Bull ESCALA E230

Setup Guide

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

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Setup Guide

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

Hardware

February 2000

Trademarks and Acknowledgements

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Year 2000

The product documented in this manual is Year 2000 Ready.

System Setup Roadmap

1

508 mm
20 inches

508 mm
20 inches

508 mm
20 inches

2

RS-485

LAN 10/100 Mb/s

ASCII terminal

RS-232

Mouse

Serial printer

Keyboard

Graphic monitor

Parallel printer
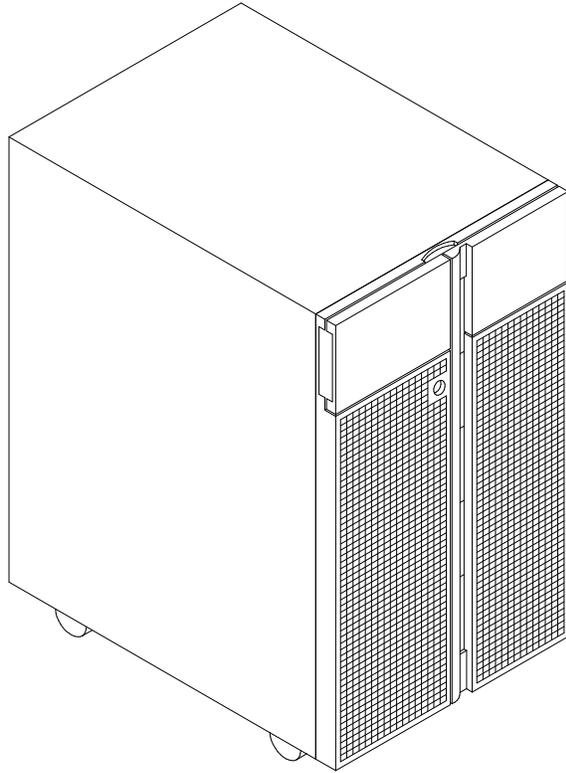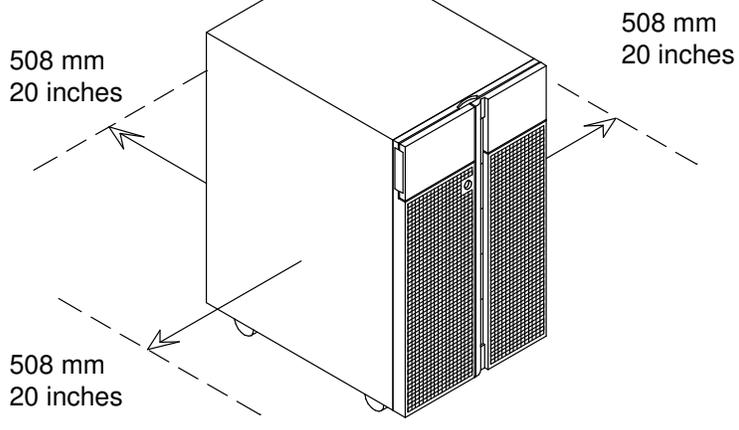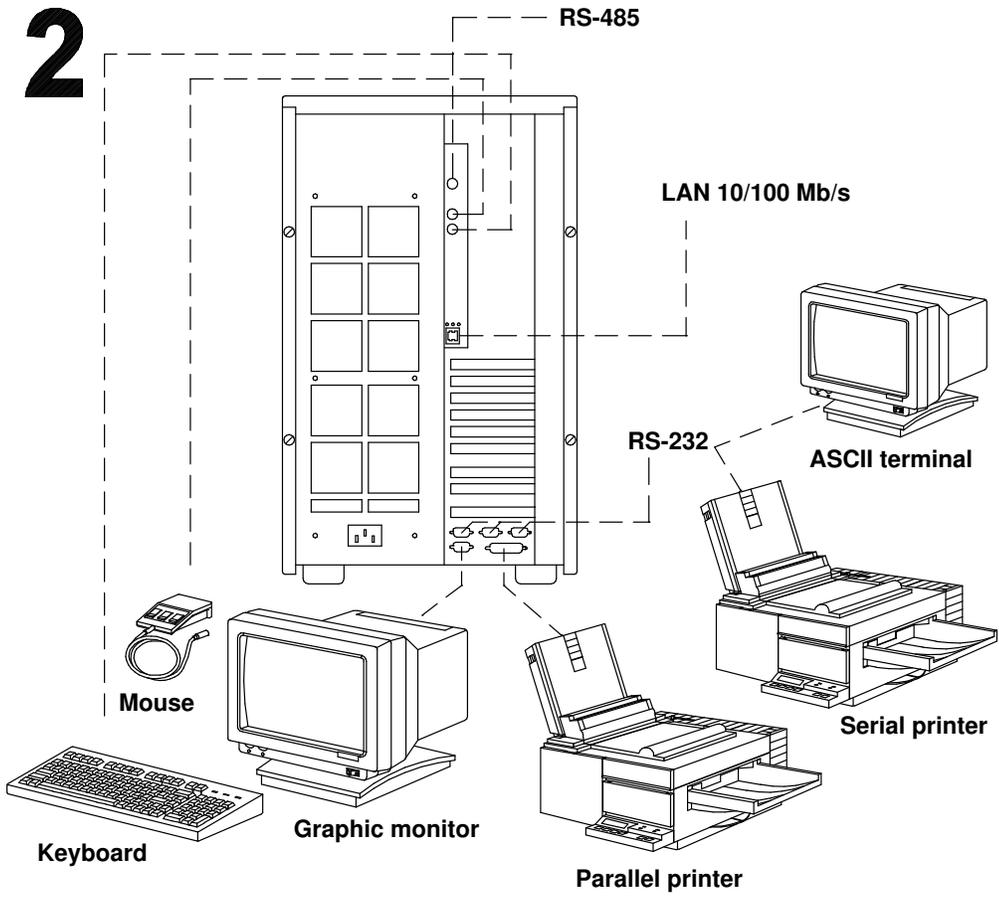
1 Reference information: **Preparing the Site**, on page 1-1

