Features

Hard Disk Drives

- Up to six 1-inch hard disks.

Media Drives

- Up to two media devices, such as CD-ROM, 4 mm/8 mm tape, MLR tape.

PCI / ISA Controllers

- Up to twelve PCI cards
  - Six on the first KPE planar
  - Six on the second KPE planar.

Chapter 2. CPU Drawer Setup Procedure

Perform all the procedures described in this section in the indicated order to setup the system and make it operational.

- **<u>Connecting Devices</u>**, below
- **<u>Inserting the Key</u>**, on page 2-6
- **<u>Connecting the Power Cords</u>**, on page 2-7
- **<u>Starting the System for the First Time</u>**, on page 2-10.

Note: If you need to connect further supported drawers to the CPU drawer, proceed as follows:

1. Set up the CPU drawer, start it for the first time and make sure that no errors are detected during the initial start up, following the procedures described in this section.

2. When you are sure that the CPU drawer operates correctly, perform the installation and connection of supported drawers:

   – For the PCI expansion drawer, please refer to the *PCI Expansion Drawer Quick Set Up* leaflet

   – For other drawers, please refer to the documentation delivered with those drawers and to the *Rack Service Guide*.

Connecting Devices

The following paragraphs explain how to physically connect devices to the system.

- **<u>Connecting Terminals</u>**, on page 2-2
- **<u>Connecting Keyboard and Mouse</u>**, on page 2-4
- **<u>Connecting Printers</u>**, on page 2-5.

DANGER

> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
> **Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
> **During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.**

Connecting Terminals

The figure indicates the three serial ports and the SVGA port:

CPU Drawer Rear Side
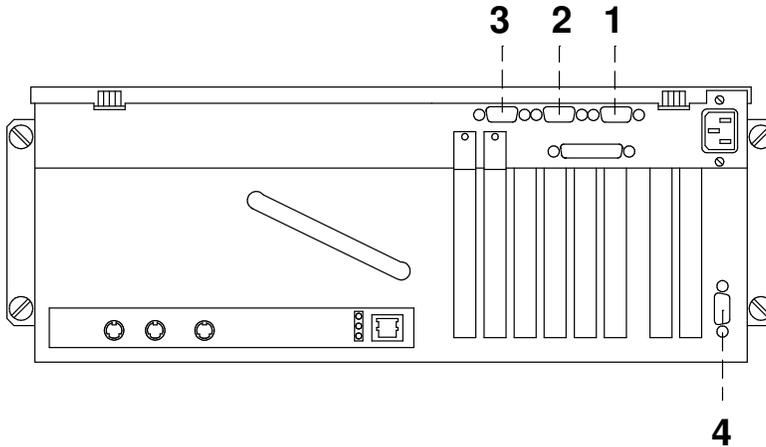
The functions of each terminal port are described below:

1 COM1 Used to connect an ASCII terminal. This terminal is called BUMP console. The Stand-By Menu is available only on the terminal connected to this port.

2 COM2 Used to remotely connect, via an external modem, an ASCII terminal to be used for remote maintenance by customer service centers. It can also be used as a normal RS-232 serial line.

3 COM3 Used as a normal RS-232 serial line. It can also be used to connect an external UPS device (Uninterruptible Power Supply). The UPS, if present, provides continuous power to the system and sustains it in case of outages, for a given amount of time.

4 SVGA Used to connect a graphic display monitor which is defined, by default, as the Open Firmware console.

Perform the following steps to physically connect any terminals to your system:

1. Connect the terminal to the proper port on the rear of the CPU drawer, as follows:

   a. If you have a graphic monitor, connect it to the SVGA port.

Note: An extender cable for the graphic monitor is supplied with the system. Use it in case the distance between the CPU drawer and the monitor requires it.

   b. If you have an ASCII terminal, connect it to the COM1 serial port (BUMP console) or to any other free serial port.

2. Connect the terminal(s) power cord(s) to the proper power outlet(s).

Once you have connected the required terminal(s), decide which one you want to use as the system console:

- If it is a graphic terminal, no additional operation is required
- If it is an ASCII terminal, you need to:
  - Switch the terminal on
  - Press the appropriate key to activate the terminal setup menu

Note: For information about the key(s) used to activate the terminal setup menu and how to set the required options, refer to the terminal specific documentation.

  - Check that the following options are set as specified below:

Communication Options	
Line Speed (baud rate)	9600
Word Length (bits per character)	8
Parity	no (none)
Number of Stop Bits	2
Interface	RS-232C (or RS-422A)
Line Control	IPRTS
Keyboard and Display Options	
Screen	normal
Row and Column	24x80
Scroll	jump
Auto LF (line feed)	off
Line Wrap	on
Forcing Insert	line (or both)
Tab	field
Operating Mode	echo
Turnaround Character	CR
Enter	return
Return	new line
New Line	CR
Send	page
Insert Character	space

  - After having successfully completed the console setup, you can switch it off.

Note: Remember that the above settings must be performed for all ASCII terminals connected to the system before you use them. Refer to the specific terminal documentation for detailed information.

Connecting Keyboard and Mouse

CPU Drawer Rear Side
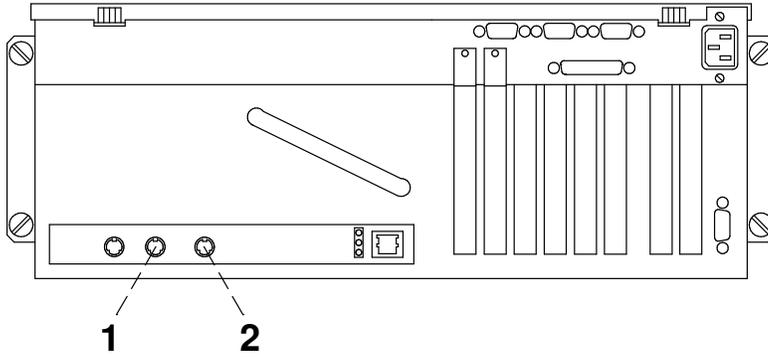
1   Mouse

2   Keyboard

Note: Keyboard and mouse are for use with graphic monitors only. You do not need to connect them, if you are not going to connect any graphic monitor.

Connect the mouse to the dedicated connector at the rear of the CPU drawer. Do not force the cable plug into the socket.

Note: An extender cable for the mouse is supplied with the system. Use it in case the distance between the CPU drawer and the mouse requires it.
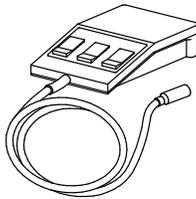
Connect the keyboard to the dedicated connector at the rear of the CPU drawer. Do not force the cable plug into the socket.

Note: An extender cable for the keyboard is supplied with the system. Use it in case the distance between the CPU drawer and the keyboard requires it.
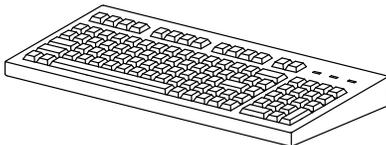
Connecting Printers

If you need to connect a printer to the system:

1. Connect the printer to the proper connector on the rear of the CPU drawer, as follows:

    –   If you are going to use it as a parallel printer, connect it to the enhanced parallel connector
    –   If you are going to use it as a serial printer, connect it to one of the serial connectors (RS-232 ports).

CPU Drawer Rear Side
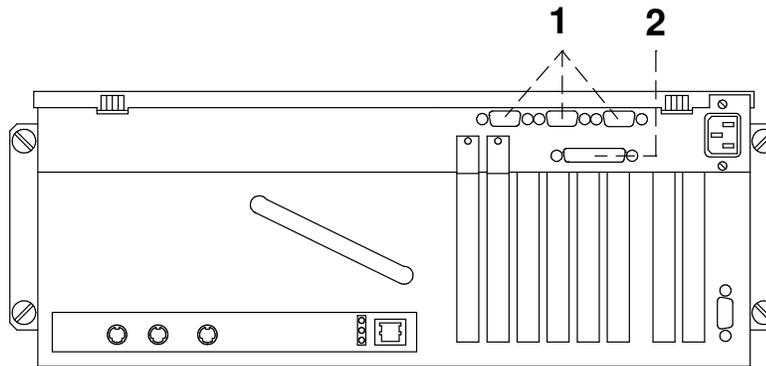
1 Serial ports

2 Parallel port

You can also connect printers to a SCSI port (if PCI controllers housing SCSI ports are installed inside the CPU drawer), and to the Ethernet network using either the native connector or external ones.

2. Connect the printer power cord first to the printer itself and then to a power outlet.

For further information about your printer connection and configuration, please refer to the documentation provided with the printer itself and to the *Terminals and Printers Configuration Guide.*

Inserting the Key

A pair of keys is supplied with each CPU drawer.
The key is used to activate the key controlled switch which is named key mode switch.
This switch enables the power on/off functions.

Keys
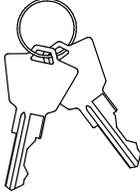
Insert one of the two keys in the CPU drawer key mode switch in the position shown in the figure.
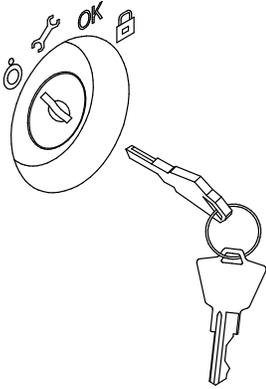
Connecting the Power Cords

Before performing the first startup of the system, the following steps must be performed to give it AC power.

Note: Make sure that the CPU drawer key mode switch is set to the Power Off position and all external devices connected to it are powered off.

1. Identify the Power Distribution Unit (PDU) toward the bottom of the rear of the rack.
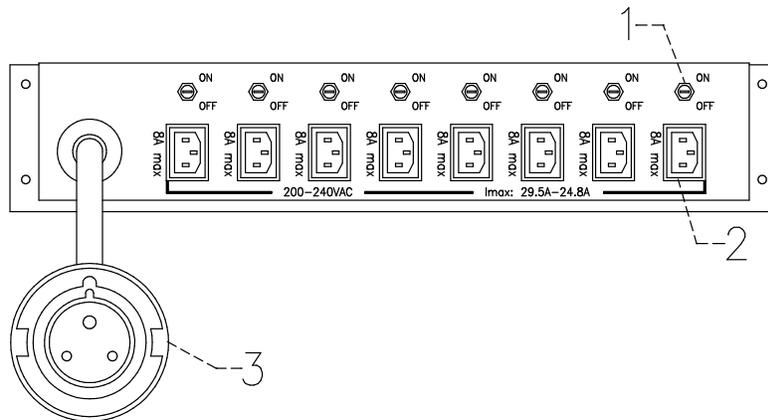
1	Circuit breakers
2	PDU outlets
3	PDU male connector

2. Connect the CPU drawer power cord to a free PDU outlet, performing the following steps:

    a. Choose a free PDU outlet. Make sure the circuit-breaker for that PDU outlet is set to OFF.

    b. Plug the power cord of the drawer into the chosen PDU outlet and into the dedicated receptacle on the drawer itself.
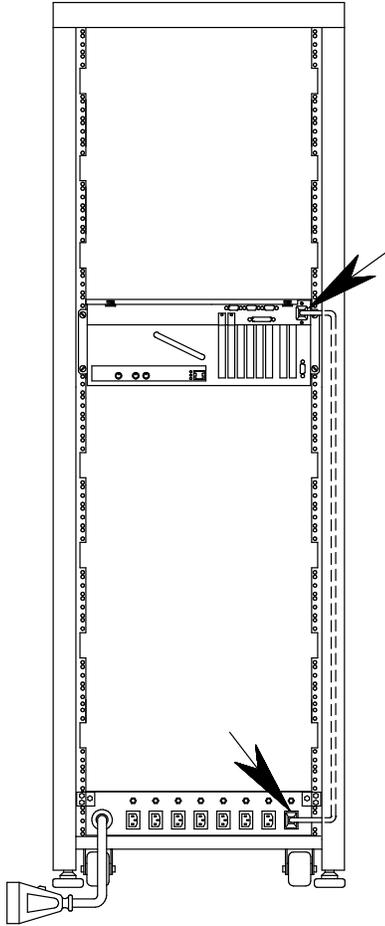
    c. Set the circuit-breaker related to the chosen PDU outlet to ON.

Note: The power cord for each drawer is supplied with the drawer itself.

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

3. Connect the PDU power cord to the male connector coming from the PDU module.

4. Plug the other end of the PDU power cord to the proper wall outlet.
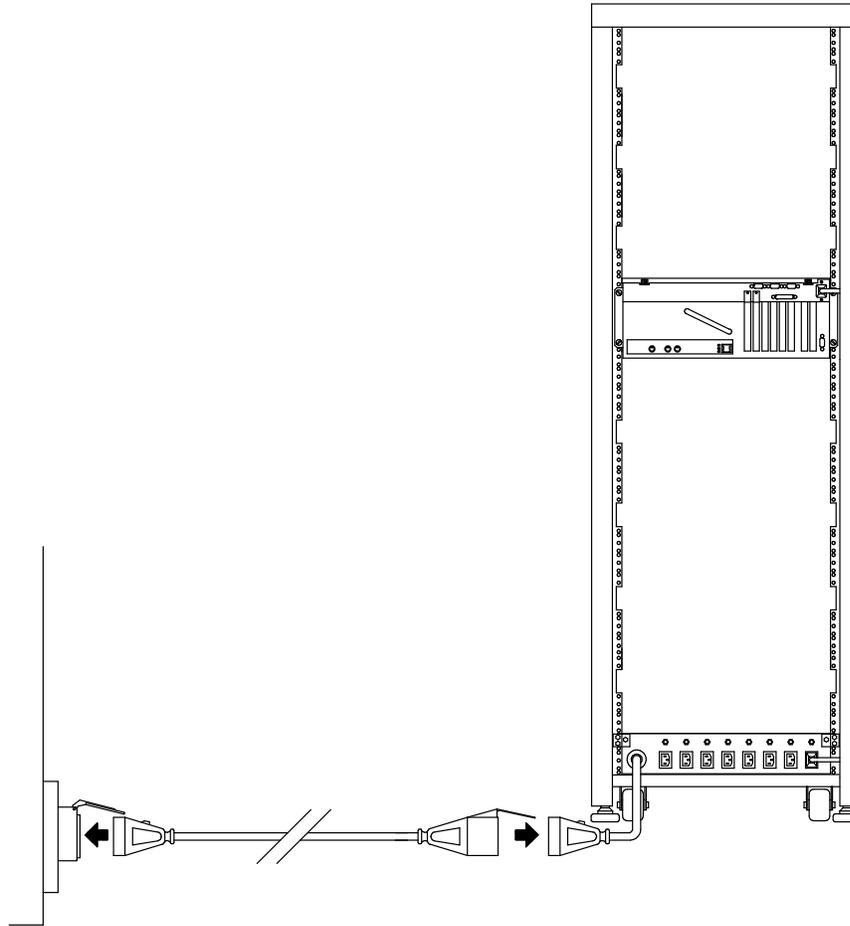
DANGER
> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**

Starting the System for the First Time

- **Checking the Software Status**, below

- **First Startup of a Pre-Installed System**, on page 2-11.

Checking the Software Status

The software for the system can be:

- Pre-installed

- Not-installed.

By default, the system software is pre-installed on the system, when you receive it. This makes your first startup of the system easier and faster.

Make sure the system software is pre-installed, by checking that the *Preload Report* sheet has been supplied with the system. This is a one sheet document which indicates where you can find the *preload report* file on the system disk.

Note: Once the system is running, you can list the installed software with the command:

lslpp –l | pg

In case the system software is not-installed, refer to the *AIX Installation Guide*.

First Startup of a Pre-Installed System

If the system software is pre-installed, you only need to perform some simple customization tasks the first time you power it on. These are tasks like setting time and date, setting root password, create users. A guided program, called *Installation Assistant*, leads you through the required steps. A contextual help is included in the program.

1. Be sure that you have connected all external devices to the CPU drawer and all power cords (including the CPU drawer one) to the proper power outlets, as previously described in this guide.

2. Power on all external devices (e.g., terminals and printers) and drawers.

3. Power on the system setting the key mode switch of the CPU drawer to the Normal position.
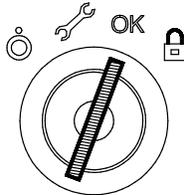
4. After some minutes, each terminal connected to the system displays a screen asking you to identify your system console. A specific key is indicated for each terminal. Press the specified key on the terminal you want to use as the system console. Press a key on only one terminal.

5. The startup procedure continues up to the display of the login prompt. Type **root** and press the Enter key or click on the OK button. If you are using a graphic monitor go to step 6, otherwise skip to step 7.

6. Open a window on your desktop.

7. Type **install_assist** and press the Enter key.

8. The *Installation Assistant* screen appears. Execute the tasks that apply to your system in the order they are listed. If you need information on the tasks, use the program help. You can also find further information on the *Installation Assistant* program in the *AIX Installation Guide*.

9. When all the needed tasks are completed, exit to the operating system login prompt, through the *Tasks Completed* selection of the program.

If you need information on the operating system licenses, please refer to the *AIX Installation Guide*.

The system is ready to work.

Chapter 3. 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* guide, delivered with the system.

- **Using the 3.5-Inch Diskette Drive**, on page 3-2
- **Using the CD-ROM Drive**, on page 3-4
- **Using the MLR Tape Drive**, on page 3-6
- **Using the 7/14 GB 8 mm Tape Drive**, on page 3-10
- **Using the 4 mm Tape Drive**, on page 3-15
- **Using Hard Disk Drives**, on page 3-19
- **Using the Keyboard**, on page 3-20
- **Using the Mouse**, on page 3-21.

Using the 3.5-Inch Diskette Drive

Functions
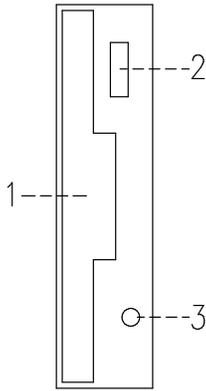
1	Diskette slot	Where the diskette is inserted
2	Unload button	Used to unload the diskette from the drive
3	In-use light	Lights when the system is accessing the drive

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).
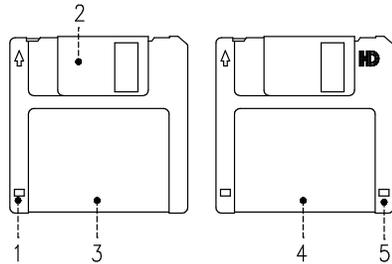
1	Write-protect slot
2	Sliding metal shutter
3	1.0M-Byte diskette
4	2.0M-Byte diskette
5	Rectangular cutout (only for 2.0M-Byte diskette)

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
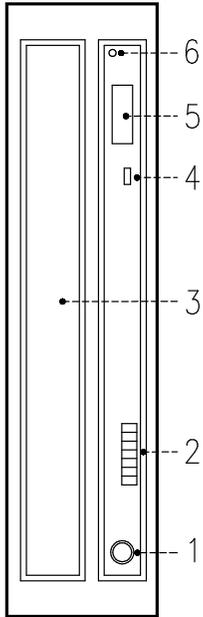
1	Headphone socket	Used for connect headphones to your CD-ROM drive
2	Volume control	Used to control the level of the audio signal from the headphone socket
3	Drive door	Prevents dust from entering into the drive
4	Busy LED indicator	Used to indicate the condition of the drive
5	Unload button	Used to 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-ROM's

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

• Keep CD-ROM's 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-ROM's in dusty, smoky, or salty areas

• Do not subject CD-ROM's to sudden temperature changes, which may cause condensation to damage them

• Do not expose CD-ROM's 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 MLR Tape Drive

The MLR 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 MLR 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 MLR tape drive.
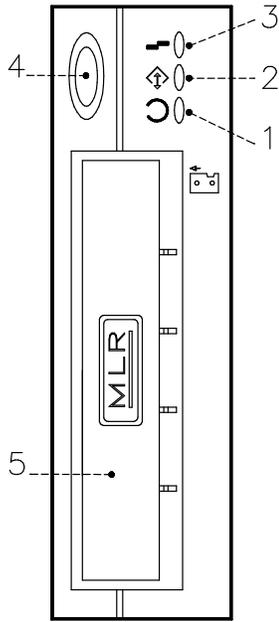
1	Ready LED (green)
2	Activity LED (green)
3	Error LED (amber)
4	Unload button
5	Drive door

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 LED's 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
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 3-8.

Note: For detailed information about the supported cartridges and their compatibility with the different media drives, please refer to the *Disks and Tapes Configuration Information* guide.

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

1. Grasp the edges of the MLR 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 MLR 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 MLR 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 data cartridge, allow it to acclimate to the operating environment (24 hours or the amount of time it has been exposed to dissimilar conditions).

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 MLR 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 7/14 GB 8 mm Tape Drive

The 7/14GB 8 mm tape drive, is a high capacity tape drive. It is typically used as backup drive.

Functions

The 7/14GB 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 7/14GB 8 mm tape drive.
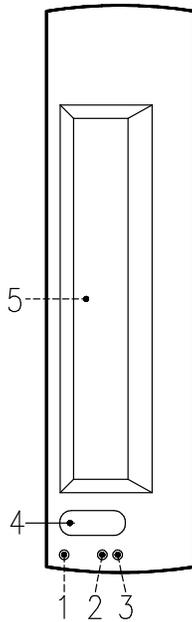
1	Error LED (amber)
2	SCSI LED (green)
3	Motion LED (green)
4	Unload button
5	Drive door

Status Lights

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

Error LED	SCSI LED	Motion LED	Device State
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 3-12.

Note: For detailed information about the supported cartridges and their compatibility with the different media drives, please refer to the *Disks and Tapes Configuration Information* guide.

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 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 tape 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.
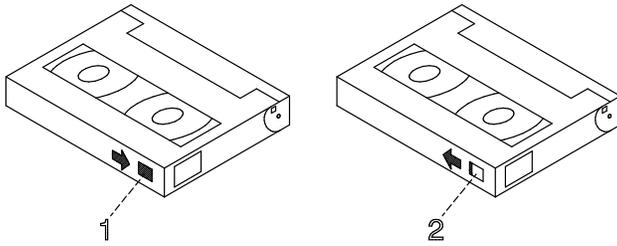
1	Window closed	Write-protect tab set
2	Window open	Write-protect tab not set

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-born 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 tape drive. Video cleaning cartridges can damage it. Some video cleaning cartridges are extremely abrasive. An 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 LED's flash. You should clean the tape drive as soon as possible after the LED's begin flashing. Use the Exabyte Premium 8 mm Cleaning Cartridge to clean your 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 18 times before being discarded. If you attempt to use an 8 mm cleaning cartridge more than 18 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.
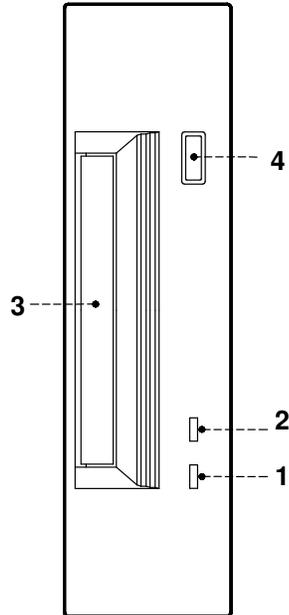
1   Tape LED (green)

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**, below.

Note: For detailed information about the supported cartridges and their compatibility with the different media drives, please refer to the *Disks and Tapes Configuration Information* guide.

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.
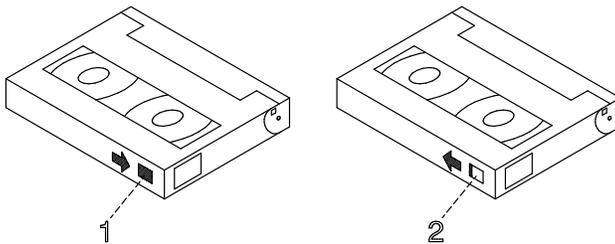
| 1 | Window closed | Write-protect tab not set |
| 2 | Window open | Write-protect tab set |

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 3-18, 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 data cartridge, allow it to acclimate to the operating environment (24 hours or the amount of time it has been exposed to dissimilar conditions).