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

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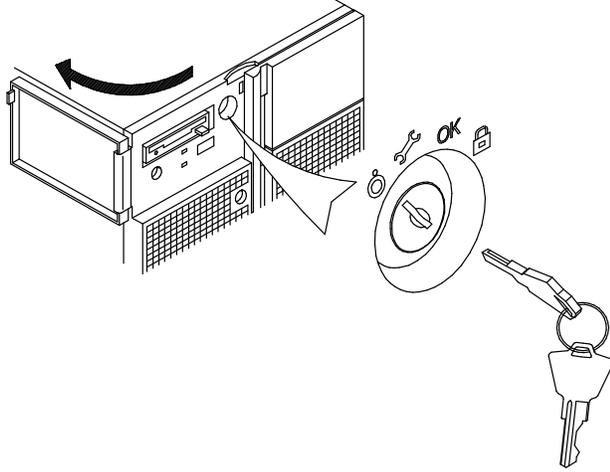
4
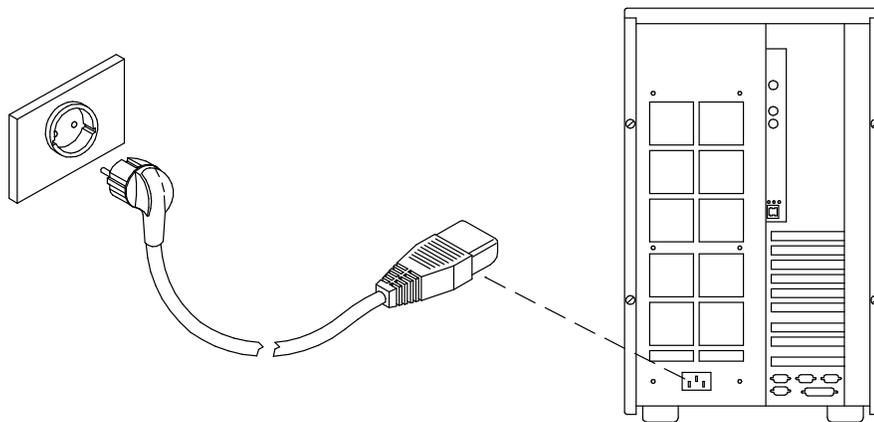
5 Check the software status for your system (pre-installed, not-installed).

● If the *Preload Report* sheet has been supplied with the system, the software is pre-installed. Skip to step 6.

●● If the *Preload Report* sheet is not supplied with the system, the software is not-installed. Refer to the *AIX 4.3 Installation Guide*.

6
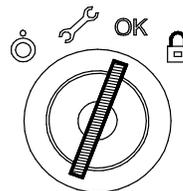
3 Reference information: **Inserting the Operator Panel Key**, on page 2-7

4 Reference information: **Connecting the Power Cord**, on page 2-9

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

6 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.

Device Disconnection

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

Laser Safety Information

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

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

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

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

> **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 upgrading.

Overview of the Contents

Note: 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**, guides to preparing the most suitable area to setup the system and presents system features.

- Chapter 2, **System 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 system, 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

- *Maintenance Guide* (86 A1 46PX), 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.