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 on page 3-15 (if it was activated before the cleaning operation).

Using Hard Disk Drives

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

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

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 blue/green LED light indicates disk activity.

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

Notes:

1. The blue LED color means: ULTRA-2/LVD mode.

2. The green LED color means: ULTRA/SE mode.

If you need to install or remove the disk devices, refer respectively to **Hard Disk Drive Installation**, on page 6-18, or **Hard Disk Drive Removal**, on page 6-12.

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 menu. For further information, please refer to **Select Keyboard**, on page 4-11.

The functions of each keyboard depend on the software used. The character sets for the keyboards are explained in your operating system documentation.
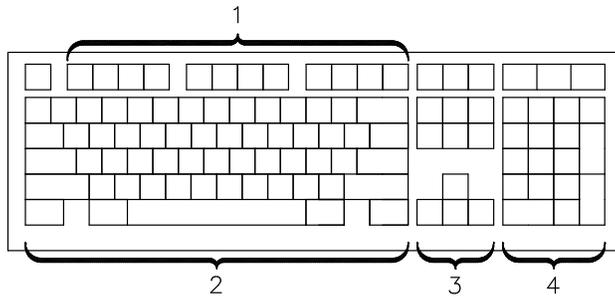
The keyboard is divided into four sections:

1	Function keys	Multipurpose keys controlled by the operating system
2	Typewriter keys	Similar to those of 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 used application
4	Numeric keypad	A keypad 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.
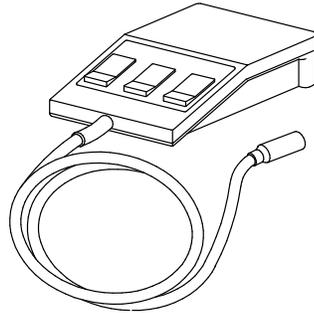
Consult your application publication for the exact use of the mouse.

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 4. Maintaining the System

- **Starting and Stopping the System**, below
- **Maintaining System Configuration Variables**, on page 4-4
- **Problem Solving**, on page 4-16.

Starting and Stopping the System

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

- **Initial Startup**, below
- **Starting the System**, on page 4-1
- **Logging into the System**, on page 4-2
- **Stopping the System**, on page 4-2
- **Rebooting the System**, on page 4-3.

Initial Startup

If you have just received the system and need to start it up for the first time, please refer to **Starting the System for the First Time**, on page 2-10.

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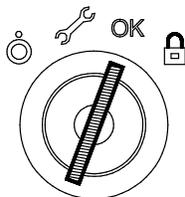
Note: Powering on the system by setting the CPU drawer key mode switch to the Service position, you enter the operating system diagnostic mode.

6. Now, go to **Logging into the System**, on page 4-2.

Logging into the System

Warning: After you have started the system, it may take a few minutes for the login prompt to appear on the display. This amount of time depends on the 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, enter the correct command before you stop the system. Failure to do so, may result in loss of data. Please refer to the 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 +5r
        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.

The Open Firmware features can be used during the system power on phase to display and modify system configuration variables, perform maintenance operations, boot or reset the system. An interactive command interpreter is also available, for very specialistic maintenance tasks.

- **What is Open Firmware**, below
- **How to Access Open Firmware**, below
- **Display and Description of the Open Firmware Menu**, on page 4-5.

What is Open Firmware

Open Firmware is an open-standard boot firmware that can be used on different hardware configurations. The Open Firmware architecture is designed to bring standardization of the firmware area providing a resilient framework, growing and evolving with new technologies.

The Open Firmware main function is to initialize the hardware and then load and execute the operating system. Additional functions are the hardware testing and the management of hardware configuration information.

Open Firmware is defined by the *IEEE Standard 1275-1994, Standard for Boot Firmware*.

How to Access Open Firmware

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

The Open Firmware features can be accessed through a menu, in a controlled and interactive mode, on:

- A graphic terminal connected to the SVGA port (default Open Firmware console), or
- A terminal connected to the COM1 port (BUMP console).

The menu is available in English only.

The access to the Open Firmware menu is conditioned by the Open Firmware **auto-boot?** variable, by default *true* (the system boots automatically).

The Open Firmware menu is called:

- Typing any key before completion of boot image loading, or
- Configuring the **auto-boot?** variable = *false*; for more information, see **Boot Options**, on page 4-9.

Display and Description of the Open Firmware Menu

The Open Firmware menu allows to view hardware configuration, display and modify system configuration variables, such as boot options and device alias definition, boot or reset the system, set remote maintenance variables.

The Open Firmware variables are stored in non-volatile memory (NVRAM). In case NVRAM is corrupted, the configuration variables are automatically restored to their default values.

A whole list of Open Firmware configuration variables is available in the *Maintenance Guide*.

Notes:

1. The modifications applied to the configuration variables do not take effect until a system restart.

2. The configuration variables must be modified with care to avoid compromising the system's behavior.

3. The menu screens shown in this section are those displayed on the graphic console. The variable values are shown as example.

The menu is entered with the following main screen.

```
                        System Menu

                ❑   System Configuration

                ❑   Boot Operating System

                ❑   Reset Machine


                ❑   System Maintenance

                ❑   Help
```
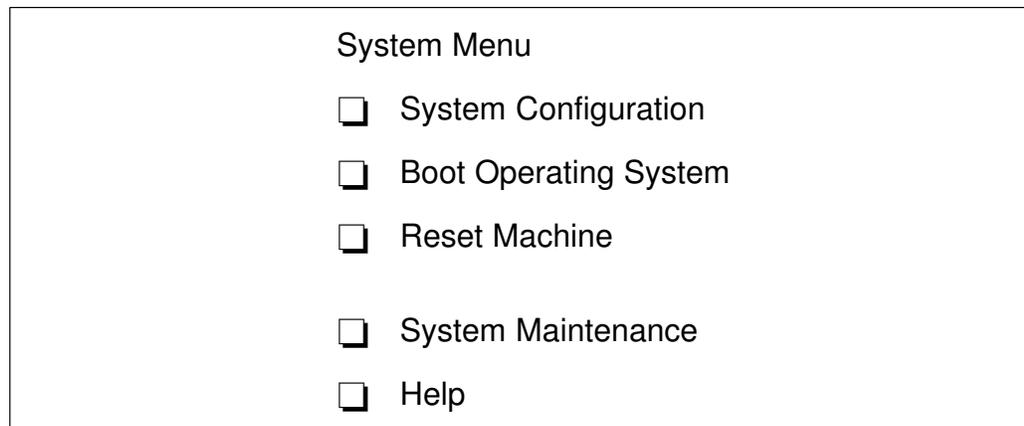
Operating Procedures

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
  - Use the OK button to confirm the modification(s) or the Cancel button to cancel the operation.
- From the BUMP console:
  - Enter the number identifying one item to select it
  - Press the Enter key to confirm the selection.

The following table summarizes the Open Firmware menu available features, providing the page reference for a quick search.

OPEN FIRMWARE SYSTEM MENU Available Features		
Main Screen, First Level	**Second Level**	**Third Level**
System Configuration, on page 4-7	**Set Date and Time**, on page 4-7	
	View Hardware Configuration, on page 4-8	
	Probe SCSI, on page 4-8	
	Manage NVRAM Variables, on page 4-8	**Boot Options**, on page 4-9
		Configuration Variables, on page 4-9
		Remote Maintenance, on page 4-10
		Surveillance Variables, on page 4-11
		Select Keyboard, on page 4-11
		Alias Definition, on page 4-12
	Manage Operating System, on page 4-13	
Boot Operating System, on page 4-14		
Reset Machine, on page 4-14		
System Maintenance, on page 4-14	**Change Password**, on page 4-15	
	ok Forth, on page 4-15	
Help, on page 4-15		

The following paragraphs describe in detail the Open Firmware menu options.

System Configuration

```
                          System Menu

     ❏     System Configuration
```

Select SYSTEM CONFIGURATION and the following screen is displayed.

```
                   System Configuration


            ❏     Set Date and Time

            ❏     View Hardware Configuration

            ❏     Probe SCSI

            ❏     Manage NVRAM Variables

            ❏     Manage Operating System


            ❏     Return to System Menu

            ❏     Help
```

Set Date and Time

```
                          System Menu

     ❏     System Configuration
           ❏ Set Date and Time
```

Select SET DATE AND TIME to display and/or update the date and time of the system. To update, position on the specific field and edit it accordingly. The date is set according to UTC (Universal Time Coordinated) format. The following screen is displayed.

```
                     Set Date and Time

     Date:  xx    -  xx  -  xxxx
            mm    -  dd  -  yyyy

     Time:  xx    -  xx  -  xx
            hh    :  mm :  ss

                  [ OK ]    [ Cancel ]
```

View Hardware Configuration

```
                    System Menu

  ❑     System Configuration
           ❑ View Hardware Configuration
```

Select 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@fe0f0020/scsi@2/disk@0,0*.

The device path names can also be represented by device alias names. For more information, refer to **Alias Definition**, on page 4-12.

Probe SCSI

```
                    System Menu

  ❑     System Configuration
           ❑ Probe SCSI
```

Select PROBE SCSI to list the devices connected to all the SCSI busses installed in the system.

Manage NVRAM Variables

```
                    System Menu

  ❑     System Configuration
           ❑ Manage NVRAM Variables
```

Select MANAGE NVRAM VARIABLES to display and/or update the common user Open Firmware variables stored in NVRAM. The following screen is displayed.

```
                  Manage NVRAM Variables


           ❑   Boot options

           ❑   Configuration variables

           ❑   Remote maintenance

           ❑   Surveillance Variables

           ❑   Select keyboard

           ❑   Alias definition


           ❑   Return to System Configuration

           ❑   Help
```

Select BOOT OPTIONS to display and/or modify the system boot options. The following screen is displayed.

```
┌─────────────────────────────────────────────────────────────┐
│                    System Menu                              │
│                                                             │
│  ❑   System Configuration                                   │
│        ❑ Manage NVRAM Variables                             │
│            ❑ Boot Options                                   │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────┐
│                                                             │
│          Manage NVRAM Variables                             │
│                                                             │
│   Boot options:                                             │
│                                                             │
│        auto-boot?              true                         │
│        boot-device            cdrom# aixtape disk net       │
│        diag-switch?           false                         │
│        diag-device            cdrom# aixtape disk net       │
│                        ┌──────┐   ┌────────┐                 │
│                        │  OK  │   │ Cancel │                 │
│                        └──────┘   └────────┘                 │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

The available boot options are:

- **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 the system boots normally

- **diag-switch?**, assumes the value of the CPU drawer key mode switch position:

  - *false*, if the key is set to the Normal position, and the system boots from the device defined by **boot-device**, else

  - *true*, if the key is set to the Service position, and the system boots from the device defined by **diag-device**.

- **diag-device**, identifies the device(s) from which the system boots in diagnostic mode for maintenance purposes.

Select CONFIGURATION VARIABLES to display and/or modify the parameters of the configuration variables. The following screen is displayed.

```
┌─────────────────────────────────────────────────────────────┐
│                    System Menu                              │
│                                                             │
│  ❑   System Configuration                                   │
│        ❑ Manage NVRAM Variables                             │
│            ❑ Configuration Variables                        │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

```
        Manage NVRAM Variables

    Configuration variables:

        input-device            keyboard
        output-device           screen
        pci0b-probe-list        8,9,a,b,c
        pci0a-probe-list        2,3,4,5,6,7
                    OK      Cancel
```

The configuration variables are:

- **input-device**, identifies the console input device (usually *keyboard* for graphic terminal, *com1* for ASCII terminal (BUMP console) or *com2*)

- **output-device**, identifies the console output device (usually *screen* for graphic terminal, *com1* for ASCII terminal (BUMP console) or *com2*)

- **pci0a-probe-list** and **pci0b-probe-list**, list which PCI bus device numbers to probe and in what order (the assumed value is system dependent and includes all available slots).

Select REMOTE MAINTENANCE to properly configure the remote maintenance flags. The following screen is displayed.

```
                System Menu

    ❏   System Configuration
            ❏ Manage NVRAM Variables
                ❏ Remote Maintenance
```

```
        Manage NVRAM Variables

    Remote maintenance:

        sp-d-in?                true
        sp-d-out?               false
        sp-line                 2
                    OK      Cancel
```

The remote maintenance flags are:

- **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 failure at system power on

- **sp-line**, identifies the service line on which the remote connection will be established.

For more information about remote maintenance flags, please refer to the *Maintenance Guide*.

Select SURVEILLANCE VARIABLES to display and/or modify the state of surveillance during the system runtime phase. The following screen is displayed.

```
┌────────────────────────────────────────────────────────────────┐
│                        System Menu                             │
│                                                                │
│   ❑   System Configuration                                     │
│         ❑  Manage NVRAM Variables                              │
│              ❑  Surveillance variables                         │
│                                                                │
└────────────────────────────────────────────────────────────────┘
```

```
┌────────────────────────────────────────────────────────────────┐
│                  Manage NVRAM Variables                        │
│                                                                │
│     Surveillance variables:                                    │
│                                                                │
│            sp-sen                     off                       │
│            sp-sti                     5                         │
│            sp-sdel                    10                        │
│                          ┌──────┐   ┌────────┐                 │
│                          │  OK  │   │ Cancel │                 │
│                          └──────┘   └────────┘                 │
└────────────────────────────────────────────────────────────────┘
```

The surveillance variables are:

• **sp-sen**, defines the state of surveillance (*on* = enabled).

If **sp-sen**=*on*:

• **sp-sti**, defines the period of time of the periodic surveillance when the system control is under the operating system. The time unit is minutes.

• **sp-sdel**, defines the period of time that the BUMP has to wait before starting the periodic surveillance when the system control is under the operating system. This value covers the AIX boot time. The time unit is minutes.

Select SELECT KEYBOARD to adopt the more suitable keyboard language (support of different character set). The following screen is displayed.

```
┌────────────────────────────────────────────────────────────────┐
│                        System Menu                             │
│                                                                │
│   ❑   System Configuration                                     │
│         ❑  Manage NVRAM Variables                              │
│              ❑  Select Keyboard                                │
│                                                                │
└────────────────────────────────────────────────────────────────┘
```

```
┌────────────────────────────────────────────────────────────────┐
│                  Manage NVRAM Variables                        │
│                                                                │
│     Select keyboard:                                           │
│                                                                │
│         US            French         UK                        │
│         Italian       German         Spanish                   │
│         Danish        Finnish        Norwegian                 │
│         Belgian       Portuguese                               │
│                                                                │
│     Selected: US                                               │
│                          ┌──────┐   ┌────────┐                 │
│                          │  OK  │   │ Cancel │                 │
│                          └──────┘   └────────┘                 │
└────────────────────────────────────────────────────────────────┘
```

Select ALIAS DEFINITION to list, create and/or delete a device alias. A device alias is the short representation of a device path. The most common used devices in the system have a predefined alias name. The following screen is displayed.

```
┌─────────────────────────────────────────────────────────────────┐
│                      System Menu                                  │
│                                                                   │
│   ❑   System Configuration                                        │
│       ❑  Manage NVRAM Variables                                   │
│           ❑  Alias Definition                                     │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│              Manage NVRAM Variables                               │
│                                                                   │
│    Select Alias definition:                                       │
│                                                                   │
│              ❑   List                                             │
│                                                                   │
│              ❑   New alias                                        │
│                                                                   │
│              ❑   Delete alias                                     │
│                                                                   │
│              ❑   Network boot alias                               │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

Select LIST, to list all current device aliases.

Select NEW ALIAS, to create a new alias definition. The alias name and device name are requested.

Select DELETE ALIAS, to delete a defined device alias.

Select NETWORK BOOT ALIAS, 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.

- **Netmask**, the IP netmask of the host system.

Manage Operating System

Select MANAGE OPERATING SYSTEM to display the first available boot device and/or select a different boot device. The following screen is displayed.

```
                          System Menu

     ❑     System Configuration
              ❑ Manage Operating System
```

```
                   Manage Operating System

        Select the device to boot:

        /pci@fe0f0090/ethernet@8

            OK      Cancel      Boot     Default
```

To select a different boot device, position on the device path displayed and edit it accordingly. The list of the present devices is shown through the **View Hardware Configuration** menu option, on page 4-8.

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 default value is automatically restored at the next system power on.

Note: The system boot could be conditioned by the security level defined by the system administrator. A password could be requested. For more information, please refer to the *Maintenance Guide*.

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

Boot Operating System

```
                     System Menu

    ❑     Boot Operating System
```

Select BOOT OPERATING SYSTEM to launch a system boot from the first available default device.

Note: This option could be conditioned by the security level defined by the system administrator. A password could be requested. For more information, please refer to the *Maintenance Guide*.

Reset Machine

```
                     System Menu

    ❑     Reset Machine
```

Select RESET MACHINE to perform a system reset.

System Maintenance

```
                     System Menu

    ❑     System Maintenance
```

This option is reserved to the personnel who has a good knowledge of the system architecture and hardware design.

Select SYSTEM MAINTENANCE and, for security reasons, a password is requested. For more information, please refer to the *Maintenance Guide*.

```
    Please enter the password: **************

              ┌──────┐   ┌────────┐
              │  OK  │   │ Cancel │
              └──────┘   └────────┘
```

If the password is entered correctly, the screen of this option is displayed.

```
                  System Maintenance

        ❑     Change Password

        ❑     OK Forth


        ❑     Return to System Manager Menu

        ❑     Help
```

Change Password

```
                    System Menu

    ❏   System Maintenance
        ☐ Change Password
```

Select CHANGE PASSWORD to modify the security password configuration variable. The following screen is displayed.

```
    Update password:

        Current Password:       **************
        New Password:           **************
        Confirm New Password: **************

                    [ OK ]    [ Cancel ]
```

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

```
                    System Menu

    ❏   System Maintenance
        ☐ OK Forth
```

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

Select OK FORTH to access the Open Firmware command interpreter (**ok** prompt). The following sentence is displayed.

```
        Type 'menu' to return to the menu ...

        ok
```

The **ok** prompt command line gives you access to an extensive set of functions for hardware and software development, fault isolation and debugging based on Forth language interpreter. The commands that are available at **ok** prompt depend upon the setting of security level defined by the system administrator. For more details, please refer to the *Maintenance Guide*.

The main and most useful commands available through the interactive command interpreter (**ok** prompt) are described in the *Maintenance Guide*.

Help

This option provides information about the current menu screen and the relevant operating procedures.

Problem Solving

In case of system problems, you can consult **What To Do When a Problem Occurs**, on page 4-18.

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 Problem

It may happen, sometimes, that a problem prevents the system from working correctly.

In many cases, this depends on trivial causes, simple human faults, which can be easily discovered and removed, with no need for a specialist intervention.

In other cases, bad functioning is due to more serious human faults or to a system failure, and the problem solution requires technical intervention.

This section describes some common problems, the possible trivial causes and the related solutions.

Only when you have ensured that the problem is not due to any of the listed causes, you need technical intervention.

The system itself offers some maintenance tools, available also when the operating system is not running, which test the system hardware, and perform the fault isolation.

If you are maintaining the system on your own, you can find the description of these tools in the *Maintenance Guide*. This guide is available at your supplier.

The following table lists some of the problems that may occur working with the system, during either the system power on or its normal operating state. If you encounter one of these problems, you can try to solve it on your own.

Otherwise, if it is necessary to call the technical support for assistance, remember to read the system serial number, as this will be requested by the technical support.

The system serial number is written on the rating plate label placed on the left side of the CPU drawer rear side.

Its format is XAN - F*xx* - *nnnnn*, where:

F*xx*   is the system run code defined by the manufacturer
nnnnn   is the system serial number (5 digits).

Note: XAN changes into XBH for the systems shipped to Brazil.
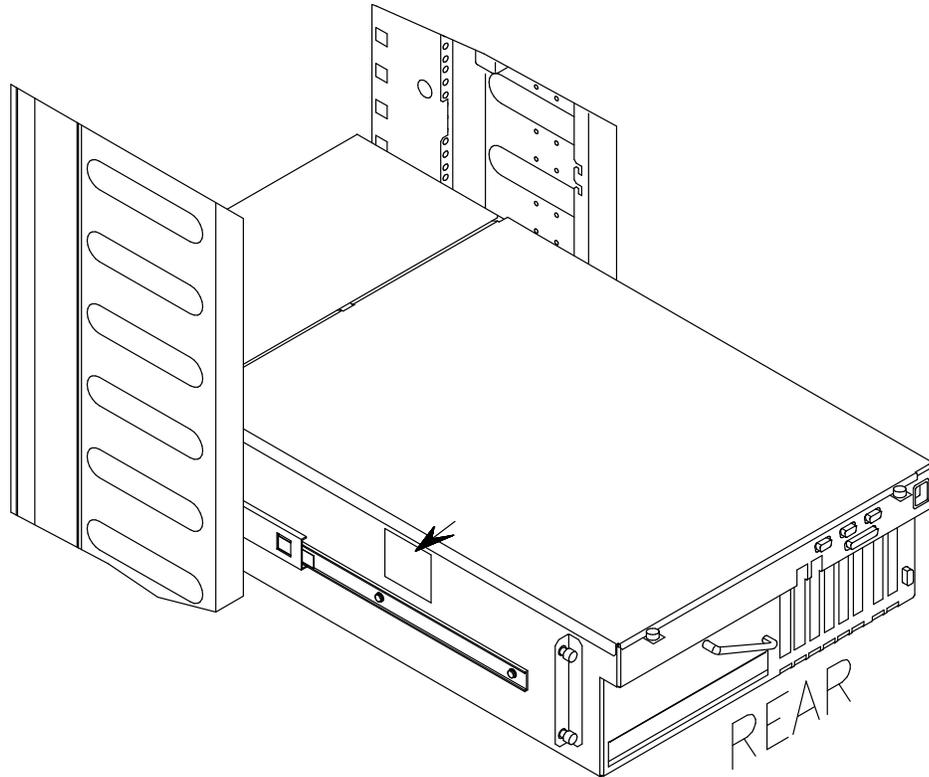
What To Do When a Problem Occurs

Problem Description	Possible Cause	Solution
System Power		
The system does not power on	The CPU drawer power cord is not connected to a PDU outlet or is not properly connected.	*Properly connect the power cord to the CPU drawer and to a PDU outlet.*
	The PDU power cord is not connected to an AC outlet or is not properly connected.	*Properly connect the power cord to the PDU and to the AC outlet.*
	The AC outlet is faulty.	*Try another AC outlet.*
	The AC source is missing.	*Call your electrician to check the AC source.*
Monitor		
The monitor does not power on (the monitor power light is off)	The monitor power switch is not set to the ON position.	*Set the switch to the ON (I) position.*
	The power cord is not connected to an AC outlet.	*Connect the power cord to a working AC outlet.*
	The power cord is not properly connected.	*Properly connect the power cord to the monitor and to the AC outlet.*
	The AC outlet is faulty.	*Try another AC outlet.*
The monitor power light is on but nothing displays on the screen (see note below)	The monitor contrast and/or brightness knobs are set too low.	*Adjust the contrast and/or brightness knobs until you can see the display.*
	The computer system is not powered on.	*Power on the system.*
	The monitor video cable is not properly connected to the dedicated port.	*Properly connect the video cable to the dedicated port.*
	The video cable is not connected to the proper port.	*Check that video cable is connected to:* *- The SVGA port for a graphic monitor* *- A serial port for any ASCII terminal.*
Mouse		
The mouse does not move the cursor or there is no cursor on the screen	The mouse driver has not been loaded.	*Load the mouse driver.*
	The wrong mouse driver is loaded.	*Remove the conflicting mouse driver and install the correct one.*
	The mouse needs to be cleaned.	*Remove the tracking ball and clean it with a damp cloth. Clean the contacts with a component cleaning spray.*
	You are not using the mouse with the proper monitor.	*Use the mouse with the system graphic monitor.*
The mouse buttons do not work	The contacts are dirty.	*Clean the contacts with a component cleaning spray.*
Note: After you have powered on both the system and the graphic terminal connected to the SVGA port, it may take several seconds before something is displayed on the screen. You have a problem only if nothing displays after at least few minutes.		

Problem Description	Possible Cause	Solution
Keyboard		
The keyboard does not function	The keyboard is not connected to the CPU drawer keyboard port.	*Check the cable connection to the system.*
	The keyboard cable is not properly connected.	*Properly connect the keyboard cable.*
	You are not using the keyboard with the proper monitor.	*Use the keyboard with the system graphic monitor.*
The keyboard types random characters	Liquid or dust spilled into the keyboard.	*Allow the keyboard to dry, or clean it with alcohol or component cleaning spray.*
Some of the keys on the keyboard stick or do not work	Liquid spilled into the keyboard.	*Gently pull the key cap off and remove the sticky substance with alcohol.*
	The key contacts are dirty.	*Clean the key contacts with a component cleaning spray; allow the keyboard to dry thoroughly before powering up the system.*
Printer		
The printer does not power on	The printer power switch is not set to the ON position.	*Set the switch to the ON (I) position.*
	The power cord is not connected to an AC outlet.	*Connect the power cord to a working AC outlet.*
	The power cord is not properly connected.	*Properly connect the power cord to the printer and to the AC outlet.*
	The AC outlet is faulty.	*Try another AC outlet.*
The printer does not print	The printer is off-line.	*Press the printer ON-LINE switch and make certain the ON-LINE LED lights.*
	The printer data cable is not properly connected.	*Check the cable and connect it to the correct port.*
	The printer interface is not properly set.	*Check that the printer is set either to serial mode if you are using a serial connection or to parallel mode if you are using a parallel connection. For more details, please refer to the printer documentation.*

Chapter 5. Configuring the System

This section details the system configuration rules in terms of:

- **Rack Configuration**, on page 5-2:
  - The rules to be followed when installing drawers in a rack.

- **Drawers Configuration**, on page 5-5:
  - The rules to be followed when installing CPU's and memory in the CPU drawer
  - The rules to be followed when installing disks, media devices and controllers in the CPU and PCI expansion drawers.

Rack Configuration

This section describes the rules to be followed when installing drawers in a rack.

The rack is divided into 36 units (U), grouped in 11 areas; each U corresponds to 44.45 mm (1.75 inches).

The minimum rack configuration consists of a CPU drawer and a Power Distribution Unit (PDU). The PDU is always installed in the bottom area of the rack and can connect up to 8 drawers; in case more than 8 drawers are connected, an additional PDU is requested.

Different types of drawers can be installed in the rack. The installation priority of drawers is based upon the drawer function, its height and its weight.

- **Rack Area Organization**, below
- **Configuration Table For Drawers**, on page 5-3.

Rack Area Organization

Rack areas are organized as shown below. The starting unit (U) and dimension of each area are indicated.

Area 11 (4U) 33

Area 10 (4U) 29

Area 9 (4U) 25

Area 8 (4U) 21

Area 7 (2U) 19

Area 6 (4U) 15

Area 5 (4U) 11

Area 4 (4U) 07

Area 3 (2U) 05

Area 2 (2U) 03

Area 1 (2U) 01
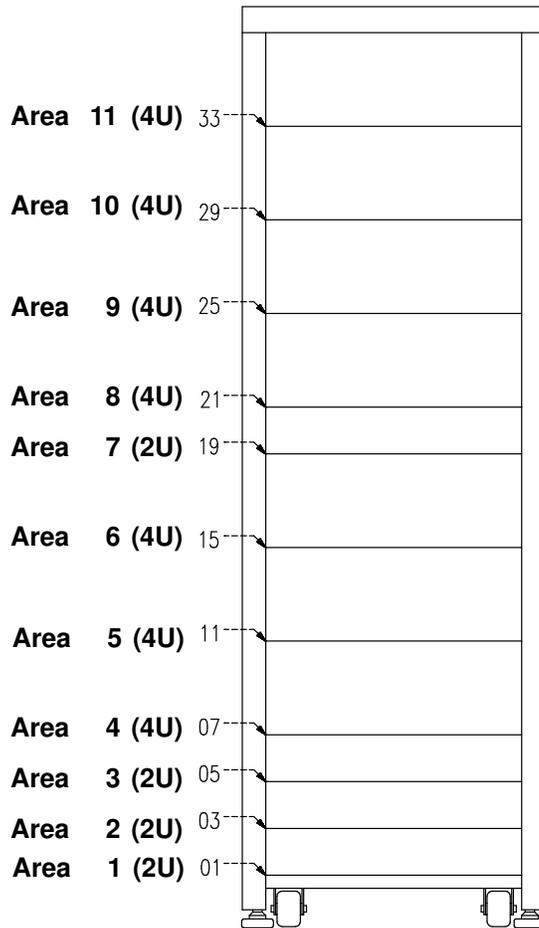
Configuration Table for Drawers

The following table indicates the position and priority of installation of each drawer in the rack.

The DRAWER columns indicate the drawer specificities (left-side part of the table):

- INST. ORD.: the installation order of the drawer inside the rack, with respect to the other drawers
- NAME: the name of the drawer
- SIZE**:** the size of the drawer in number of Units.

The RACK AREAS columns indicate where each drawer can be installed in the rack (right-side part of the table).

Notes:

1. Different possibilities are indicated for each drawer and are numbered according to their priority (1 is the highest priority). In case the highest priority area is already occupied, the drawer must be installed in the <highest + 1> priority area.

2. A drawer can occupy, partially or totally, one or more areas. In case one drawer occupies more than one area, this is indicated in the table. See, for example, DAS 3X00, which is a 12U drawer.

3. A PCI expansion drawer, if present**,** must be installed in the area just below the CPU drawer it is connected to.

4. Area 7 is a reserved area for cabling.

Drawer			Rack Areas and Drawer Installation Priorities										
Inst. Ord.	Name	Size	1 2U	2 2U	3 2U	4 4U	5 4U	6 4U	7 2U	8 4U	9 4U	10 4U	11 4U
1.	PDU	2U	1										
2.	PDU additional	2U		1									
3.	PCI Exp. drawer + CPU drawer (4U+4U)	8U		3 PCI exp.		CPU draw.	2 PCI exp.	CPU draw.		1 PCI exp.	CPU draw.		
4.	CPU drawer	4U		6		5	4	3		1	2		
5.	PCI Exp. drawer	4U		6		5	4	3		1	2		
6.	DAS 3X00	12U		1									
						2				3			
											4		
7.	DAS 2900	8U		1									
						2							
							3					4	
8.	DAS 1300	6U			1								
							2					3	
9.	SSA	4U		1		2	3	4			5	6	
10.	LXB4000/LXB7000	4U		6		5	2	1				3	4
11.	LXB and LXG	8U					1					2	
12.	DLT 4000/7000	4U		1		2	3	4			5	6	7
13.	8mm VDAT	3U		1		2	3	4			5	6	7
14.	SPS/DPE (Standby Power Supply+DAS 5700)	8U				1				2			
											3		
												4	
15.	SPS/DPE/1DAE	12U			1					2			
16.	SPS/DPE/2DAE	16U			1					2			
17.	SPS/DPE/3DAE	20U			1								
18.	SPS/DPE/4DAE	24U			1								
19.	SPS/DPE/5DAE	28U			1								
20.	SPS/DPE/6DAE	32U			1								
21.	DAE5000	4U		7		8	1	2		3	4	5	6
22.	FC-AL Hub	1U rear		9	4	5	6	1		7	8	2	3
23.	Console Concentrator and Cluster Hub	4U		3		4	1	2		7	8	5	6
24.	Console Concentrat.	4U		3		4	1	2		7	8	5	6
25.	Switch Fast Ethernet	2U rear			1	2	3	4			5	6	
26.	Switch Gbit Ethernet	2U rear			1	2	3	4			5	6	
27.	Cluster Hub	2U rear		8	1	2	3	4			5	6	7

Drawers Configuration

System Configuration Summary Table

The following table summarizes the minimum and maximum configuration values in terms of memory, CPU's, controllers and devices, for both the CPU drawer and the PCI expansion drawer.

COMPONENT		CPU DRAWER	PCI EXPANSION DRAWER
MEMORY	MIN.	256M Bytes (1 memory bank)	-
	MAX.	8G Bytes (8x1G Byte memory banks)	-
CPU	MIN.	1	-
	MAX.	4	-
PCI CONTROLLER	MAX.	8	12
ISA CONTROLLER	MAX.	1	-
MEDIA	MIN.	CD-ROM	0
	MAX.	2 (CD-ROM +1)	2
HARD DISK	MIN.	1 system disk (9G Bytes)	0
	MAX.	6 (109G Bytes)	6 (109G Bytes)

Note: If a PCI expansion drawer is connected, one or two PCI slots of the CPU drawer are dedicated to the PCI interconnection cards (KBR cards).

The following schematic shows the main areas of the CPU drawer:

Top View of the CPU Drawer
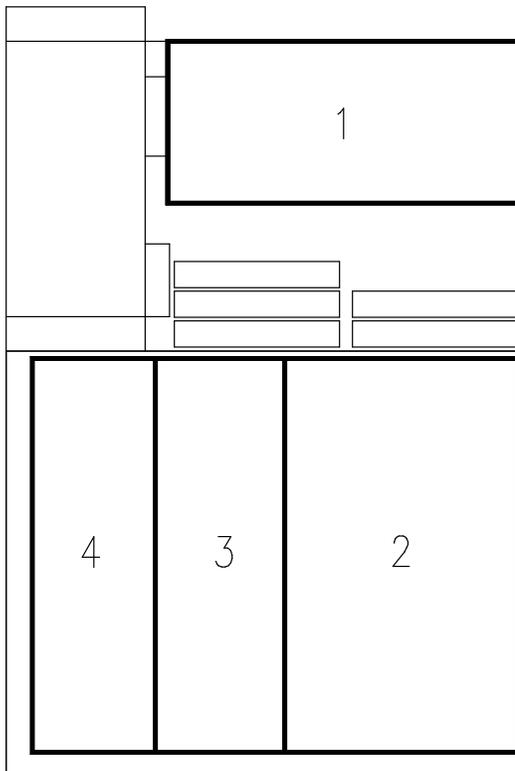
1	Device Area
2	PCI/ISA Controller Area
3	CPU Area
4	Memory Area

The following schematic shows the main areas of the PCI expansion drawer:

Top View of the PCI Expansion Drawer
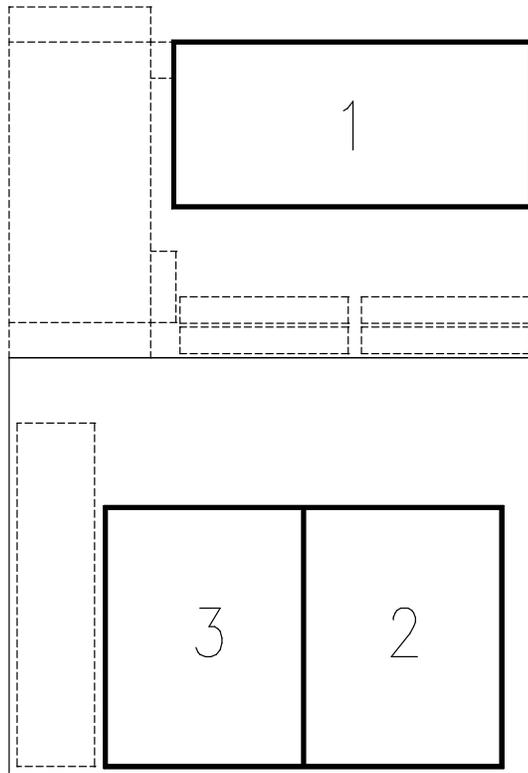
1   Device Area

2   PCI Controller Area (1st KPE planar)

3   PCI Controller Area (2nd KPE planar)

The configuration rules of each area are described in the following paragraphs.

Memory Configuration

There are four memory connectors on the CPU drawer system planar.

Drawer Rear

The four memory connectors on the system planar house four memory risers (FSM), housing eight standard synchronous DIMM connectors.
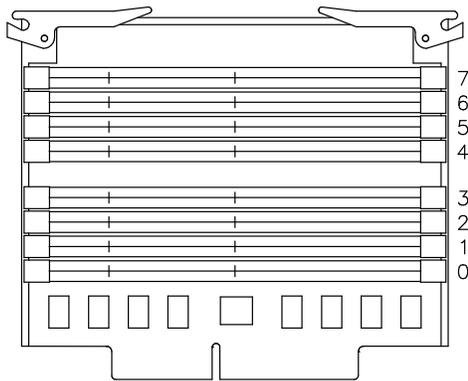
Note: It is not possible to install memory DIMM's directly on the system planar.

The system memory is organized in memory banks made up of four memory DIMM's each, one per memory riser.

Minimum memory bank capacity is 256M Bytes (4x64M Byte memory DIMM's).

Maximum memory bank capacity is 1G Byte (4x256M Byte memory DIMM's).

Maximum memory capacity is 8G Bytes (8x1G Byte memory banks).

The synchronous DIMM's have the characteristics summarized below:

DIMM **Standard 72 bit 168 pin (PC100 - registered with PLL)**
VCC **3.3V**
Frequency **100MHz (with CL2)**
Functionality **Synchronous**
Height **1.7 inch max**
Package Type **TSOPII**

Memory DIMM's belonging to the same memory bank must be plugged into the same connector on each memory riser; for example: memory bank 7 will be made up of 1 memory DIMM plugged in position 7 on each memory riser.

Here are some additional configuration rules to be followed to obtain the best performances. Breaking these rules will decrease performances but will not bring to a loss of memory.

- Install an even number of memory banks

- Install memory banks in couples of homogeneous capacity; each couple of homogeneous memory banks must be installed in contiguous slots, starting from slot 7-6 and then 5-4, 3-2 and 1-0

- Considering the amount of memory you want to use, prefer using as many couples of memory banks as you can, provided that you do not compromise a possible future upgrading.

CPU Configuration

There are four CPU connectors on the CPU drawer system planar.
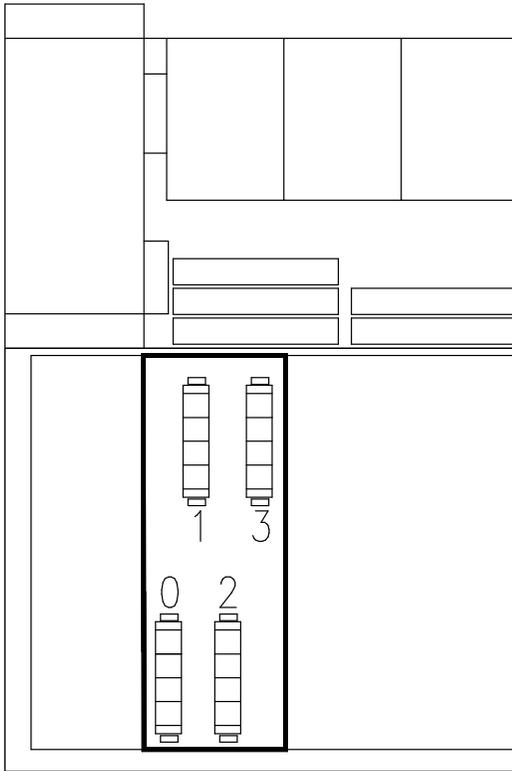
Drawer Rear

The CPU cards must be homogeneous.

Minimum configuration is one CPU, which must be installed in slot 1.

Note: The system cannot work if there is no CPU installed in slot 1.

Install CPU cards according to the following sequence:

Installation Sequence	CPU Card Slot #
1st	1
2nd	0
3rd	3
4th	2

CPU Drawer Controller Configuration

The CPU drawer can house up to eight PCI controllers, having the characteristics described below:

- Up to 4, 64 bit, 33 MHz, PCI controllers
- Up to 4, 32 bit, 33 MHz, PCI controllers.

Moreover, it houses one ISA slot for the internal modem connection.
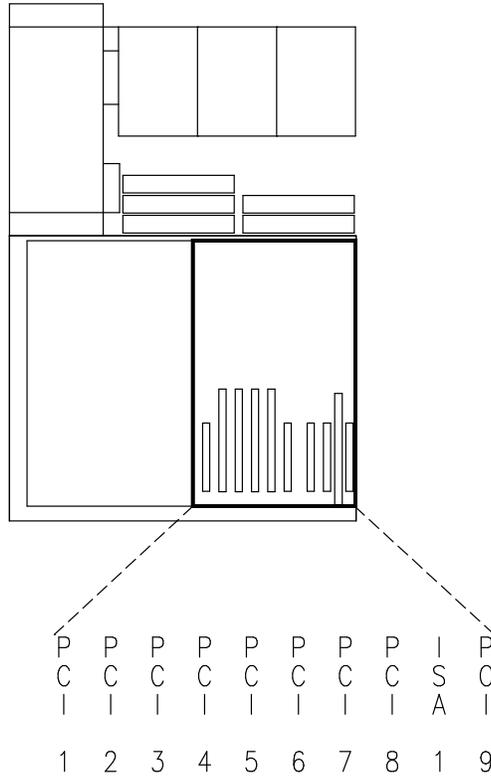
Drawer Rear View

Notes:

1. There is an additional PCI slot (PCI 9, last on the right in the drawing) which is not available in this model, due to mechanical constrains.

2. PCI slot 8 can be used only if the ISA slot is not used and vice-versa.

PCI/ISA Controller Bus Dependences

The CPU drawer provides two native PCI local busses (PCI0, PCI1). PCI bus 0 generates an additional PCI bus through a PCI to PCI bridge (PCI0_1). It also generates an ISA bus through a PCI to ISA bridge.

The following table shows the PCI bus dependences and slot type:

Bus ID	Controller Card Slot #	Slot Type
PCI #1	PCI1 PCI2 PCI3 PCI4	PCI 32 bit PCI 64 bit PCI 64 bit PCI 64 bit
PCI #0	PCI5	PCI 64 bit
PCI #0_1	PCI6 PCI7 PCI8	PCI 32 bit PCI 32 bit PCI 32 bit
ISA	ISA1	ISA 8/16 bit

The configuration rules are:

- To obtain the best performances, first load PCI busses 0 and 1; when these busses are fulfilled, load PCI bus 0_1; load the PCI expansion drawer busses, if any, after those of the CPU drawer are fully loaded

- If a PCI expansion drawer is connected, the KBR cards, dedicated to its connection, must be installed in the CPU drawer in mandatory positions:

  - PCI slot 5 (first KBR)
  - PCI slot 4 (second KBR, if present).

- It is possible to install 32 bit controllers in 64 bit slots

- Although it would sensibly decrease performances, it is possible to install 64 bit controllers in 32 bit slots

- PCI slots 1 and 8 can house only short format controllers (maximum allowed length is 190 mm / 7.5 inches, connector excluded; Matrox, being a medium-long format controller, is allowed in PCI slot 8)

- 64 Port Asynchronous RS-232/RS-422 controllers cannot be installed in contiguous slots

- RAID LVD controller cannot be installed after the PCI bridge, therefore it is not allowed in slots 6, 7, 8 and in the PCI expansion drawer.

- It is suggested, to keep good performances, to install only one Gbit Ethernet controller per PCI bus, possibly into 64 bit slots and before the PCI bridge.

- Install the graphic controller, if any, before the RAID controller (e.g., if the RAID controller is installed in PCI slot 3, install the graphic one in PCI slot 2).

See **System Devices Location Map**, on page B-1, for further details about the I/O subsystem dependences and device location.

The controller cards are identified by a label visible on the external side of the metallic plate guide. See **PCI/ISA Controller List**, on page 5-28, for the list of supported controllers and related labels.

PCI Expansion Drawer Controller Configuration

The PCI expansion drawer can be equipped with one or two PCI expander planars (KPE), housing each up to 6, 32 bit, 33 MHz PCI controller cards.