- *Terminals and Printers Connections* (86 A1 86GX), describes how to connect a terminal or a printer that is not supplied with the system.

- *AIX Problem Solving Guide and Reference* (86 A2 32JX), provides information to help investigate, define 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 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 discuss both the hardware and software aspects.

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

- *Disk Expansion Unit Quick Set Up* (86 A1 12PX), contains the step by step hardware procedures for a quick set up of the disk expansion unit.

- *Using the Disk Expansion Unit* (86 A1 16PX), contains information about the disk expansion unit operability, features and upgrading.

- *Disk Expansion Unit Service Guide* (86 A1 13PX), provides the description of the disk expansion unit hardware components, instructions for their installation and/or replacement and information about SCSI cables. 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

Preparing the Site

Make sure you have an adequate number of proper telephone plugs, grounded electrical outlets for your system, display, and any other options you intend to install.

Place your system in a location that is dry. Rain or spilled liquids might damage your system.

Floor

The floor should be made of a durable, antistatic, insulating material which will not produce or retain dust and can be easily cleaned.

Recommended materials are:

- Laminated material
- Linoleum
- Tiles
- Vinyl.

Materials not to be used are:

- Parquet (produces dust when polished)
- Waxed or glass surfaces (a source of static electricity)
- Carpets (produce and retain dust and are a source of static electricity).

If a carpet is necessary, it must be made of an antistatic material or treated with antistatic product.

Fire Protection

Fire exstinguishers should be installed in the system room containing carbon dioxide (CO_2) or inert gas. If a water system is used, precautions should be taken to prevent the accidental turning on of the water.

It is recommended to install smoke and heat detectors.

Arranging Your Office

We offer you some information for adjusting the furniture in your office.

An adjustable chair with comfortable support is suggested, adjust the chair to fit your body properly.

Your lower back (lumbar region) should be supported correctly by the back of the chair.

Place your monitor slightly below your eyes level when you are sitting at the keyboard. Keep an adequate distance from your eyes to the screen about 18 - 28 in. (450 - 700 mm).

Position the monitor to minimize glare and reflections on the screen and, if necessary, use the screen filter to protect against electrostatic discharge.

Keep your screen clean, to reduce unwanted reflections.

Avoiding Fatigue

A non-direct light of about 500 lm/m^2 (lumen per square meter) measured at a distance of 750 mm from the floor should be enough to work in comfort.

When you are seated since long time, stand up and take a short break to reduce fatigue and to relax your eyes.

Physical Dimensions

The table below lists the dimension of the system unit and its weight.

Height	24.8 in.	630 mm off the floor
Width	13.9 in.	353 mm
Depth	19.7 in.	500 mm
Weight	121.4 lbs*	55 kg*

* This value corresponds to a maximum system configuration; i.e. including a max. number of cards and devices.

Clearance

The amount of space needed by the system unit during normal operation is indicated in the figure below.

508 mm
20 inches

508 mm
20 inches

508 mm
20 inches
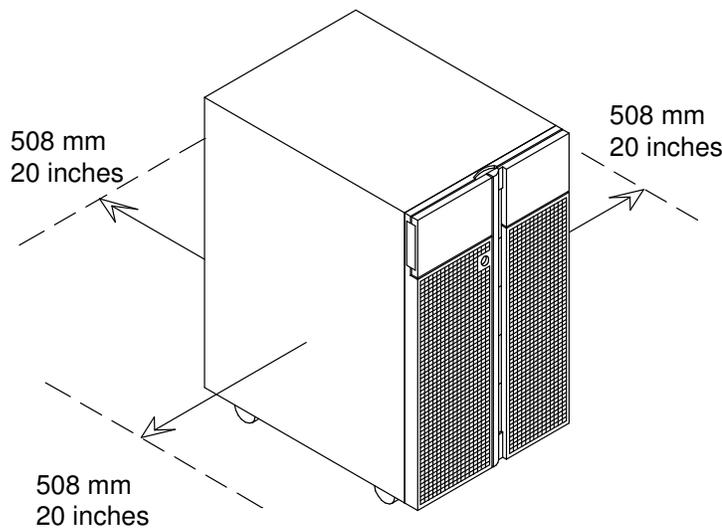
In addition, before installing the system, you should keep into consideration also the space that could be necessary on each side for possible service and maintenance.

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 that you have chosen.