```
| KXB2  2/P1  2/P2  2/P3  2/P4  2/P5  2/P6 |    | KXB1  1/P1  1/P2  1/P3  1/P4  1/P5  1/P6 |

|------------------ 2nd  KPE ------------------>|    |------------------ 1st  KPE ------------------>|
```
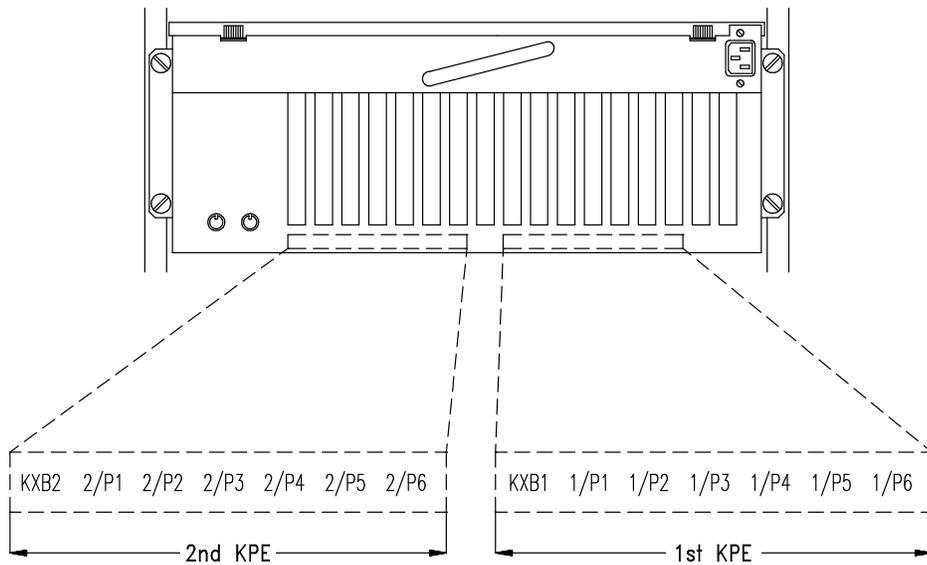
Drawer Rear

An additional slot of each KPE planar is dedicated to the KXB card, which provides the extension of the CPU drawer PCI busses.

The KXB card of each KPE planar is connected to the CPU drawer corresponding KBR card, as follows:

PCI Expansion Drawer	CPU Drawer
KXB of the 1st KPE	KBR, slot PCI #5
KXB of the 2nd KPE	KBR, slot PCI #4

Warning: The KXB card must be installed only in its dedicated slot.

The controllers are installed by the system manufacturer according to specific rules. In case you need to install additional controllers, here are some rules to follow:

- It is not possible to install RAID LVD controller in the PCI expansion drawer; therefore RAID LVD configurations are not allowed in the PCI expansion drawer

- SCSI controllers for internal devices must be installed in fixed position on the first KPE planar. Notice that this rule must be applied even if two KPE planars are installed.

  In particular:

  – The SCSI controller for Area 3 disk devices (and Area 2 disk devices, if on the same bus) must be installed in PCI 5 slot of the first KPE (1/P5)

  – The SCSI controller for Area 2 disk devices, if a specific controller for the area is used, must be installed in PCI 4 slot of the first KPE (1/P4)

  – The SCSI controller for Area 1 media devices, if any, must be installed in PCI 6 slot of the first KPE (1/P6).

- A maximum of three SCSI controllers per KPE is allowed; as those for internal devices are always installed on the first KPE, start installing those for external devices, if any, on the second KPE, if present.

- A maximum of three Ethernet controllers per KPE is allowed; if possible, share their installation between the two KPE's.

- 64 Port Asynchronous RS-232/RS-422 controllers cannot be installed in contiguous slots.

- Graphic controllers cannot be installed in the PCI expansion drawer.

- The PCI SCSI RAID Controller Ultra2-LVD cannot be installed in the PCI expansion drawer.

See **PCI/ISA Busses and Devices**, on page B-5, for further details on the I/O subsystem dependences and device location.

The controller cards are identified by a label visible on the external side of the metallic plate guide. See **PCI/ISA Controller List**, on page 5-28, for the list of supported controllers and related labels.

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

CPU Drawer Device Configuration

In the CPU drawer, there are three device areas. These are located horizontally, on the front side of the drawer.

CPU Drawer Top View
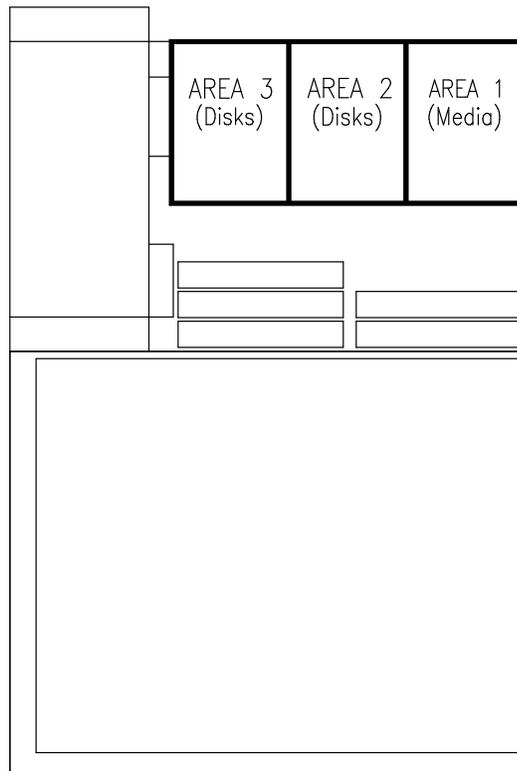
```
 _____
|      |    _____   |
|      |   |          |          |        |  |
|      |   | AREA 3   | AREA 2   | AREA 1 |  |
|      |___| (Disks)  | (Disks)  | (Media)|  |
|      |   |          |          |        |  |
|      |   |_____|_____|_____|  |
|      |    _____                   |
|      |   |_____|   _____  |
|      |___|_____|  |_____| |
|          |_____|  |_____| |
|       _____ |
|      |                                    ||
|      |                                    ||
|      |                                    ||
|      |                                    ||
|      |                                    ||
|      |                                    ||
|      |                                    ||
|      |_____||
|_____|
```

- Area 1 hosts up to two 1.6 inch media drives
- Areas 2 and 3 host each up to three 1 inch hard disk drives.

A disk cage is required to install hard disk drives. Each disk cage occupies one area.

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

Each SCSI bus supports the connection of up to two disk cages.

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

The system supports ULTRA-2/LVD disk devices (Low Voltage Differential), running at 10000 RPM (Revolutions Per Minute).

The system planar hosts two native SCSI busses:

- The first bus, ULTRA/SE (Single Ended), SCSI-0, is always used to control media drives installed in Area 1

- The second bus, ULTRA-2/LVD, SCSI-1, is used, by default, to control hard disk drives installed in Area 3 and Area 2.

Hard disk drives and/or media drives installed in each drawer can also be managed by additional SCSI controllers, provided they are installed in the drawer itself.

The table which follows, summarizes the possible SCSI connections inside the CPU drawer:

SCSI BUS	Area 1	Area2 alone	Area 3 alone	Areas 2 and 3 together
SCSI-0	yes	no	no	no
SCSI-1	no	no	yes	yes
1st RAID bus	no	yes	no	no
2nd RAID bus	no	no	yes	no
Additional ULTRA-2/LVD SCSI bus	no	yes	no	no

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

• Install the system disk drive in the rightmost position of Area 3 (SCSI-ID 0) of the CPU drawer (looking at the system rear)

• Install devices beginning always from the free slot inside the area in the rightmost position (looking at the system rear)

• A mix of media drives and hard disk drives inside the same area is not allowed.

Refer to **SCSI-ID Configuration**, on page 5-26, for details about the SCSI-ID identification that the device will acquire once it is installed and for some suggestions about the device installation sequence.

Some device configuration examples are provided in **Examples of SCSI Connections for the CPU Drawer**, on page 5-17.

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

Disk 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 the system.

See **Device Hot Swapping**, on page 6-21, for the swapping procedure.

RAID Configurations

The CPU drawer support RAID configurations through a specific RAID controller which provides two RAID busses. Each RAID bus manages one internal disk area.

Examples of SCSI Connections for the CPU Drawer

Some examples of SCSI connections are illustrated in the following pages. These do not include all possible disk/media device configurations, but they should represent an easy template to help you perform the required SCSI connections.

In particular, the following examples are given:

- **Devices on the Native SCSI Busses**, below

  – Connection of one media device in Area 1 and disk devices in Area 3

  – Connection of two media devices in Area 1, and disk devices in Areas 3 and 2.

- **Devices on an Additional SCSI Bus**, on page 5-19

  – Connection of disk devices in Area 2 on an additional SCSI bus and disk devices in Area 3 and media devices in Area 1 on the native SCSI busses.

- **Devices under RAID Configuration**, on page 5-20

  – Connection of disk devices on two RAID busses.

Notes:

1. You can find information on the SCSI cables and terminators used to perform these connections in **SCSI Cables Description and Connection**, in the *Maintenance Guide*.

2. Additional examples of SCSI connections, related to the PCI expansion drawer, are in **Examples of SCSI Connections for the PCI Expansion Drawer**, on page 5-23.

Devices on the Native SCSI Busses

- Connection of one media device in Area 1 and disk devices in Area 3.
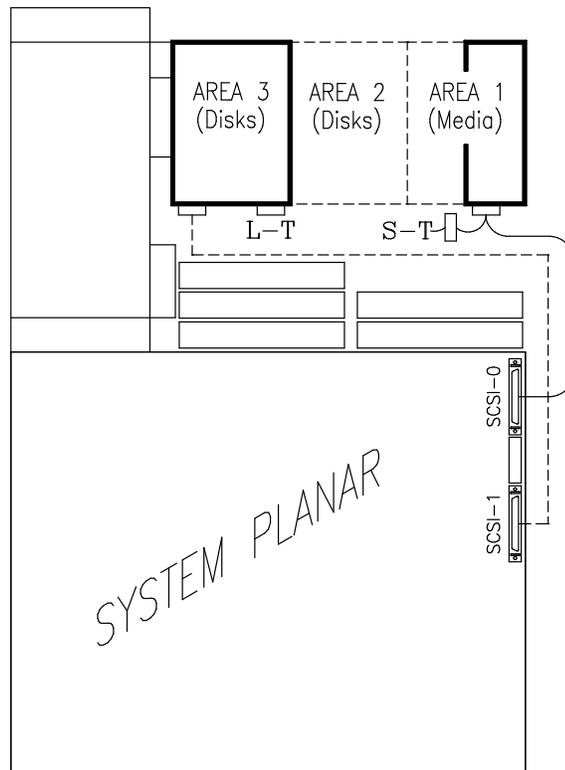
Legend:
L-T LVD/SE terminating plug
S-T SE terminating plug
SCSI-0 / SCSI-1 Native SCSI busses

• Connection of two media devices in Area 1, and disk devices in Areas 3 and 2.
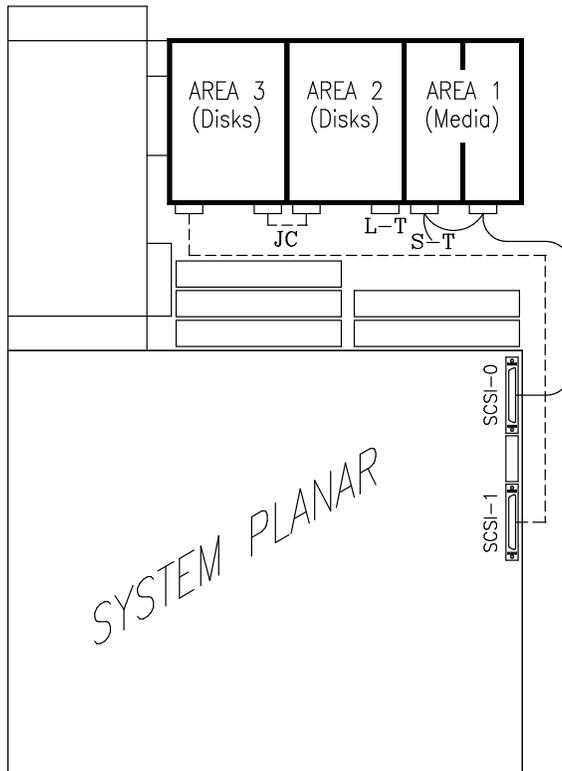
 Legend:
L-T LVD/SE terminating plug
S-T SE terminating plug
JC Jumper cable
SCSI-0 / **SCSI-1** Native SCSI busses

Devices on an Additional SCSI Bus

- Connection of disk devices in Area 2 on an additional SCSI bus and disk devices in Area 3 and media devices in Area 1 on the native SCSI busses.

    This configuration is recommended for software disk mirroring.
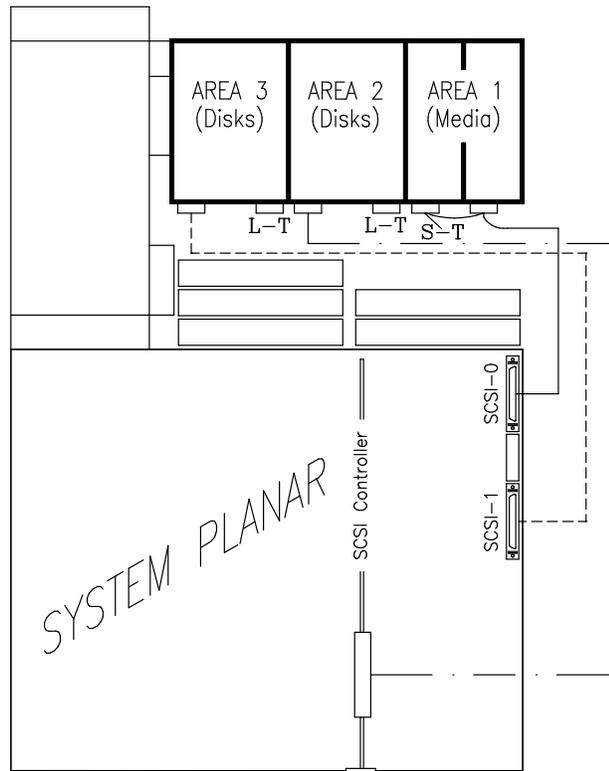
Legend:
L-T LVD/SE terminating plug
S-T SE terminating plug
JC Jumper cable
SCSI-0 /**SCSI-1** Native SCSI busses

Devices under RAID Configuration

- Connection of disk devices on two RAID busses.
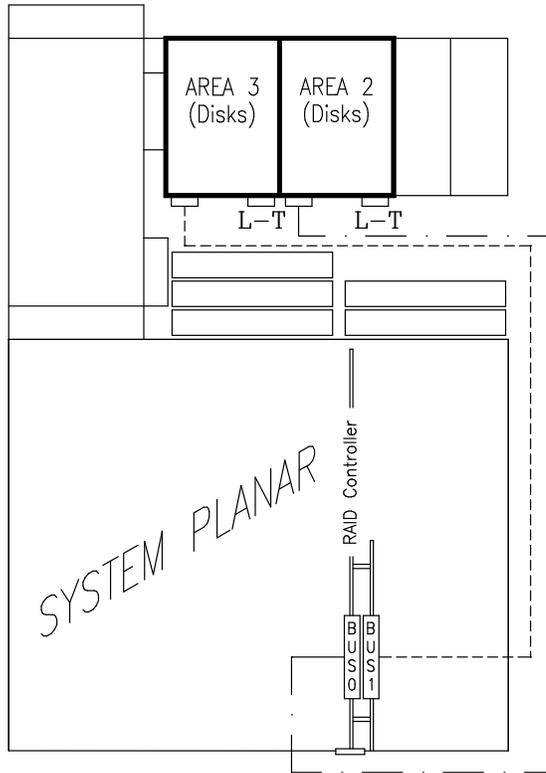
Legend:
L-T LVD/SE terminating plug

PCI Expansion Drawer Device Configuration

The PCI expansion drawer has three device areas. These are located horizontally, on the front side of the drawer.
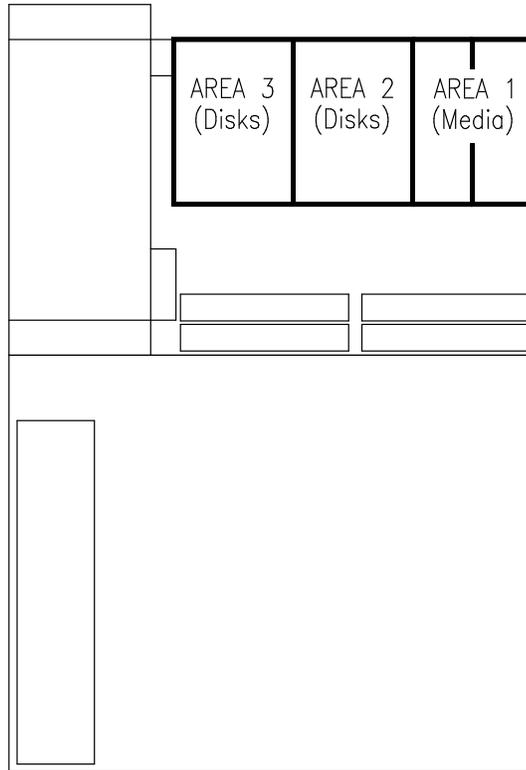
Drawer Rear

- Area 1 hosts up to two 1.6 inch media drives

- Areas 2 and 3 host each up to three 1 inch hard disk drives.

A disk cage is required to install hard disk drives. Each disk cage occupies one area.

The connection to the SCSI bus is done through the disk cage back planes. Each SCSI bus supports the connection of up to two disk cages.

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

The drawer supports ULTRA-2/LVD disk devices (Low Voltage Differential), running at 10000 RPM (Revolutions Per Minute).

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

- Area 3 disk devices must be managed by a SCSI controller installed in PCI 5 slot of the first KPE planar **(**1/P5**)**

- Area 2 disk devices can be managed either by the Area 3 controller installed in PCI 5 slot or by a dedicated SCSI controller installed in PCI 4 slot of the first KPE planar (1/P4)

- Area 1 media devices must be managed by a SCSI controller installed in PCI 6 slot of the first KPE planar (1/P6)

- Install devices beginning always from the free slot inside the area in the rightmost position (looking at the drawer rear)

- A mix of media drives and hard disk drives inside the same area is not allowed.

Refer to **SCSI-ID Configuration**, on page 5-26, for details about the SCSI-ID identification that the device will acquire once it is installed and for some suggestions about the device installation sequence.

Examples of device configuration are provided in **Examples of SCSI Connections for the PCI Expansion Drawer**, on page 5-23.

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

Disk Hot Swapping

If a hard disk drive is faulty, it can be removed and replaced <u>without interrupting the system activity,</u> through the hot swapping feature implemented on the system.

See **Device Hot Swapping**, on page 6-21, for the swapping procedure.

RAID Configurations

The PCI expansion drawer supports RAID configurations through a specific RAID controller which provides two RAID busses. Each RAID bus manages one internal disk area.

The RAID controller must be installed in the CPU drawer. A specific SCSI connection kit is used to connect it from the CPU drawer to the disk cages of the PCI drawer.

Examples of SCSI Connections for the PCI Expansion Drawer

Some examples of SCSI connections are illustrated in the following pages. These do not include all possible disk/media device configurations, but they should represent an easy template to help you perform the required SCSI connections.

In particular, the following examples are given:

- **Devices on Two SCSI Busses**, below

    – Connection of disk devices on one SCSI bus and media devices on another SCSI bus

- **Devices on Three SCSI Busses**, on page 5-24

    – Connection of disk devices on two SCSI busses and media devices on another SCSI bus

- **Devices under RAID Configuration**, on page 5-25

    – Connection of disk devices on two RAID busses.

Notes:

1. You can find information on the SCSI cables used to perform these connections in the *PCI Expansion Drawer Service Guide.*

2. Additional examples of SCSI connections, related to the CPU drawer, are in **Examples of SCSI Connections for the CPU Drawer**, on page 5-17.

Devices on Two SCSI Busses

- Connection of disk devices on one SCSI bus and media devices on another SCSI bus.
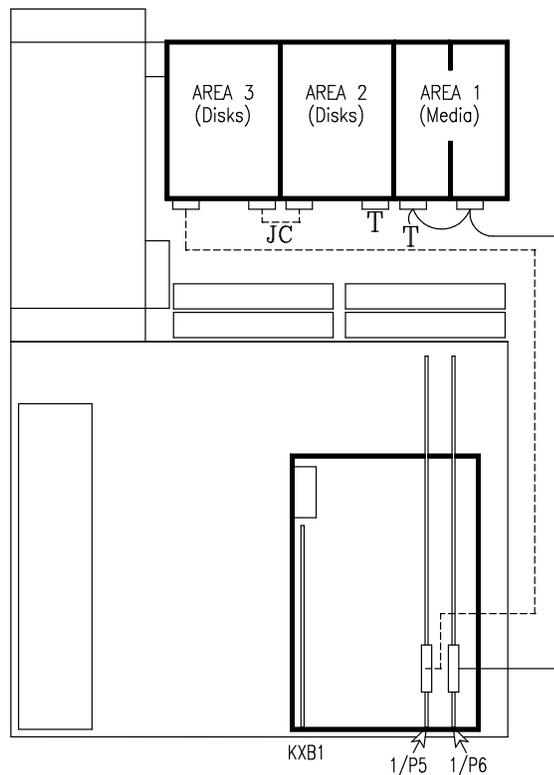
Legend:
T Terminating plug
JC Jumper cable

Devices on Three SCSI Busses

- Connection of disk devices on two SCSI busses and media devices on another SCSI bus.
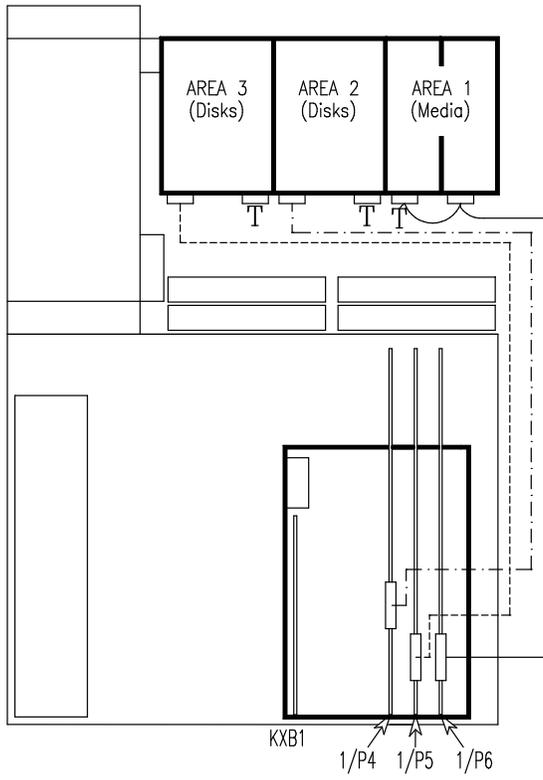
Legend:
T Terminating plug

Devices under RAID Configuration

- Connection of disk devices on two RAID busses.

AREA 3 (Disks) AREA 2 (Disks)

Bus 0 Bus 1

KXB1 1/P5
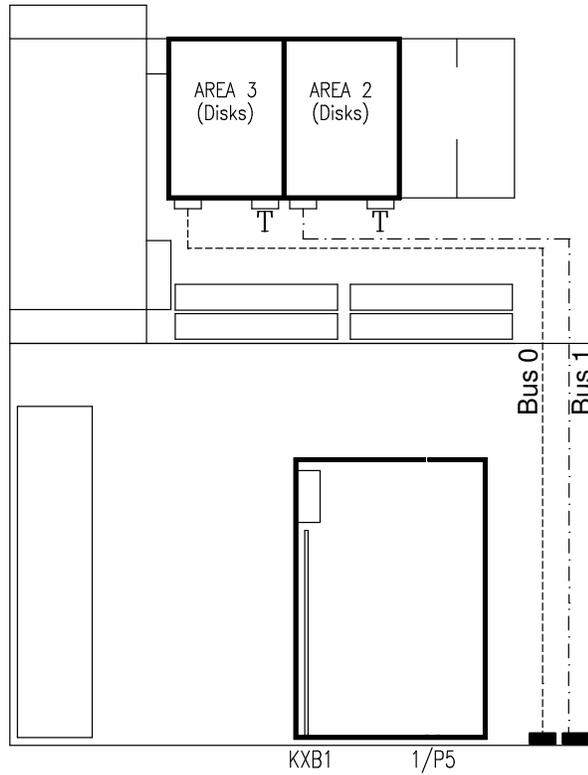
Legend:
T Terminating plug

- Connection of external SCSI link between the CPU drawer and the PCI expansion drawer.

Rear View PCI Expansion Drawer

Bus 0

Bus 1

Rear View CPU Drawer
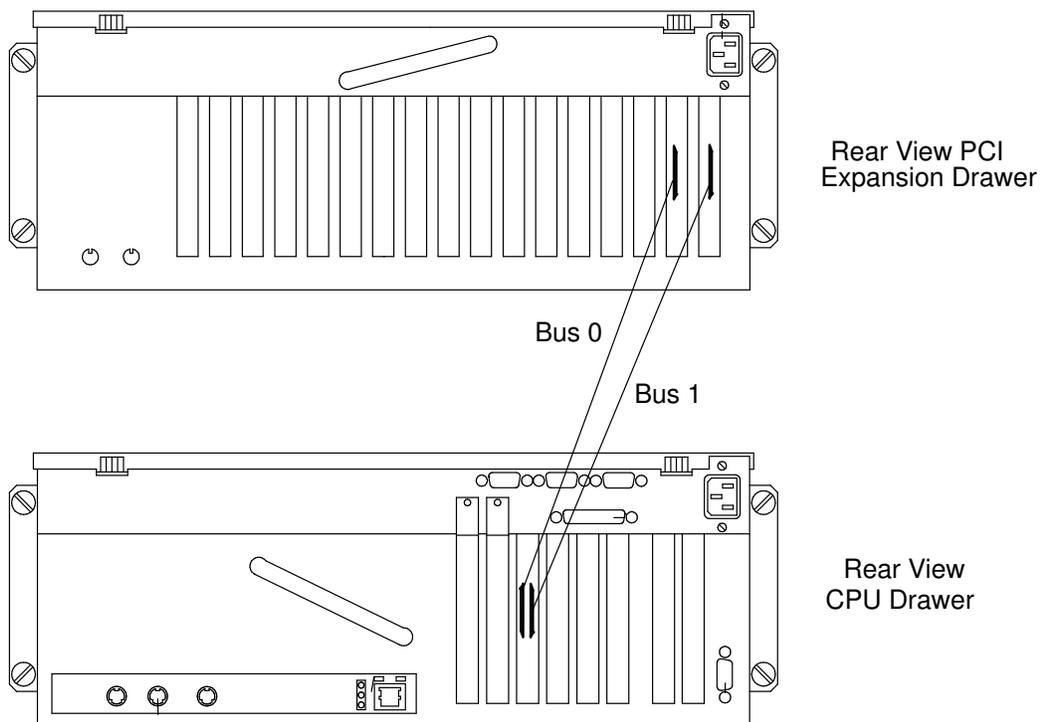
SCSI-ID Configuration

The following applies to CPU and PCI expansion drawer devices.

- **Media Drive SCSI-ID**, below

- **Hard Disk Drive SCSI-ID**, on page 5-27.

Media Drive SCSI-ID

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

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

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

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

The following table shows the correspondence between physical position and SCSI-ID for media drives installed in the drawer(s). It also gives the suggested installation sequence.

Notice that there is not a direct link between the installation sequence and the SCSI-ID. Even if the installation sequence is not the one reported here, you must keep the correspondence between physical position and SCSI-ID.

- **MEDIA DRIVE CONFIGURATION TABLE (Drawer Rear View)**

Device Area	3		2		1	
Physical Position	-	-	-	-	M2	M1
SCSI-ID	-	-	-	-	5	6

Legend:
M*n* = M media drive
       n number giving the installation sequence of the devices inside the drawer.

Hard Disk Drive SCSI-ID

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

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

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

The following tables detail the correspondence between physical position and SCSI-ID for hard disk drives installed in the drawer(s).

Notice that there is not a direct link between the installation sequence and the SCSI-ID. Even if the installation sequence is not the one reported here, the correspondence between physical position and SCSI-ID remains unchanged.

- **HARD DISK DRIVE CONFIGURATION TABLE (Drawer Rear View)**

Device Area	3			2			1	
Physical Position	D3	D2	D1	D6	D5	D4	-	-
SCSI-ID	2	1	0	A	9	8	-	-

Legend:
D*n* = D hard disk drive
    n number giving the installation sequence of devices inside the drawer.

PCI/ISA Controller List

The controller cards are identified by a label visible on the external side of the metallic plate guide.

A list of controller cards supported by your system is provided below. Notice that this list is not meant to be exhaustive and that very recent controller cards could be missing from it.

The description of each controller and its identification label are anyway included in the controller specific documentation.

The following table provides the cross reference between the controller card model and the identification label.

Label	Description
1-T	Graphics GXT130P
4-J	SSA 4-Port RAID
8-T	Auto LAN Streamer Token Ring
B1-2	64-bit Graphics (MGA Millennium) 2MB RAM
B1-3	64-bit Graphics (MGA Millennium) 4MB RAM
B2-G	1-Port Synchronous Communication
B2-H	4-Port Synchronous Communication
B2-L	2-Port Synchronous Communication
B3-9	128-Port Async. EIA 232
B3-A	8-Port Async. EIA 232
B3-B	8-Port Async. EIA 422A
B3-C	64-Port Async. EIA 422A
B4-4	SCSI RAID (ULTRA/SE)
B4-5	ULTRA SCSI SE
B4-6	ULTRA SCSI DE
B4-7	Fiber Channel Emulex
B4-8	Fiber Channel Emulex
B4-9	ULTRA-2/LVD SCSI
B4-A	Copper Fiber Channel
B4-B	Optical Fiber Channel
B4-C	SCSI RAID Controller Ultra2-LVD
B5-3	FDDI Fiber UTP Single Ring
B5-4	FDDI Fiber Single Ring
B5-5	FDDI Fiber Dual Ring
B5-6	Ethernet 10/100Mbps
B5-9	155 ATM
B5-A	ISA Internal Modem FRANCE
B5-B	ISA Internal Modem UK
B5-C	ISA Internal Modem BELGIUM
B5-D	ISA Internal Modem NETHERLANDS
B5-E	ISA Internal Modem ITALY
B5-K	ISA Internal Modem US
B5-L	ISA Internal Modem GERMANY
B5-M	Ethernet ZNYX 10/100Mbps
B5-N	Gigabit Ethernet-SX
B5-R	Token Ring
B5-S	PAN European Modem

Chapter 6. Expanding the System Configuration

- **Device Upgrading**, on page 6-10
- **Controller Upgrading**, on page 6-23
- **CPU Upgrading**, on page 6-28
- **Memory Upgrading**, on page 6-30
- **Adding a PCI Expansion Drawer**, on page 6-34.

Before starting any upgrade procedure, the system must be prepared, as described in **Preparing the System for an Upgrade**, on page 6-2. Also, the upgrading procedures must be executed carefully following the configuration rules given in **Configuring the System**, on page 5-1.

Top View of the Drawer
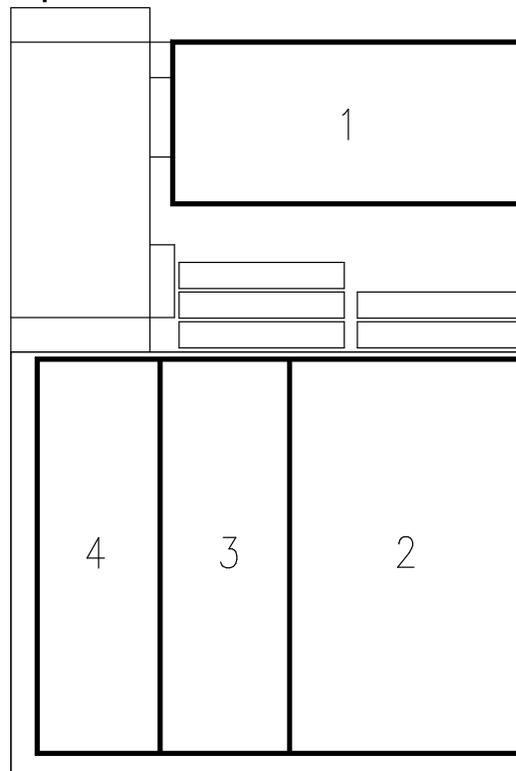
1	Device Area
2	Controller Area
3	CPU Area
4	Memory Area

The system configuration can also be expanded by adding a PCI expansion drawer.

The hardware installation procedure of the PCI expansion drawer is described in the *Rack Service Guide*.

The connection between the base CPU drawer and the PCI expansion drawer is described in *PCI Expansion Drawer Quick Set Up*, a leaflet delivered with the PCI expansion drawer itself.

The procedures included in this section, related to the device and controller area upgrading, apply both to the CPU and PCI expansion drawers.

Preparing the System for an Upgrade

A sequence of operations, such as stopping the system, sliding the drawers out of the rack, removing drawers front or top cover, restarting the system, may be required whenever you need to maintain the CPU drawer or the PCI expansion drawer.

In particular, before starting any maintenance procedure and after having completed it, some specific operations are required for each procedure.

All of these operations are detailed in the following paragraphs, while specific reference-marks to them are included in each procedure.

- **How to Handle Hardware Components**, on page 6-3
- **Preliminary Operations**, on page 6-4
- **Partial Removal / Installation of the Drawer**, on page 6-5
- **Top Cover**, on page 6-7
- **Front Cover**, on page 6-8
- **Restart Operations**, on page 6-9.

How to Handle Hardware Components

Tools Needed

You should have the following tools available before you start installation and removal procedures on the drawers.

- A large flat blade screwdriver
- A hex pipe wrench M5 for taptite hex screws M3
- A hex pipe wrench M7 for taptite hex screws M4 (length of tube=145 mm)
- A torx screwdriver for torx screws ∅ 3 mm
- A torx screwdriver for torx screws ∅ 4 mm
- A Phillips screwdriver size 1 for cross-slotted screws
- 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 drawers.

2. Wear the antistatic wrist strap, refer to **How to Use the Antistatic Wrist Strap**, below.

3. Grip hardware components by the edges. Hold drives by the frame. Avoid touching the soldered joints or pins.

4. If you need to lay the hardware component down while it is out of the antistatic envelope, lay it on the antistatic envelope.

5. Handle the hardware components carefully in order to prevent permanent damage.

How to Use the Antistatic Wrist Strap

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

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

Preliminary Operations

CAUTION:
Before upgrading the system, ensure that the following preliminary operations have been performed correctly to prevent a possible hazard.

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

Note: In case one hard disk drive is faulty, the hot swapping feature enables you to remove and replace it without stopping the system activity. Refer to the procedures described in **Device Hot Swapping**, on page 6-21.

1. Exit any applications that are running. Consult the application manuals for instructions.

2. Open the front door of the rack.

3. Check that the media drives, if any, do not contain any media.

4. If the system is running, perform a system shutdown.

5. Power off the system by turning the key mode switch of the CPU drawer to the Power Off position.

6. Open the rear door of the rack.

7. Make sure the power switches for all the external devices and drawers connected to the CPU drawer, if any, are set to OFF, unless they are shared in a High Availability configuration. In this case, they must not be powered off.

8. Switch off the circuit-breaker of the PDU outlet where the CPU drawer is connected. If a PCI expansion drawer is connected to this CPU drawer, switch off also the related circuit-breaker of the PDU outlet.

9. Unplug the power cord of the CPU drawer from the dedicated receptacle at the CPU drawer rear. If a PCI expansion drawer is connected to this CPU drawer, unplug also its power cord.

CAUTION:
To remove the primary power from the drawer, unplug the "Appliance Coupler" on the rear side.

Notes:

1. In case any cables connected to the drawer make the drawer sliding operation difficult, record (if not already done) which connector attaches to which cable and disconnect the cables.

2. Check that all the on-board LED's are set to OFF before performing any operation on the system.

DANGER
When adding or removing any additional devices to or from a drawer, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect the drawer power cord 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

Removal

1. Open the rear door of the rack.

2. Loosen the retaining screws that secure the drawer to the rack chassis.
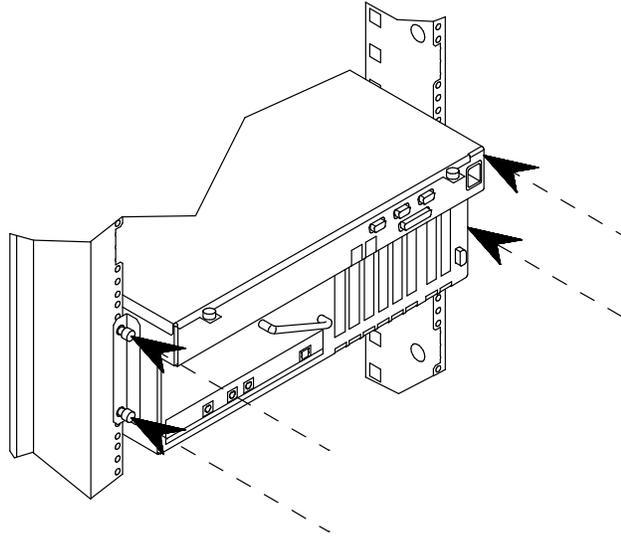
Note: In case cables connected to the drawer make the drawer sliding operation difficult, record which connector attaches to which cable and disconnect the cables.

3. Firmly grip the handle placed on the rear of the drawer and slide the drawer out, until it is well locked.
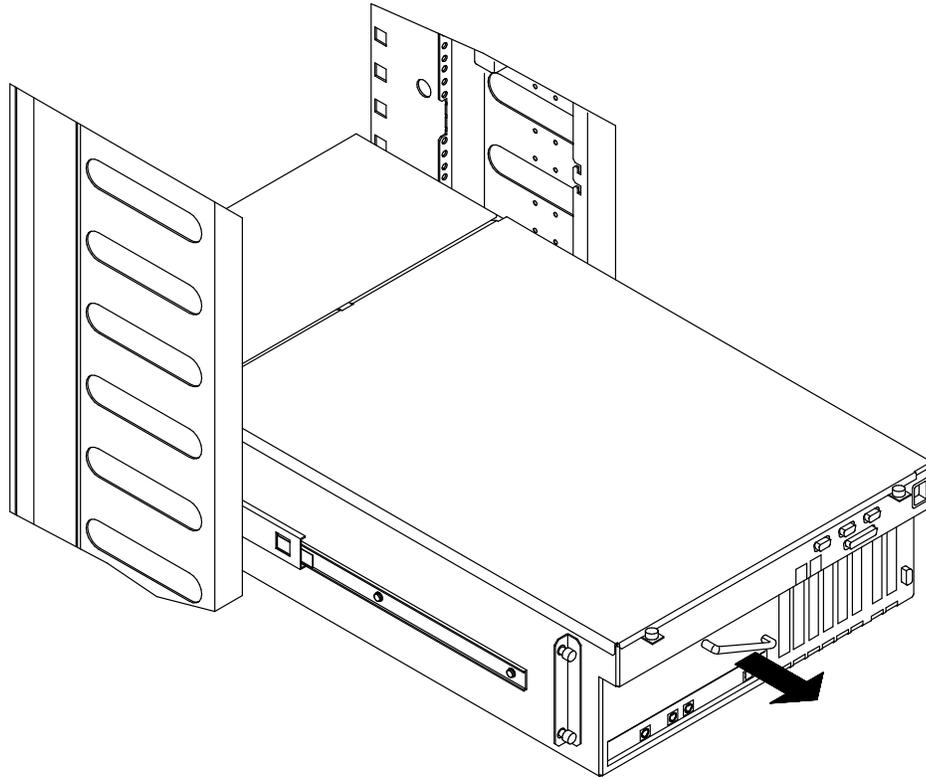
Installation

1. Insert the drawer into the rack, performing the following steps:

   a. Unlock the drawer telescopic rails, pushing simultaneously the metal tongues at sides of the drawer, as indicated at A in the figure.

   b. Firmly slide the drawer inside the rack, until it is well seated, as shown at B.
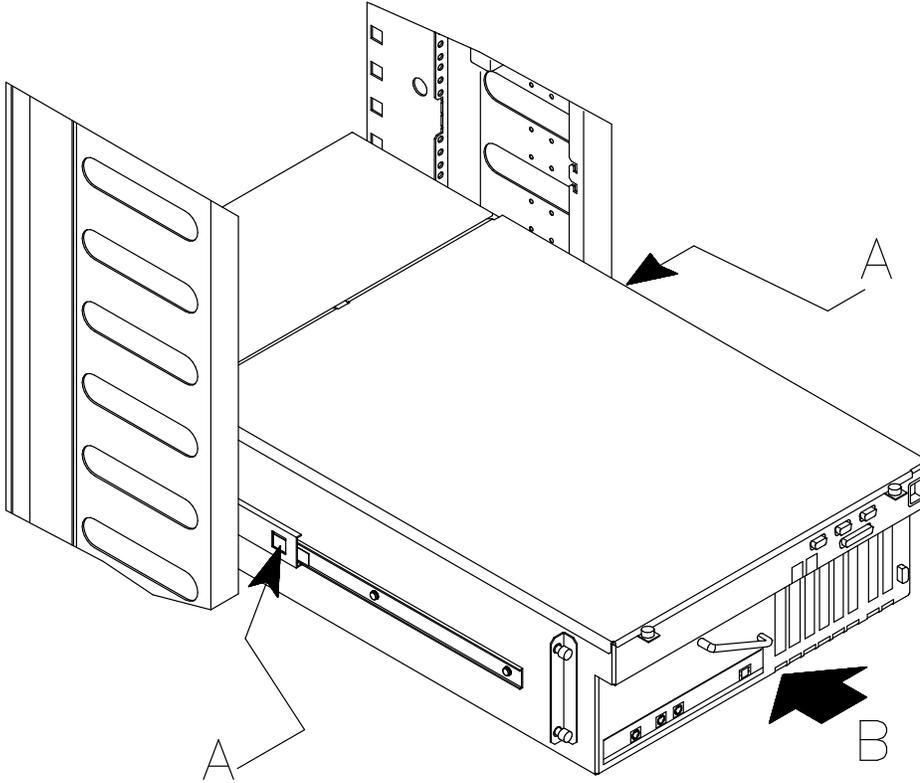
2. Secure the drawer to the rack chassis, tightening its retaining screws on the rear side.
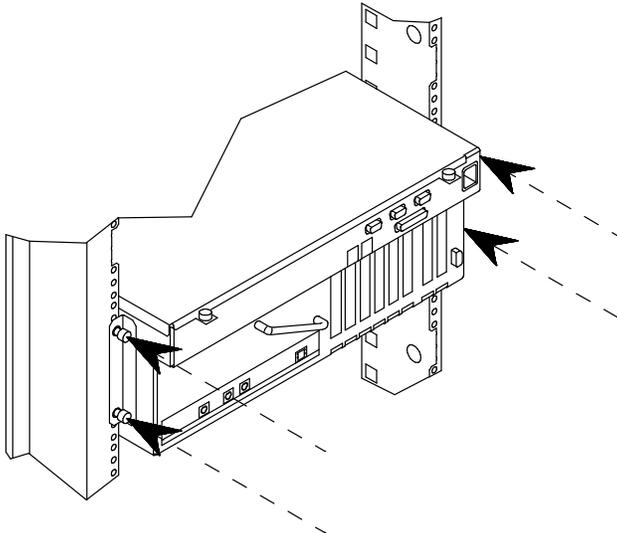
3. Close the rear door of the rack.

Top Cover

Removal

1. Perform the operation described in **Partial Removal** / **Installation of the Drawer**, **Removal** procedure, on page 6-5.

2. Loosen the retaining screws located on the top cover, at the drawer rear, as indicated by A in the figure.

3. Remove the drawer top cover sliding it towards you, as shown at B.
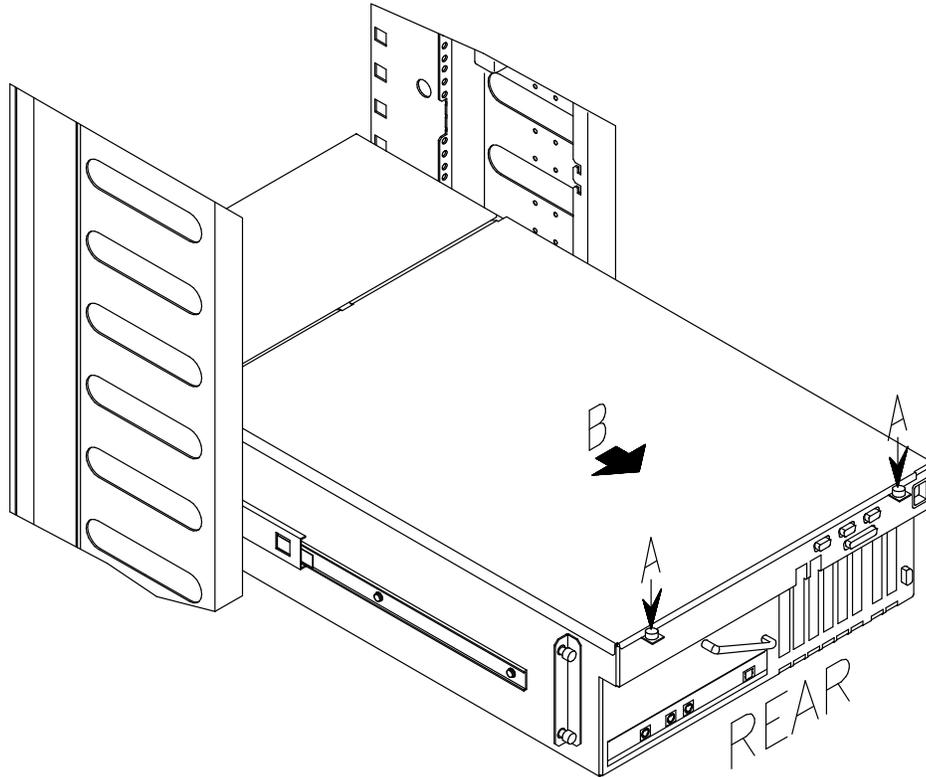
Installation

1. Hook the retaining bracket on the top cover with the corresponding retainer on the drawer chassis.

2. Secure the top cover to the drawer, tightening clockwise its retaining screws.

3. Perform the operation described in **Partial Removal** / **Installation of the Drawer**, **Installation** procedure, on page 6-6.

Front Cover

Removal

1. Open the front door of the rack.
2. Loosen the four retaining screws of the front cover and remove it, as shown in the figure.
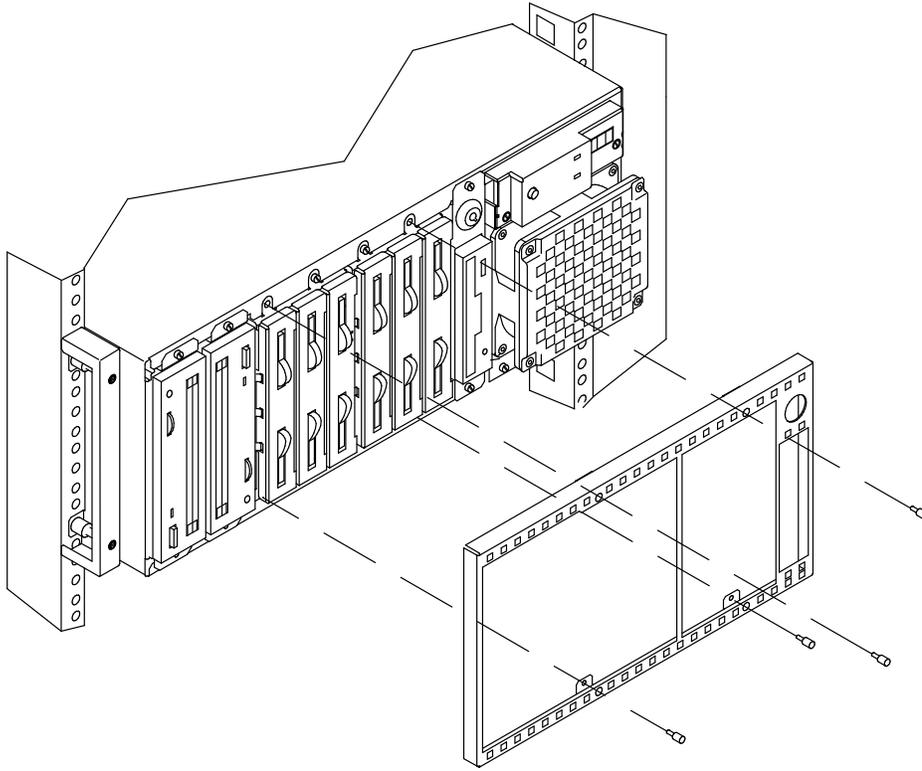
Installation

1. Position the front cover on the drawer front.
2. Fix the front cover tightening the related screws.
3. Close the front door of the rack.

Restart Operations

The following operations must be performed after all maintenance operations on the drawer 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. Connect any external cable to the CPU drawer or PCI expansion drawer rear, according to the original configuration.

2. Connect the CPU drawer power cord. Connect also the PCI expansion drawer power cord, if present.

Warning: Do not connect the drawers to a power source other than the PDU.

3. Switch on the circuit-breaker of the PDU outlet where the CPU drawer is connected. Switch on also the circuit-breaker of the PDU outlet where the PCI expansion drawer is connected, if present.

4. Set the power switches of the external devices and drawers connected to the CPU drawer, if any, to ON.

5. Close the rear door of the rack.

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).

7. Close the front door of the rack.

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 the operating system documentation.

Device Upgrading

Note: These removal, installation and hot swapping procedures apply to devices both in the CPU drawer and in the PCI expansion drawer.

- **Media Drive Removal**, below
- **Hard Disk Drive Removal**, on page 6-12
- **Media Drive Installation**, on page 6-15
- **Hard Disk Drive Installation**, on page 6-18
- **Device Hot Swapping**, on page 6-21.

Media Drive Removal

Warning: Before handling any device, be sure you know the configuration rules described in **Configuring the System**, on page 5-1.

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 6-4.

3. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Removal** procedure, on page 6-5.

4. Remove the top cover, as described in **Top Cover**, **Removal** procedure, on page 6-7.

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 6-3).

Note: The figures in this paragraph 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. Do not re-install the top cover, but re-install the drawer, as described in **Partial Removal/Installation of the Drawer**, **Installation** procedure, on page 6-6.

8. Remove the front cover, as described in **Front Cover**, **Removal** procedure, on page 6-8.

9. Loosen the screws retaining the device.
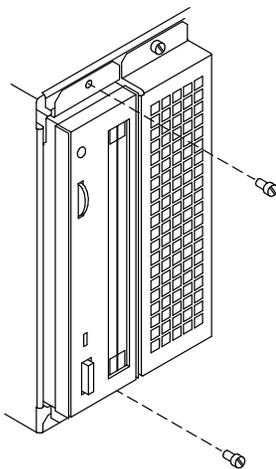
10. Slide the media drive out of the slot.

11. Loosen the screws retaining the mounting kit and remove it from the media.
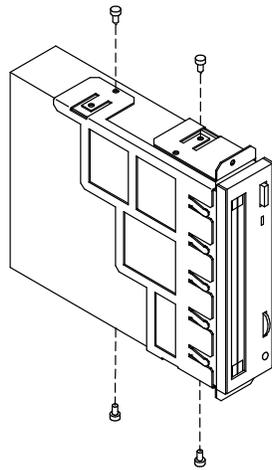
Warning: It is recommended to store the mounting kit for possible future re-installation.

12. Remove the SCSI adapter from the SCSI connector of the device.
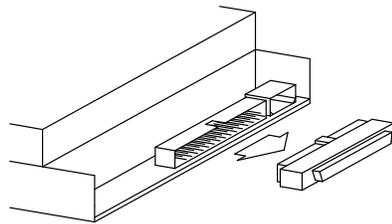
Warning: It is recommended to store the SCSI adapter for possible future re-installation.

13. If you replace the media drive with a new one, record the SCSI-ID setting and skip to **Media Drive Installation**, on page 6-15.

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

14. Store the removed device in an antistatic envelope.

15. 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.

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

17. Re-install the drawer front cover, as described in **Front Cover**, **Installation** procedure, on page 6-8.

18. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Removal** procedure, on page 6-5.

19. Re-install the top cover, as described in **Top Cover**, **Installation** procedure, on page 6-7.

20. Re-install the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Installation** procedure, on page 6-6.

21. Perform the instructions described in **Restart Operations**, on page 6-9.

Hard Disk Drive Removal

Warning: Before handling any device, be sure you know the configuration rules described in **Configuring the System**, on page 5-1.

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 6-21.

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 6-4.

3. Remove the front cover, as described in **Front Cover**, **Removal** procedure, on page 6-8.

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 6-3).

5. 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.
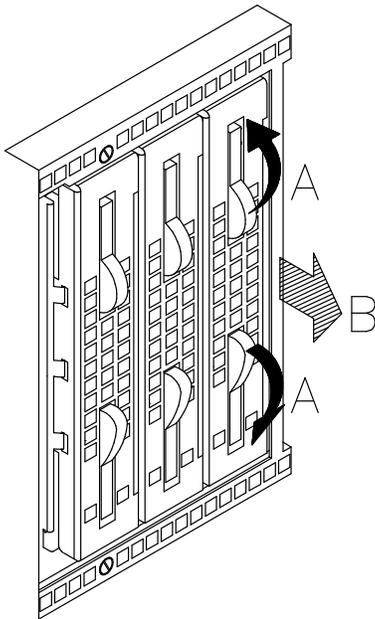
6. Grip the metal support of the light ducts and pull it out of the disk carrier.
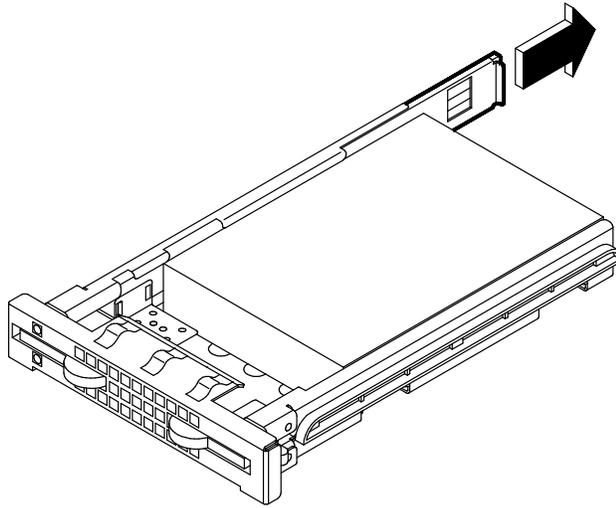
7. Unscrew the screws on the right side of the disk carrier and remove them.

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

9. Move the hard disk drive out of the locking brackets in the disk carrier and slide it out.
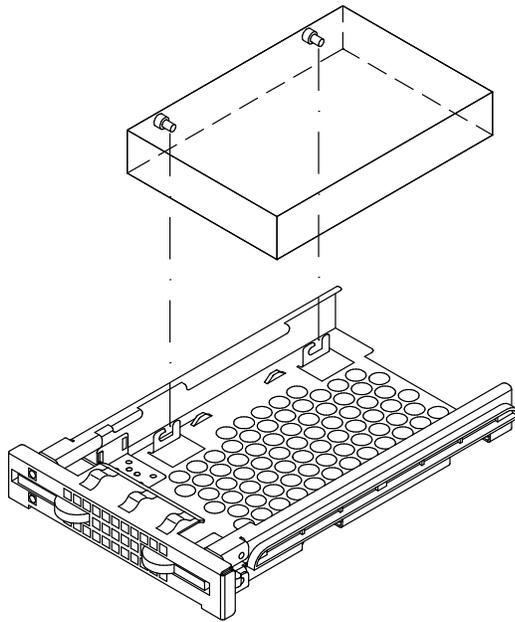
10. Lay the hard disk drive on a flat surface.

11. 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).
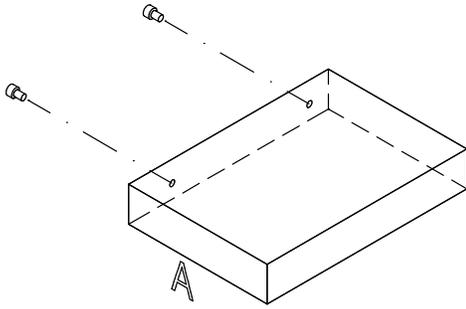
12. Store the removed device in an antistatic envelope.

13. If you replace the hard disk drive with a new one, skip to **Hard Disk Drive Installation**, on page 6-18. If you do not replace the hard disk drive just removed with any other device, perform the following steps.

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

15. Tighten the mounting screws onto the disk carrier for future re-installation (B).
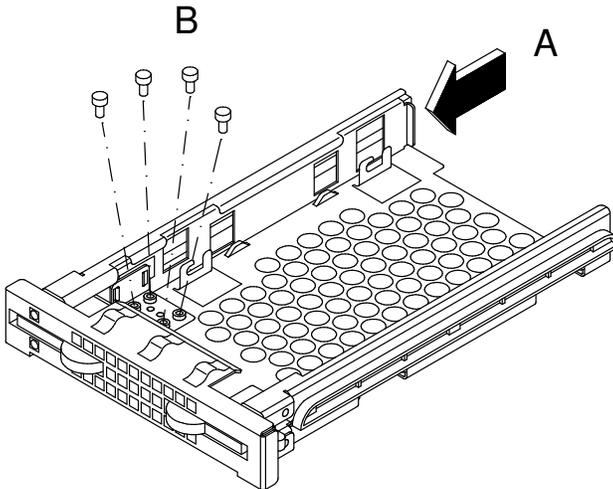
16. Grip the disk carrier by the edges and slide it in the corresponding free slot.

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

18. Re-install the drawer front cover, as described in **Front Cover**, **Installation** procedure, on page 6-8.

19. Perform the instructions described in **Restart Operations**, on page 6-9.

Media Drive Installation

Warning: Before handling any device, be sure you know the configuration rules described in **Configuring the System**, on page 5-1.

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).

1. Perform the instructions described in **Preliminary Operations**, on page 6-4.

2. Remove the front cover, as described in **Front Cover**, **Removal**, on page 6-8.

3. Wear the antistatic wrist strap. It is recommended not to touch the card components and connector (for details, if needed, see **How to Handle Hardware Components**, on page 6-3).

4. If you are installing a new media, remove the metal blank from the designated slot by loosening the screws used to secure the blank to the chassis.
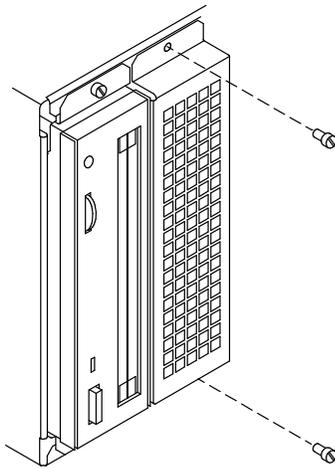
Warning: It is recommended to store the metal blank and screws for possible future re-installation.

5. Set the SCSI-ID of the media drive according to the rules described in **SCSI-ID Configuration**, on page 5-26.

6. Install the SCSI adapter on the SCSI connector of the media drive. This SCSI adapter is needed to adapt the SCSI connector of the media drive to the connector present on the SCSI cable.
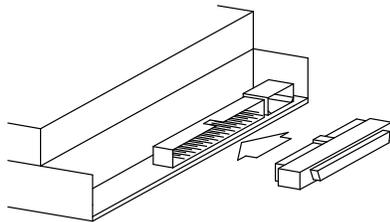
7. Assemble the media drive mounting kit at the sides of the media drive, as indicated in the figure.
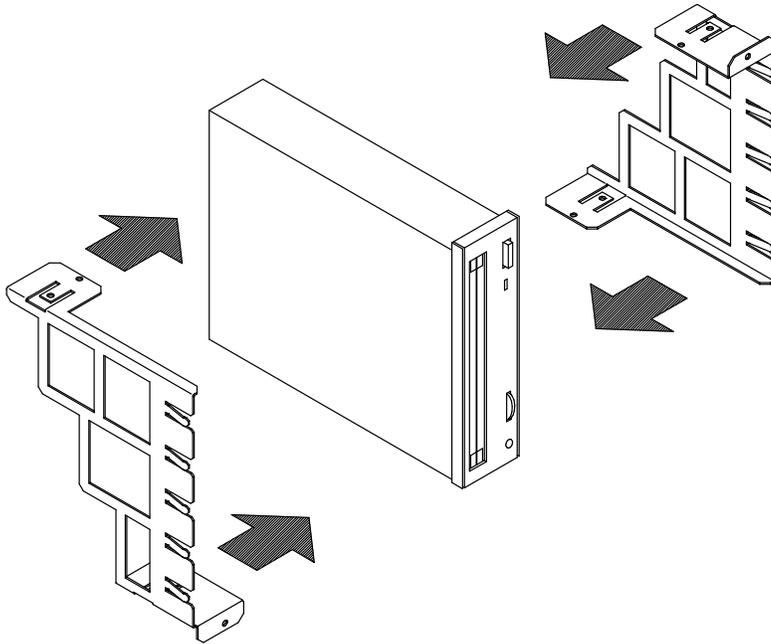
8. Secure the mounting kit tightening the screws.
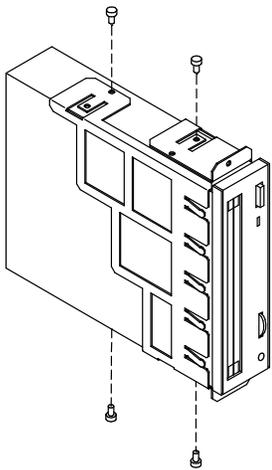
9. Align the device in the designated slot and then slide it inside the system. Secure then the media, tightening the corresponding screws.
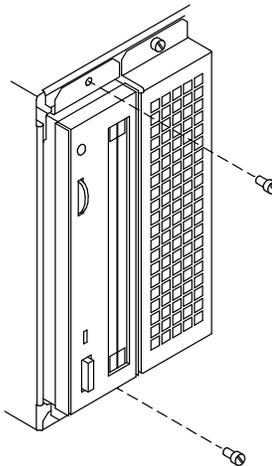
10. Re-install the drawer front cover, as described in **Front Cover**, <u>**Installation**</u> procedure, on page 6-8.

11. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawer**, <u>**Removal**</u> procedure, on page 6-5.

12. If not already done, remove the top cover, as described in **Top Cover**, <u>**Removal**</u> procedure, on page 6-7.

13. Connect a connector of the split power cable and the SCSI cable to the media drive rear.

14. Re-install the top cover, as described in **Top Cover**, <u>**Installation**</u> procedure, on page 6-7.

15. Re-install the drawer, as described in **Partial Removal** / **Installation of the Drawer**, <u>**Installation**</u> procedure, on page 6-6.

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.

16. Perform the instructions described in <u>**Restart Operations**</u>, on page 6-9.

17. When the operating system is up and running, check that the new device is recognized by the system (**lscfg -pv** command). 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 Installation

In this procedure are described the operations to add a hard disk drive to a disk cage, while adding a disk cage to a drawer requires some operations which must be performed by a technician with a good knowledge of the system architecture.

Warning: Before handling any device, be sure you know the configuration rules described in **Configuring the System**, on page 5-1.

1. Perform the instructions described in **Preliminary Operations**, on page 6-4.

2. Remove the front cover, as described in **Front Cover**, **Removal** procedure, on page 6-8.

3. Wear the antistatic wrist strap. It is recommended not to touch the card components and connector (for details, if needed, see **How to Handle Hardware Components**, on page 6-3).

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).

5. Remove the disk carrier from the disk cage (B). It is recommended to lay it on a flat surface**.**
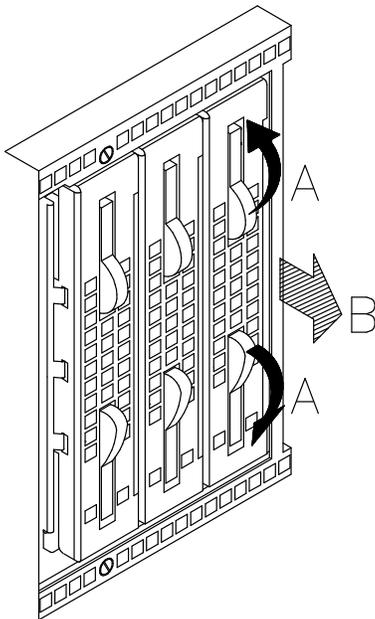
6. Unscrew the mounting screws provided with each installed disk carrier.
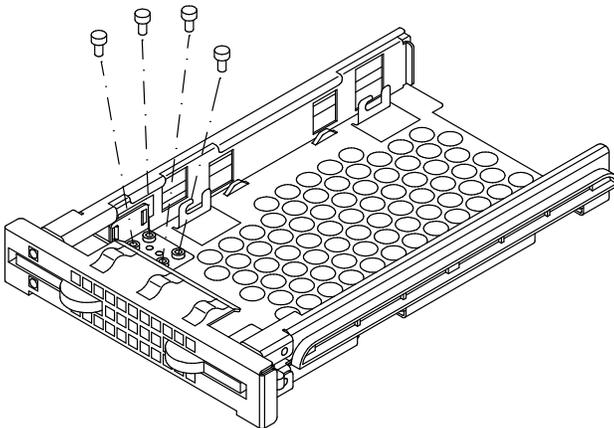
7. Grip the metal support of the light ducts and pull it out of the disk carrier.
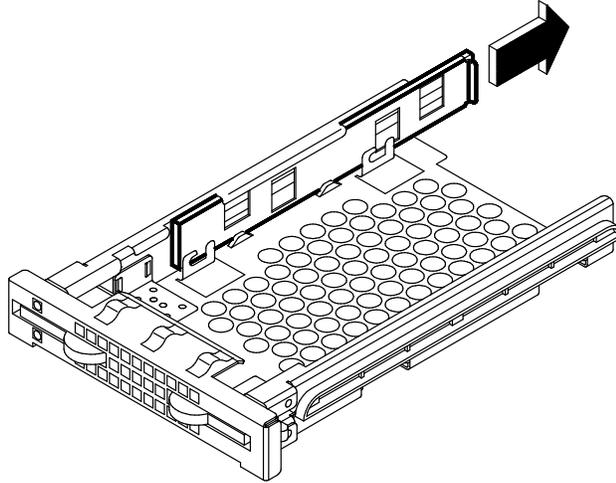
8. If you purchased the hard disk drive from a supplier other than your system supplier, be sure that the device itself has no SCSI-ID set but has the motor delay jumper set. Refer to the documentation delivered with the device.

9. 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 A in the figure (the SCSI connector is on the opposite side).
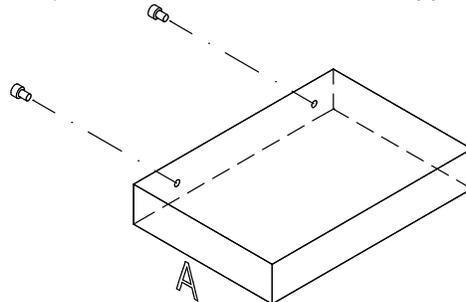
10. Slide the hard disk drive into the disk carrier making sure that the screw threads fit into the locking brackets of the disk carrier. The SCSI connector of the hard disk drive must be kept towards the rear of the disk carrier.
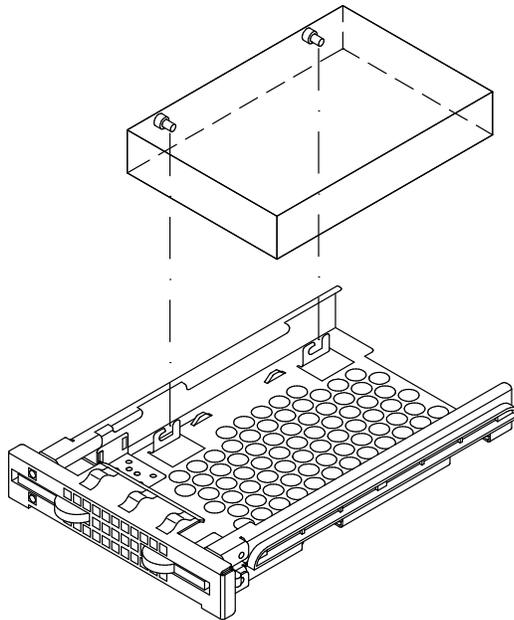
11. Lightly push the drive towards the front side of the disk carrier to seat the screws in the locking brackets (A). Secure the hard disk drive by tightening first the screws on the right side (B) and then the screws on the left side of the disk carrier (C).
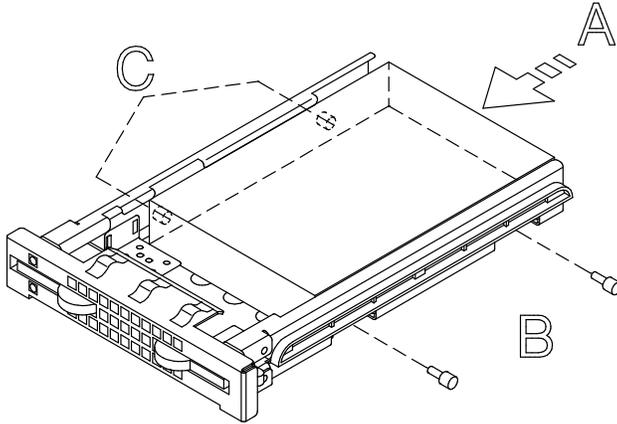
12. Grip the light duct support and slide it into its slide-way until a click tells you that it is well seated.
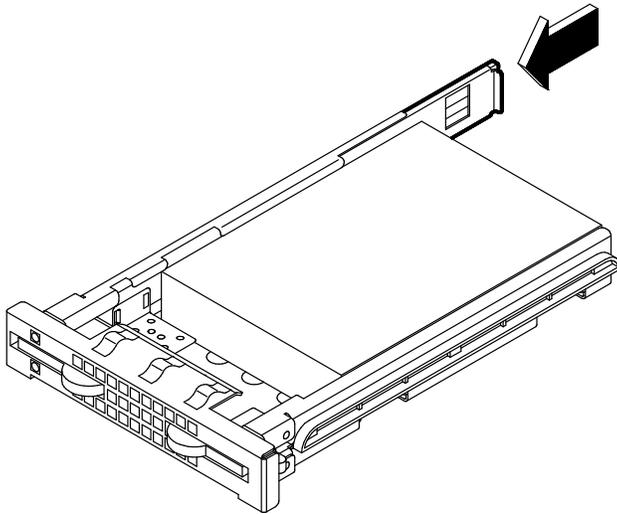
13. Firmly grip the disk carrier and slide it inside the empty slot of the disk cage.

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

15. Refer to **SCSI-ID Configuration**, on page 5-26, to know the SCSI-ID identification that the hard disk drive will acquire.

16. Re-install the drawer front cover, as described in **Front Cover**, **Installation** procedure, on page 6-8.

17. Perform the instructions described in **Restart Operations**, on page 6-9.

18. When the operating system is up and running, check that the new device is seen by the system (**lscfg -pv** command). 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).

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 the system.

The replacement operation is reserved to the system administrator (*root* authority).

The actions to be taken are described in:

- **Hot Swapping under Basic (JBOD) Configuration**, below
- **Hot Swapping under RAID Configuration**, on page 6-22.

Hot Swapping under Basic (JBOD) Configuration

Warning: Before handling any device, be sure you know the configuration rules described in **Configuring the System**, on page 5-1.

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*, in the **Logical Volumes**, **System Management Interface Tool** section.

3. Accessing the drawer from the front, identify the faulty hard disk drive through the blue/green LED light off.

Note: The LED light is blue if the disk is running in ULTRA-2/LVD mode, it is green if the disk is running in ULTRA/SE mode.

4. Physically remove the hard disk drive according to the instructions described in **Hard Disk Drive Removal**, on page 6-12.

5. Replace the hard disk drive with a new one according to the instructions described in **Hard Disk Drive Installation**, on page 6-18.

6. Configure the new hard disk drive through the **smit** command (System Management, Devices, Add a Disk) and restore the original device configuration.

7. Check the blue/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 **Configuring the System**, on page 5-1.

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 6-12.

3. Replace the hard disk drive with a new one according to the instructions described in **Hard Disk Drive Installation**, on page 6-18.

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.

Controller Upgrading

- **Controller Removal**, below
- **Controller Installation**, on page 6-25
- **SCSI Controller for Internal Devices**, on page 6-27.

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 6-4.

3. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Removal** procedure, on page 6-5 .

4. Remove the top cover, as described in **Top Cover**, **Removal** procedure, on page 6-7.

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 6-3).

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 6-27.

7. Loosen the retaining screw used to lock the controller card (A).

8. Firmly grip the controller card by the edges and slide it out of the slot (B).

9. While removing the controller, the spring (C) may shift. Re-install it, making sure it is well seated.
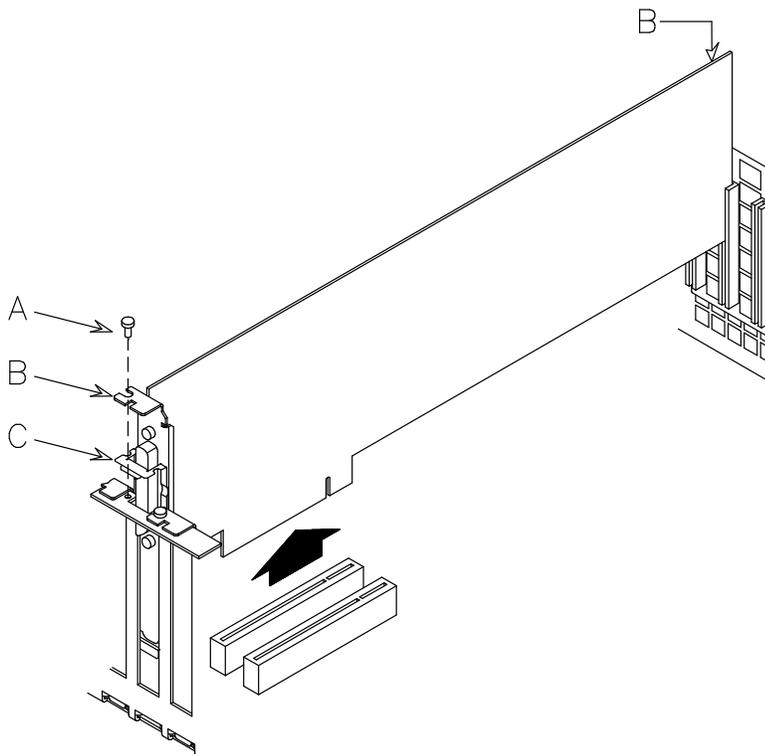
10. Store the removed controller card in an antistatic envelope.

11. If the controller card just removed will be replaced with another one, skip to the **Controller Installation** procedure, on page 6-25, otherwise continue with the following steps.

12. Slide the slot cover in the free slot (B), paying attention to the spring (C), then secure the slot cover by tightening clockwise its retaining screw (A).
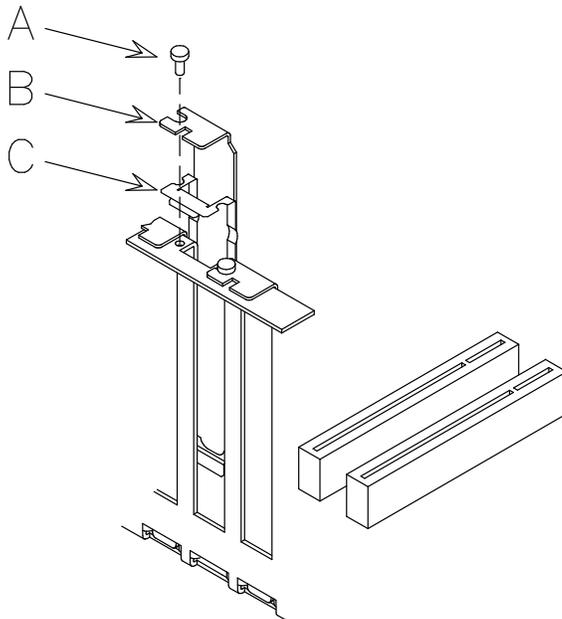
Warning: It is recommended to install a slot cover in any free controller card slot.

13. Re-install the top cover, as described in **Top Cover**, **Installation** procedure, on page 6-7.

14. Re-install the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Installation** procedure, on page 6-6.

15. Perform the instructions described in **Restart Operations**, on page 6-9.

Controller Installation

Warning: Before handling any controller, be sure you know the configuration rules described in **Configuring the System**, on page 5-1.

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 6-4.

3. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawe**r, **Removal** procedure, on page 6-5.

4. Remove the top cover, as described in **Top Cover**, **Removal** procedure, on page 6-7.

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 6-3).

6. Loosen the PCI/ISA slot cover retaining screw (A) of the designated controller card slot, then slide the slot cover (B), paying attention to the spring (C) that may shift.
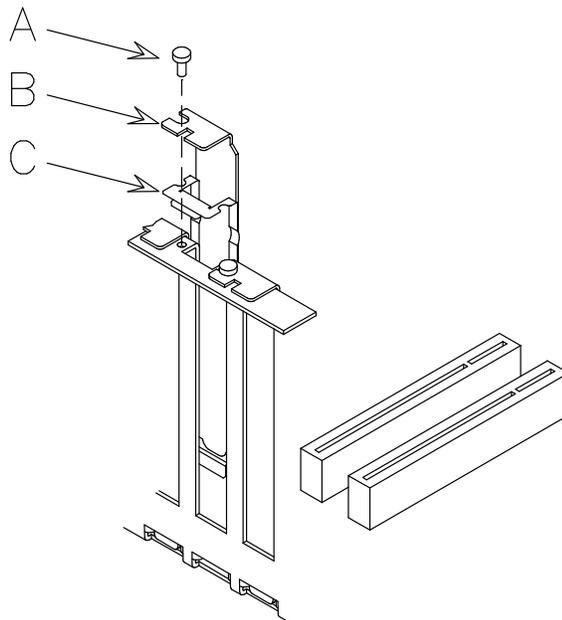
Warning: It is recommended to store the removed slot cover for possible re-installation.

7. 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.

8. Grip the controller card by the upper edges.

9. Align and slide the controller card into the designated controller card connector as indicated in the figure (B).

10. Firmly push the controller card until its finger connector is plugged in securely, paying attention to the spring (A) that may shift.

11. Secure the controller card in the slot by tightening clockwise its retaining screw (C).
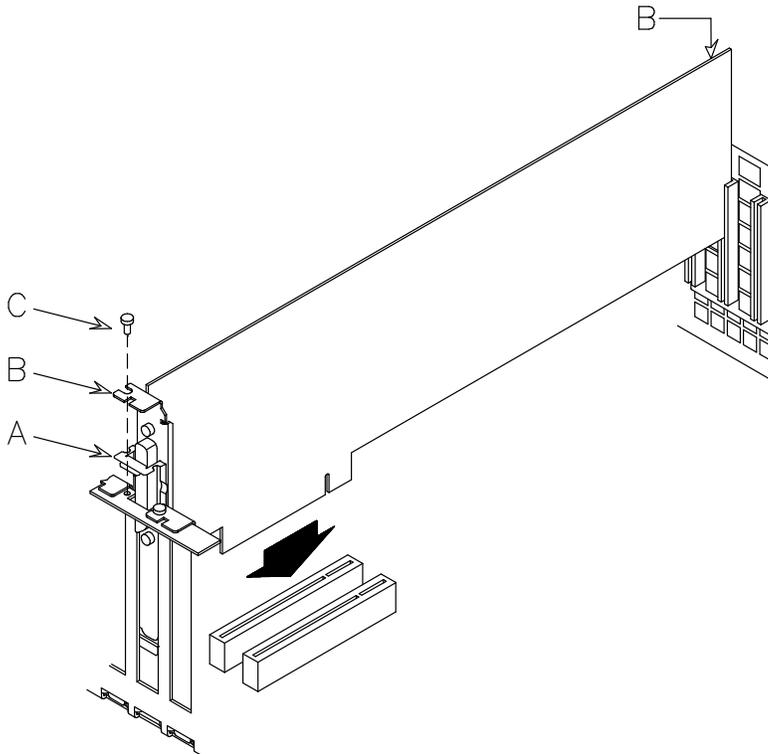
12. Connect any connector cable to the controller card just installed, if any.

Note: If you need to install a SCSI controller to manage internal devices, see **SCSI Controller for Internal Devices**, on page 6-27.

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

13. Re-install the top cover, as described in **Top Cover**, **Installation** procedure, on page 6-7.

14. Re-install the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Installation** procedure, on page 6-6.

15. Perform the instructions described in **Restart Operations**, on page 6-9.

16. 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. When the required operations are completed, check that the new card is correctly seen by the system (**lscfg -pv** command).

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 6-25, 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 the SCSI connections description in the *Maintenance Guide*. Otherwise, call your Service Representative for assistance.

The same applies to the SCSI controller removal.

CPU Upgrading

- **CPU Removal**, below
- **CPU Installation**, on page 6-29.

Warning: Before executing any operations on the CPU cards, be sure you know the relevant configuration rules, described in **CPU Configuration**, on page 5-10.

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 6-4.

2. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Removal** procedure, on page 6-5.

3. Remove the top cover, as described in **Top Cover**, **Removal** procedure, on page 6-7.

4. Wait until the CPU card LED is off. Notice that this could take several minutes.

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 6-3).

6. Open the hooked clips of the CPU card to unlock it, unplug the CPU card and slide it out of the metallic frame.
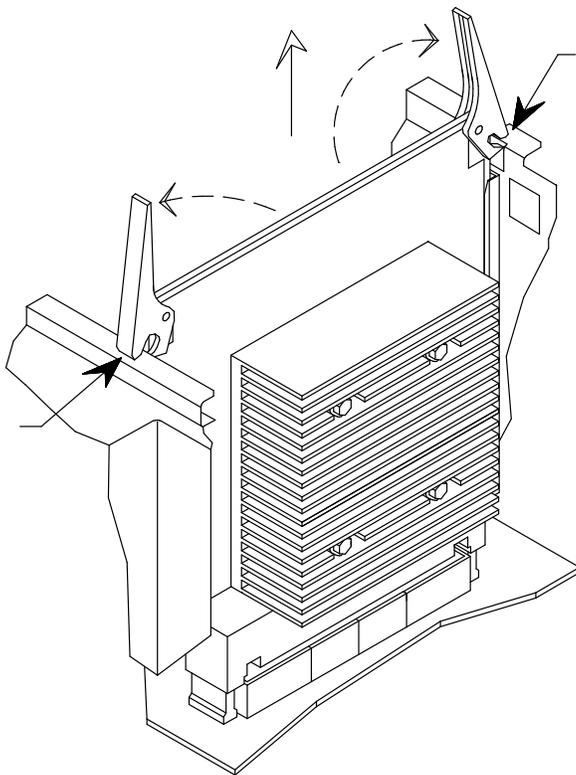
7. Store the removed CPU card in an antistatic envelope.

8. If you are replacing the CPU card with a new one, go to **CPU Installation**, on page 6-29; otherwise proceed with the steps below.

9. Re-install the top cover, as described in **Top Cover**, **Installation** procedure, on page 6-7.

10. Re-install the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Installation** procedure, on page 6-6.

11. Perform the instructions described in **Restart Operations**, on page 6-9.

CPU Installation

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 6-4.

2. Extract the drawer, as described in **Partial Removal / Installation of the Drawer**, **Removal** procedure, on page 6-5.

3. Remove the top cover, as described in **Top Cover**, **Removal** procedure, on page 6-7.

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 6-3).

5. Remove, if present, the plastic protective cover from the designated CPU connector on the system planar.

6. Open outward the two hooked clips of the CPU card.

7. 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.

8. Tilt the hooked clips until these are anchored to the metallic frame and push them.
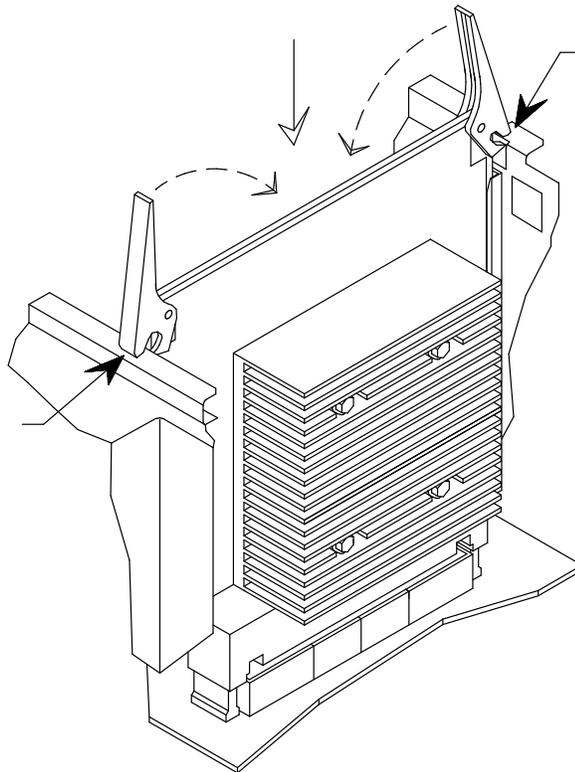
9. Re-install the top cover, as described in **Top Cover**, **Installation** procedure, on page 6-7.

10. Re-install the drawer, as described in **Partial Removal / Installation of the Drawer**, **Installation** procedure, on page 6-6.

11. Perform the instructions described in **Restart Operations**, on page 6-9.

12. When the operating system is up and running, check that the new card is correctly configured (**lscfg -pv** command). If not, check that the CPU card is well installed. If the problem persists, refer to the *Maintenance Guide* for CPU test execution or call your Service Representative for assistance.

Memory Upgrading

The system memory can be expanded by adding one or more memory banks to the existing configuration.

Warning: Before handling any memory bank, be sure you know the configuration rules described in **Memory Configuration**, on page 5-8.

Adding a Memory Bank on Memory Risers

1. Perform the instructions described in **Preliminary Operations**, on page 6-4.

2. Extract the drawer, as described in **Partial Removal** / **Installation of the Drawer**, **Removal** procedure, on page 6-5.

3. Remove the top cover, as described in **Top Cover**, **Removal** procedure, on page 6-7.

4. Wait until the memory riser LED is off. Notice that this could take several minutes.

5. 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 6-3).

6. Opening the hooked clips of the memory riser, unplug it and slide it out of the metallic frame.
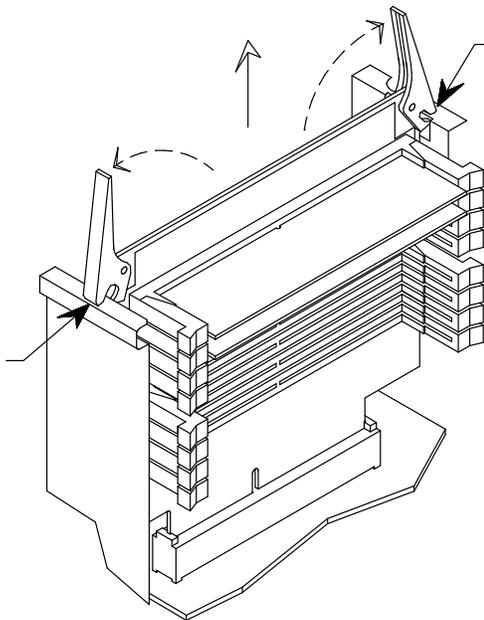
7. Lay it down on an antistatic envelope until all operations on it are concluded.

8. Repeat the steps for each of the four memory risers.

If you need to reorganize the memory bank configuration, according to the rules described in **Memory Configuration**, on page 5-8, you may need to remove the memory DIMM's already installed, following the instructions below. If this is not the case, skip to **step 12**.

9. Open by pressing, one a time, the little levers at the sides of the memory DIMM connector (A); grip the memory DIMM by the edges and firmly pull it out of the memory riser (B).
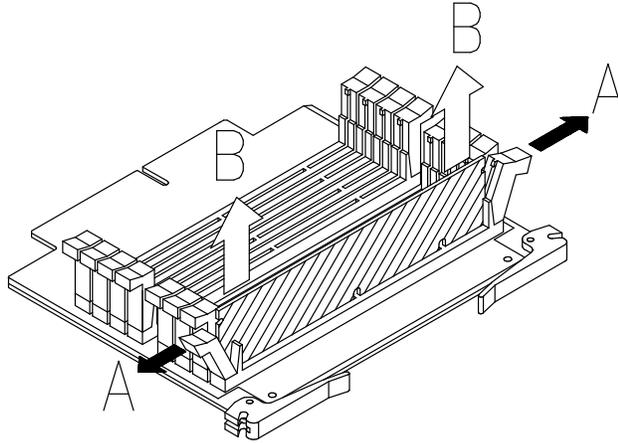
10. Repeat step 9 for each of the four memory DIMM's (one per memory riser).

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

12. Open the little levers at the sides of the memory DIMM connector; grip one memory DIMM by the edges and guide it vertically to the appropriate memory DIMM connector on the memory riser (A), making sure that the two keys on the memory DIMM fit the two keys on the memory DIMM connector.

13. Firmly push the memory DIMM down until it is seated into the memory DIMM connector and the two levers automatically close (B).
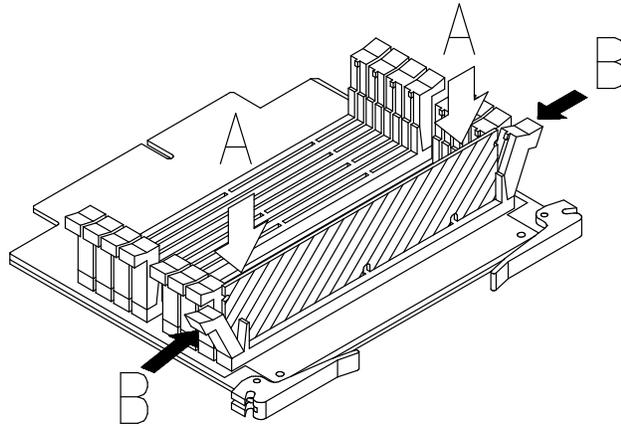
14. Make sure that all the little levers of the memory riser are well closed, in particular the ones that are left empty.

15. Repeat the steps 12 to 14 for each of the four memory DIMM's (one per memory riser).

Note: The memory risers must be installed on the system planar as shown in the figure.
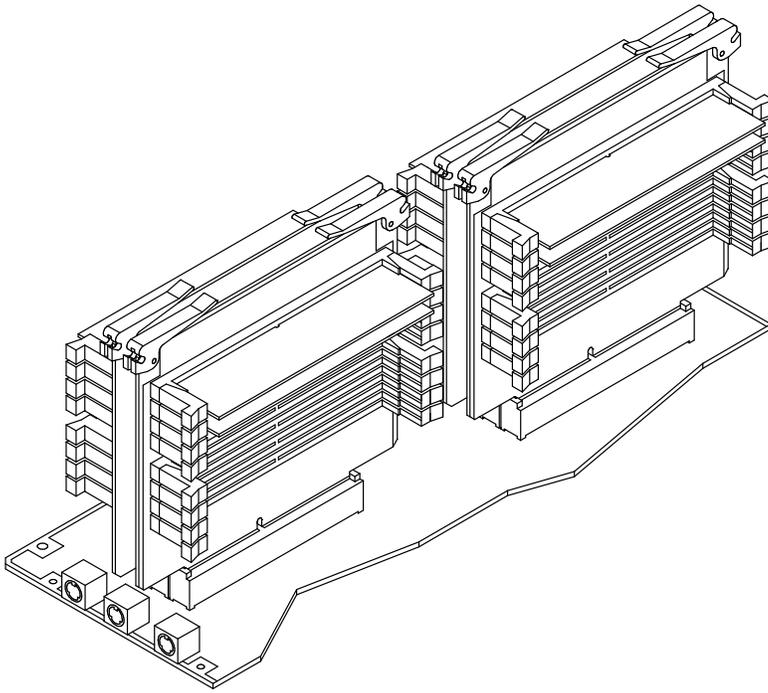
16. Open outward the two hooked clips of the memory riser.

17. 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.

18. 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.

19. Push the hooked clips.
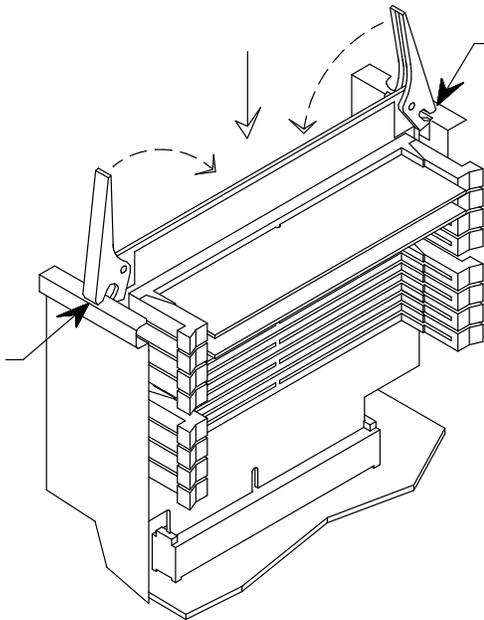
20. Repeat the steps 16 to 19 for each of the four memory risers.

21. Re-install the top cover, as described in **Top Cover**, **Installation** procedure, on page 6-7.

22. Re-install the drawer, as described in **Installation** procedure, on page 6-6.

23. Perform the instructions described in **Partial Removal** / **Installation of the Drawer**, **Restart Operations**, on page 6-9.

24. When the operating system is up and running, check that the system memory configuration is updated (**lscfg -pv** command). If not, check that the memory DIMM's are well installed and that you did not break any of the memory configuration rules. If the problem persists, refer to the *Maintenance Guide* for memory test execution or call your Service Representative for assistance.

Adding a PCI Expansion Drawer

One PCI expansion drawer can be connected to the CPU drawer.

Each PCI expansion drawer has three device areas.

- The description of the PCI expansion Drawer hardware components, installation and removal procedure are described in the *PCI Expansion Service Guide*.

- The configuration rules of the PCI expansion drawer device areas and controllers are described in **Drawer Configuration**, on page 5-5.

- The connection rules to the CPU drawer and the set up of the PCI expansion drawer are described in the *PCI Expansion Drawer Quick Set Up* leaflet.

Appendix A. System Specifications

Operating Specifications

The system operates correctly with the following working conditions.

Environment Specifications

Relative Humidity

	System Running	System On Standby
Relative Humidity	from 20% to 80% without condensation	from 5% to 95% without condensation
Gradient	10%/h	30%/h
Max. Wet Bulb Temperature	24˚C (75.2˚F)	28˚C (82.4˚F)
Moisture Content	0.019kg water/kg dry air	0.024kg water/kg dry air

Environment Temperature

	System Running	System On Standby
Dry Bulb Temperature	from 10˚C to 32˚C (from 50˚F to 89.6˚F)	from 5˚C to 50˚C (from 41˚F to 122˚F)
Gradient	10˚C/h (50˚F/h)	25˚C/h (77˚F/h)

Barometric Pressure

- **Min:** 747 hPa   (altitude 2500 m)
- **Max:** 1020 hPa   (altitude -150 m).

Electrical Specifications

Power International Standard

IEC 61000-4-2-3 - EN 61000-4-2-3

Complete Rack Unit Power

5980 VA

CPU Drawer Power

748 VA

PCI Expansion Drawer Power

748 VA

Operating Voltage

Voltage:	200 Vac to 240 Vac	Nominal, Auto ranging	+6%, -10%
Frequency range:	50 to 60 Hz	±3%	
Current:	Max 29.5 A	at 200 Vac	

CPU Drawer Thermal Output (typical)

2550 BTU/hr per CPU drawer.

PCI Expansion Drawer Thermal Output (typical)

2550 BTU/hr per PCI Expansion drawer.

Acoustic Noise

The values listed in the table below correspond to a system placed in a room having the temperature of 25˚C (77˚F), with a configuration including the following components:

Rack

- 1 CPU drawer
- 1 PDU.

CPU Drawer

- 1 CPU card
- 2 memory banks
- 3 PCI cards
- 2 hard disk drives
- 2 media drives.

	System Running	**System Idle**
Acoustic Power	Lw(A): 6.6 Bels	Lw(A): 6.4 Bels

Standards

The system complies with the following standards:

Hardware

- EMC-CISPR 22 Class A

- CSA C108.8 Class A

- CISPR 22

- EN 55022 Class A

- FCC CFR-47 Class A

- VCCI Class A

- Safety:

  - European: EN 60950

  - USA: UL 1950

  - Canada: CSA C22.2 No. 950

  - Rest of the World: IEC950.

The system is also compliant with the following European directives:

- 73/23/EEC

- 89/336/EEC and 92/31/EEC

- 93/68/EEC.

Firmware

- IEEE1275CSA C108.8-1994 (Open Firmware).

Appendix B. System Devices Location Map

- **Drawers, Cards, Fans, CPU's, Memory and Sensors**, on page B-2

- **PCI/ISA Busses and Devices**, on page B-5

- **PCI Architecture Flow (I/O Subsystem)**, on page B-8.

Each system device is mapped through location codes which identifies its physical location (physical location code) and/or its logical function (AIX location code).

A physical location code is an alphanumeric string of variable length, consisting of a hierarchical series of device identifier: each device is identified through a path which starts from the unit including the device and leads to the device itself.

The unit including the device is identified as follows:

- **U1.#**, where:

    - **U1** identifies the rack housing the drawers

    - **#** physically identifies the drawer: **0** CPU drawer, **1** PCI expansion drawer.

An example of physical location code follows; it identifies the memory DIMM installed on memory riser 0, in slot 1:

- **U1.0.P1-M0.1**

    - **U1.0** identifies the CPU drawer

    - **P1** identifies the system planar

    - **M0.1** identifies memory riser 0, connector 1.

The AIX location code is a string in the format AB-CD-EF-GH. AB identifies the bus the device belongs to, CD identifies the device itself, EF identifies a connector and GH identifies a port or device. Planars, cards and controllers are identified by AB-CD only. For PCI controllers, CD is the hexadecimal value of the device identification on the PCI bus multiplied by 8. For example, the location code of the device installed in PCI slot 5, which is on PCI bus 0 and has the Dev. ID 7, is:

- **10-38**, where

    - **10** identifies PCI bus 0

    - **38** is the hexadecimal value of decimal 56 (Dev. ID 7 multiplied by 8).

Aim of the following tables is to provide and correlate the different identifications of each system device.

The tables list:

- The available devices

- The bus they belong to (for PCI/ISA devices only)

- The device identification (Dev. ID) on the bus (for PCI devices only, not meaningful for ISA devices)

- The device node under Open Firmware

- The device physical location code

- The AIX location code.

Additional information on the device handling is given in **Identifying Device Path**, in the *Maintenance Guide*.

Drawers, Cards, Fans, CPU's, Memory and Sensors

Device	Open Firmware Node	Physical Location Code	AIX Location Code
CPU drawer	-	U1.0	00-00
PCI expansion drawer	-	U1.1	00-00
System planar	-	U1.0-P1	00-00
FSB card	-	U1.0-P1-X1	00-00
Operator panel	-	U1.0-P1-X2	00-00
Hexadecimal display	-	U1.0-P1-X2/L1	-
CPU drawer key mode switch	-	U1.0-P1-X2/L2	-
CPU drawer thermal sensor	-	U1.0-V1	-
PCI expansion drawer thermal sensor	-	U1.1-V1	-
KHS card	-	U1.0-P1-X3	00-00
KDD card	-	U1.1-X1	00-00
First KPE card	-	U1.1-P1	00-00
Second KPE card	-	U1.1-P2	00-00
CPU drawer fan 1	-	U1.0-F1	-
CPU drawer fan 2	-	U1.0-F2	-
CPU drawer fan 3	-	U1.0-F3	-
CPU drawer fan 4	-	U1.0-F4	-
CPU drawer power supply	-	U1.0-V1	-
CPU drawer power supply fan 1	-	U1.0-V1/F1	-
CPU drawer power supply fan 2	-	U1.0-V1/F2	-
PCI exp. drawer fan 1	-	U1.1-F1	-
PCI exp. drawer fan 2	-	U1.1-F2	-
PCI exp. drawer fan 3	-	U1.1-F3	-
PCI exp. drawer power supply	-	U1.1-V1	-
PCI exp. drawer power supply fan 1	-	U1.1-V1/F1	-
PCI exp. drawer power supply fan 2	-	U1.1-V1/F2	-
CPU slot 0	/cpus/PowerPC,RS64-II@0	U1.0-P1-C0	00-00
CPU slot 0 L2 cache	/cpus/PowerPC,RS64-II@0/l2-cache	U1.0-P1-C0	00-00
CPU slot 0 thermal sensor	/cpus/PowerPC,RS64-II@0	U1.0-P1-C0/V1	00-00
CPU slot 1	/cpus/PowerPC,RS64-II@1	U1.0-P1-C1	00-01
CPU slot 1 L2 cache	/cpus/PowerPC,RS64-II@1/l2-cache	U1.0-P1-C1	00-01
CPU slot 1 thermal sensor	/cpus/PowerPC,RS64-II@1	U1.0-P1-C1/V1	00-01
CPU slot 2	/cpus/PowerPC,RS64-II@2	U1.0-P1-C2	00-02
CPU slot 2 L2 cache	/cpus/PowerPC,RS64-II@2/l2-cache	U1.0-P1-C2	00-02
CPU slot 2 thermal sensor	/cpus/PowerPC,RS64-II@2	U1.0-P1-C2/V1	00-02
CPU slot 3	/cpus/PowerPC,RS64-II@3	U1.0-P1-C3	00-03
CPU slot 3 L2 cache	/cpus/PowerPC,RS64-II@3/l2-cache	U1.0-P1-C3	00-03

Device	Open Firmware Node	Physical Location Code	AIX Location Code
CPU slot 3 thermal sensor	/cpus/PowerPC,RS64-II@3	U1.0-P1-C3/V1	00-03

Device	Open Firmware Node	Physical Location Code	AIX Location Code
Memory riser 0	-	U1.0-P1-M0	00-00
Memory riser 1	-	U1.0-P1-M1	00-00
Memory riser 2	-	U1.0-P1-M2	00-00
Memory riser 3	-	U1.0-P1-M3	00-00
Memory DIMM 0 on riser 0	/memory@0/IBM,memory-module@0	U1.0-P1-M0.0	00-00
Memory DIMM 0 on riser 1	/memory@0/IBM,memory-module@1	U1.0-P1-M1.0	00-00
Memory DIMM 0 on riser 2	/memory@0/IBM,memory-module@2	U1.0-P1-M2.0	00-00
Memory DIMM 0 on riser 3	/memory@0/IBM,memory-module@3	U1.0-P1-M3.0	00-00
Memory DIMM 1 on riser 0	/memory@0/IBM,memory-module@4	U1.0-P1-M0.1	00-00
Memory DIMM 1 on riser 1	/memory@0/IBM,memory-module@5	U1.0-P1-M1.1	00-00
Memory DIMM 1 on riser 2	/memory@0/IBM,memory-module@6	U1.0-P1-M2.1	00-00
Memory DIMM 1 on riser 3	/memory@0/IBM,memory-module@7	U1.0-P1-M3.1	00-00
Memory DIMM 2 on riser 0	/memory@0/IBM,memory-module@8	U1.0-P1-M0.2	00-00
Memory DIMM 2 on riser 1	/memory@0/IBM,memory-module@9	U1.0-P1-M1.2	00-00
Memory DIMM 2 on riser 2	/memory@0/IBM,memory-module@a	U1.0-P1-M2.2	00-00
Memory DIMM 2 on riser 3	/memory@0/IBM,memory-module@b	U1.0-P1-M3.2	00-00
Memory DIMM 3 on riser 0	/memory@0/IBM,memory-module@c	U1.0-P1-M0.3	00-00
Memory DIMM 3 on riser 1	/memory@0/IBM,memory-module@d	U1.0-P1-M1.3	00-00
Memory DIMM 3 on riser 2	/memory@0/IBM,memory-module@e	U1.0-P1-M2.3	00-00
Memory DIMM 3 on riser 3	/memory@0/IBM,memory-module@f	U1.0-P1-M3.3	00-00
Memory DIMM 4 on riser 0	/memory@0/IBM,memory-module@10	U1.0-P1-M0.4	00-00
Memory DIMM 4 on riser 1	/memory@0/IBM,memory-module@11	U1.0-P1-M1.4	00-00
Memory DIMM 4 on riser 2	/memory@0/IBM,memory-module@12	U1.0-P1-M2.4	00-00
Memory DIMM 4 on riser 3	/memory@0/IBM,memory-module@13	U1.0-P1-M3.4	00-00
Memory DIMM 5 on riser 0	/memory@0/IBM,memory-module@14	U1.0-P1-M0.5	00-00
Memory DIMM 5 on riser 1	/memory@0/IBM,memory-module@15	U1.0-P1-M1.5	00-00
Memory DIMM 5 on riser 2	/memory@0/IBM,memory-module@16	U1.0-P1-M2.5	00-00
Memory DIMM 5 on riser 3	/memory@0/IBM,memory-module@17	U1.0-P1-M3.5	00-00
Memory DIMM 6 on riser 0	/memory@0/IBM,memory-module@18	U1.0-P1-M0.6	00-00
Memory DIMM 6 on riser 1	/memory@0/IBM,memory-module@19	U1.0-P1-M1.6	00-00
Memory DIMM 6 on riser 2	/memory@0/IBM,memory-module@1a	U1.0-P1-M2.6	00-00
Memory DIMM 6 on riser 3	/memory@0/IBM,memory-module@1b	U1.0-P1-M3.6	00-00
Memory DIMM 7 on riser 0	/memory@0/IBM,memory-module@1c	U1.0-P1-M0.7	00-00
Memory DIMM 7 on riser 1	/memory@0/IBM,memory-module@1d	U1.0-P1-M1.7	00-00
Memory DIMM 7 on riser 2	/memory@0/IBM,memory-module@1e	U1.0-P1-M2.7	00-00
Memory DIMM 7 on riser 3	/memory@0/IBM,memory-module@1f	U1.0-P1-M3.7	00-00

PCI/ISA Busses and Devices

The I/O subsystem is made of PCI/ISA devices.

The CPU drawer system planar hosts two native PCI local busses (**PCI 0**, **PCI 1**). The bus **PCI 0** generates an additional PCI bus through a PCI to PCI bridge (**PCI 0_1**) and an **ISA bus** through a PCI to ISA bridge.

The CPU drawer PCI configuration can be expanded with the connection of a PCI expansion drawer.

The PCI expansion drawer can be equipped with one or two PCI expander planars (**KPE**). The PCI bus of each KPE planar is generated through the connection of a PCI to PCI bridge card hosted in the CPU drawer (**KBR**) to another PCI to PCI bridge card (**KXB**), installed in a KPE dedicated slot.

Please, note the following:

- *<controller>* is the type of controller card installed in the slot, such as:

  - **ethernet**, for Ethernet controller cards

  - **scsi**, for SCSI controller cards

  - **DPT,scsis**, for SCSI RAID controller cards (for this controller card, it is also specified the RAID Bus: **scsi@0** (bus 0, mother board), **scsi@1** (bus 1, daughter board).

CPU Drawer PCI Device Table

Device	Bus	Dev ID	Open Firmware Node	Physical Location Code	AIX ID
Dual PCI host bridge	PCI 0	0	/pci@fe0f0020	U1.0-P1	00-fe0f0020
Dual PCI host bridge	PCI 1	0	/pci@fe0f0090	U1.0-P1	00-fe0f0090
PCI slot 1	PCI 1	9	/pci@fe0f0090/*<controller>*@9	U1.0-P1-I1	20-48
PCI slot 2	PCI 1	A	/pci@/fe0f0090/*<controller>*@a	U1.0-P1-I2	20-50
PCI slot 3	PCI 1	B	/pci@//fe0f0090/*<controller>*@b	U1.0-P1-I3	20-58
PCI slot 4 (basic configuration)	PCI 1	C	/pci@fe0f0090/*<controller>*@c	U1.0-P1-I4	20-60
PCI slot 4 (with KBR for full PCI expansion drawer)	PCI 1	C	/pci@//fe0f0090/pci@c	U1.0-P1-I4	20-60
PCI slot 5 (basic configuration)	PCI 0	7	/pci@fe0f0020/*<controller>*@7	U1.0-P1-I5	10-38
PCI slot 5 (with KBR for PCI expansion drawer)	PCI 0	7	/pci@fe0f0020/pci@7	U1.0-P1-I5	10-38
PCI to PCI bridge	PCI 0	5	/pci@fe0f0020/pci@5	U1.0-P1	10-28
PCI slot 6	PCI 0_1	0	/pci@fe0f0020/pci@5/*<controller>*@0	U1.0-P1-I6	15-00
PCI slot 7	PCI 0_1	1	/pci@fe0f0020/pci@5/*<controller>*@1	U1.0-P1-I7	15-08
PCI slot 8	PCI 0_1	2	/pci@fe0f0020/pci@5/*<controller>*@2	U1.0-P1-I8	15-10
PCI slot 9 (not used)	PCI 0_1	3	/pci@fe0f0020/pci@5/*<controller>*@3	U1.0-P1-I9	15-18
Native SCSI 0 (Media)	PCI 0	3	/pci@fe0f0020/scsi@3	U1.0-P1/Z1	10-18
Native SCSI 1 (Hard Disks)	PCI 0	2	/pci@fe0f0020/scsi@2	U1.0-P1/Z2	10-10
Native LAN	PCI 1	8	/pci@fe0f0090/ethernet@8	U1.0-P1/E1	20-40
Native Graphic	PCI 0	6	/pci@fe0f0020/display@6	U1.0-P1/G1	10-30
MPIC (interrupt controller)	PCI 0	4	/pci@fe0f0020/mpic@4	U1.0-P1	-
PCI to ISA bridge	PCI 0	1	/pci@fe0f0020/isa@1	U1.0-P1	10-08
ISA slot 1	ISA		-	-	01-01
Diskette drive	ISA		/pci@fe0f0020/isa@1/floppy@i3f0	U1.0-P1-X1/D1	01-D1
COM1	ISA		/pci@fe0f0020/isa@1/serial@i3f8	U1.0-P1-X1/S1	01-S1
COM2	ISA		/pci@fe0f0020/isa@1/serial@i2f8	U1.0-P1-X1/S2	01-S2
COM3	ISA		/pci@fe0f0020/isa@1/serial@i3e8	U1.0-P1-X1/S3	01-S3
Parallel	ISA		/pci@fe0f0020/isa@1/parallel@i378	U1.0-P1-X1/R1	01-R1
Keyboard	ISA		/pci@fe0f0020/isa@1/8042@i60/keyboard@0	U1.0-P1-X1-K1	01-K1-00
Mouse	ISA		/pci@fe0f0020/isa@1/8042@i60/mouse@1	U1.0-P1-X1-O1	01-K1-01

Expansion Drawer PCI Device Table

Device	Bus	Dev ID	Open Firmware Identification	Physical Location Code	AIX ID
1st KPE – KXB slot (KXB1)	PCI 0_2	0	/pci@fe0f0020/pci@7/pci@0	U1.1-P1-Q1	17-00
1st KPE – PCI slot1 (1/P1)	PCI 0_2_1	1	/pci@fe0f0020/pci@7/pci@0/*<controller>*@1	U1.1-P1-I1	17-08
1st KPE – PCI slot 2 (1/P2)	PCI 0_2_1	2	/pci@fe0f0020/pci@7/pci@0/*<controller>*@2	U1.1-P1-I2	17-10
1st KPE – PCI slot 3 (1/P3)	PCI 0_2_1	3	/pci@fe0f0020/pci@7/pci@0/*<controller>*@3	U1.1-P1-I3	17-18
1st KPE – PCI slot 4 (1/P4)	PCI 0_2_1	4	/pci@fe0f0020/pci@7/pci@0/*<controller>*@4	U1.1-P1-I4	17-20
1st KPE – PCI slot 5 (1/P5)	PCI 0_2_1	5	/pci@fe0f0020/pci@7/pci@0/*<controller>*@5	U1.1-P1-I5	17-28
1st KPE – PCI slot 6 (1/P6)	PCI 0_2_1	6	/pci@fe0f0020/pci@7/pci@0/*<controller>*@6	U1.1-P1-I6	17-30
2nd KPE – KXB slot (KXB2)	PCI 1_1	0	/pci@fe0f0090/pci@c/pci@0	U1.1-P2-Q1	2C-00
2nd KPE – PCI slot1 (2/P1)	PCI 1_1_1	1	/pci@fe0f0090/pci@c/pci@0/*<controller>*@1	U1.1-P2-I1	2C-08
2nd KPE – PCI slot 2 (2/P2)	PCI 1_1_1	2	/pci@fe0f0090/pci@c/pci@0/*<controller>*@2	U1.1-P2-I2	2C-10
2nd KPE – PCI slot 3 (2/P3)	PCI 1_1_1	3	/pci@fe0f0090/pci@c/pci@0/*<controller>*@3	U1.1-P2-I3	2C-18
2nd KPE – PCI slot 4 (2/P4)	PCI 1_1_1	4	/pci@fe0f0090/pci@c/pci@0/*<controller>*@4	U1.1-P2-I4	2C-20
2nd KPE – PCI slot 5 (2/P5)	PCI 1_1_1	5	/pci@fe0f0090/pci@c/pci@0/*<controller>*@5	U1.1-P2-I5	2C-28
2nd KPE – PCI slot 6 (2/P6)	PCI 1_1_1	6	/pci@fe0f0090/pci@c/pci@0/*<controller>*@6	U1.1-P2-I6	2C-30

PCI Architecture Flow (I/O Subsystem)

DPClev

PCI_0 Bus
(Dev. ID 0)

PCI_1 Bus
(Dev. ID 0)

S y s t e m   P l a n a r

PCI to ISA bridge
(Dev. ID 1)

Native SCSI1 Disks
(Dev. ID 2)

LAN 10/100 Mb/s
(Dev. ID 8)

ISA Bus

Native SCSI0 Media
(Dev. ID 3)

PCI Slot 1
(Dev. ID 9)

ISA Slot

MPIC Interrupt Controller
(Dev. ID 4)

PCI Slot 2
(Dev. ID A)

Diskette Drive
Keyboard
Mouse

Native Graphic
(Dev. ID 6)

PCI Slot 3
(Dev. ID B)

PCI Slot 5
(Dev. ID 7)

PCI Slot 4
(Dev. ID C)

FSB Card

BUMP
Direct I/O
NVRAM
EPROM

KBR Card

PCI to PCI bridge
(Dev. ID 7)

KBR Card

PCI to PCI bridge
(Dev. ID C)

KBB Card

COM1
COM2
COM3
Parallel Port

PCI_0_2 Bus

PCI_1_1 Bus

KXB Card

PCI to PCI bridge
(Dev. ID 0)

KXB Card

PCI to PCI bridge
(Dev. ID 0)

PCI to PCI bridge
(Dev. ID 5)

PCI_0_2_1 Bus

PCI_1_1_1 Bus

PCI_0_1 Bus

PCI Slot 1
(Dev. ID 1)

PCI Slot 1
(Dev. ID 1)

PCI Slot 6
(Dev. ID 0)

PCI Slot 2
(Dev. ID 2)

PCI Slot 2
(Dev. ID 2)

PCI Slot 7
(Dev. ID 1)

PCI Slot 3
(Dev. ID 3)

PCI Slot 3
(Dev. ID 3)

PCI Slot 8
(Dev. ID 2)

PCI Slot 4
(Dev. ID 4)

PCI Slot 4
(Dev. ID 4)

PCI Slot 5
(Dev. ID 5)

PCI Slot 5
(Dev. ID 5)

PCI Slot 9
not used
(Dev. ID 3)

1st KPE

PCI Slot 6
(Dev. ID 6)

2nd KPE

PCI Slot 6
(Dev. ID 6)

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.

ASIC: Application Specific Integrated Circuit.

ATM: Asynchronous Transfer Mode. A cell-switching, connection-oriented technology. In ATM networks, end stations attach to the network using dedicated full duplex connections.

AUI: Attachment Unit Interface.

B

bank: See memory bank.

BAT: Block Address Translation register.

BIST: Built In Self Test.

BPP: Bi-directional Parallel Port.

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).

CHRP: Common Hardware Reference Platform. System model architecture, implemented on multiple bus systems (PCI, ISA). Standard CHRP functions are provided to isolate the operating system from every specific hardware implementation.

CL: Cas Latency.

CPU: Central Processing Unit.

CRC: Cyclic Redundancy Check.

CTS: Clear To Send register.

D

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

DC: Direct Current generated by the power supply.

DCD: Data Carrier Detect register.

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. See also memory bank, riser.

disk cage: A metallic box which hosts up to three disk carriers. See also FD3.

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

DLL: Divisor Latch LSB register.

DLM: Divisor Latch MSB register.

DOR: Digital Output Register.

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, PCI expansion drawers, DAS drawers.

DSR: Data Set Ready register.

DTR: Data Terminal Ready register.

DUART: Dual Universal Asynchronous Receiver Transmitter.

E

ECC: Error Correcting Code.

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.

EPOFF: Early Power OFF. The high priority interrupt sent to the operating system when the primary power is lost.

EPOW: Environmental and POwer Warnings.

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.

FAST-40 WIDE-16: An enhanced standard SCSI interface, 16 bits, providing synchronous transfer rate of up to 40 MHz, with a data transfer speed of up to 80M bytes per second. It is also called ULTRA-2/LVD.

FCode: Firmware Code.

FD3: The back plane of a disk cage that connects up to three 1-inch ULTRA-2/LVD disk devices. See also disk cage, disk carrier.

FDDI: Fiber-optic Distributed Data Interface. A 100-Mbit/sec optical LAN interface. An ANSI standard for a high-speed, 100-Mbit/sec, general-purpose network for the interconnection of computers, networks, and peripheral equipment using optical fiber cable in a dual-ring configuration.

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

FFC: Failing Function Code. A code representing a functional area of the system.

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.

FPL: See system planar.

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

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

FSM: Eight-synchronous DIMM riser card. See also riser.

FRU: Field Replaceable Unit.

FW: See firmware.

G

GUI: Graphical User Interface.

H

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

HVD: High Voltage Differential.

I

I2C: Inter Integrated Circuit.

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

IEC: International Electrotechnical Commission.

IER: Interrupt Enable Register.

I/O: Input/Output.

IPI: Internal Pending Interrupt.

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

ISA: Industry Standard Architecture (Bus).

J

JBOD: Just a Bunch Of Disks.

JTAG: Protocol dedicated to ASICs programming.

K

KBB: It is a card that provides three RS-232 lines and one parallel line. It is also connected to the FSB 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.

KIO: I/O expansion. A connector on the system planar, reserved for future use.

KOP: See operator panel.

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.

KPS: See power supply.

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

L

LAN: Local Area Network.

LCB: Link Controller Board.

LCR: Line Control Register.

LED: Light-Emitting Diode.

LMB: Local Memory Board.

LSB: Low Significant Bit.

LVD: Low Voltage Differential.

M

MCR: Modem Control Register.

MDP: Memory Data Path.

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.

MLR: Multichannel Linear Recording.

MP: MultiProcessor.

MPIC: MultiProcessor Interrupt Controller.

MRS: See riser.

MSB: Most Significant Bit.

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 to run multiple applications at the same time and exchange information among them.

N

NVRAM: Non Volatile Random Access Memory.

NVRAMRC: The area where Open Firmware user-defined commands are stored.

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 (KOP): The CPU drawer 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.

OUT(n): Output signal number.

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.

PID: Product IDentification.

POST: Power On Self Test.

PowerPC: A standard RISC microprocessor family.

power supply (KPS): The CPU drawer and the PCI expansion drawer, if present, are equipped

with one redundant power supply, providing power and power regulation to all the system components. See redundant power supply.

PPI: Parallel Port Interface.

PTE: Page Table Entries.

Q

No entries.

R

rack: The metallic structure 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 (KPS): 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.

RI: Ring Indicator register.

riser (MRS): A card used for memory configuration hosting memory DIMM connector(s). See also FSM.

RMS: Recovery Management Support.

ROM: Read Only Memory.

ROS: Read Only Storage.

RPM: Revolutions Per Minute.

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.

rspc: PowerPc Reference Platform. System model architecture, implemented on multiple bus systems (PCI, ISA).

RTAS: Run Time Abstraction Services.

RTC: Real Time Clock.

RTS: Request To Send register.

S

SCR: Scratch Pad Register.

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.

SE: Single Ended.

SID: System IDentifier.

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

SMIT: System Management Interface Tool. It is an interactive screen-oriented command interface. It is provided with the operating system.

SPD: Serial Presence Detect.

SRN: Service Request Number. A group of numbers used by service technicians to determine the failing area of the system.

SRR1: Save/Restore Register 1.

SSBus: System Service Bus.

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 (FPL): The planar which interconnects all the drawer resources.

SVGA: Super Video Graphics Array.

T

TOD: Time of Day.

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

TSOPII: Tin Small Outline Package II.

U

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

UART: Universal Asynchronous Receiver Transmitter.

ULTRA-2/LVD: See Fast-40 WIDE-16.

ULTRA/SE: See Fast-20 WIDE-16.

UTC: Universal Time Coordinated.

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.

VPD: Vital Product Data.

W

No entries.

X

No entries.

Y

No entries.

Z

No entries.

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