If not yet done, carefully unpack the system unit and components, following the information 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 you 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 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 Description	Environment and Safety Considerations *Setup Guide*, **Knowing the System**, → **Preparing the Site** System Presentation and Features *Setup Guide*, **Knowing the System**, → **System Features Overview**
Operator's Controls	Operator Panel Description and Key Usage *Setup Guide*, **Knowing the System**, → **Operator Panel** Inserting the Opeator Panel Key *Setup Guide*, **System Setup Procedure** Starting ans Stopping the Ststem *Setup Guide*, **Maintaining the System**
System Panels	Device Shutter, Front and Lateral Panels *Setup Guide*, **Expanding the System Configuration**, → **Preparing the System for an Upgrade**, → **Preliminary and Restart Operations**
Media and Disk Devices	Device Areas Description *Setup Guide,* **Configuring the System**, → **Device Configuration** and *Using the Disk Expansion Unit*, **Disk Expansion Unit Configuration** Drives Configuration and SCSI-ID *Setup Guide,* **Configuring the System,** → **Device Configuration,** → **SCSI-ID Configuration** *Using the Disk Expansion Unit*, **Disk Expansion Unit Configuration** and *Disks and Tapes Configuration Information*, the paragraph related to your drive model SCSI Connection and Configuration (maintenance task) *Maintenance Guide*, **SCSI Cables Description and Connection** and *Disk Expansion Unit Service 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** and *Disk Expansion Unit Service Guide*, **Disk Expansion Unit Hardware Components**

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** Upgrading / Removal *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** Upgrading / Removal *Setup Guide*, **Expanding the System Configuration**
Controllers	Description / Configuration *Setup Guide*, **Configuring the System** Upgrading / 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*, **Controller Configuration**, → **PCI/ISA Controller List**
Disk Expansion Unit	Description / Configuration *Using the Disk Expansion Unit* External Connections *Disk Expansion Unit Quick Set Up*

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 Base Unit	Description of the Hardware Components and Internal Connectors *Maintenance Guide*, **Hardware Maintenance**, → **List of the Hardware Components** Faulty Component Replacement *Maintenance Guide*, **Hardware Maintenance** SCSI Connections and Configuration Examples *Maintenance Guide*, **SCSI Cables Description and Connection**
Specific Maintenance for the Disk Expansion Unit	Description of the Hardware Components and Internal Connectors *Disk Expansion Unit Service Guide*, **Disk Expansion Unit Hardware Components** Adding a Disk Expansion Unit *Disk Expansion Unit Quick Set Up* Faulty Component Replacement *Disk Expansion Unit Service Guide*, **Hardware Maintenance** SCSI Connections and Configuration Examples *Disk Expansion Unit Service Guide*, **SCSI Cables Description and Connection**

System Presentation

Your new system is a powerful computer, easy to use and easy to maintain.

Front View of the Base Unit

The system operator's controls are on the front side of the base unit protected by two shutters.

The first shutter covers the operator panel and floppy drive area (left side of the unit), the second one covers the media and disk devices area (right side of the unit).
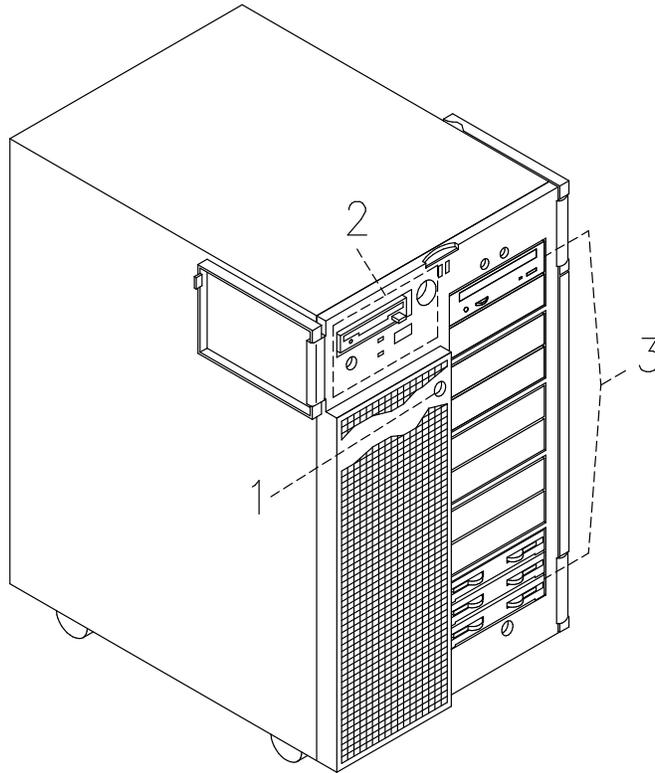
1 Device shutter key lock: the key lock used to lock the device shutter

2 Operator panel: the operator's control panel

3 Media and disk devices area: the area where the operator can access these devices

Rear View of the Base Unit

Connectors:
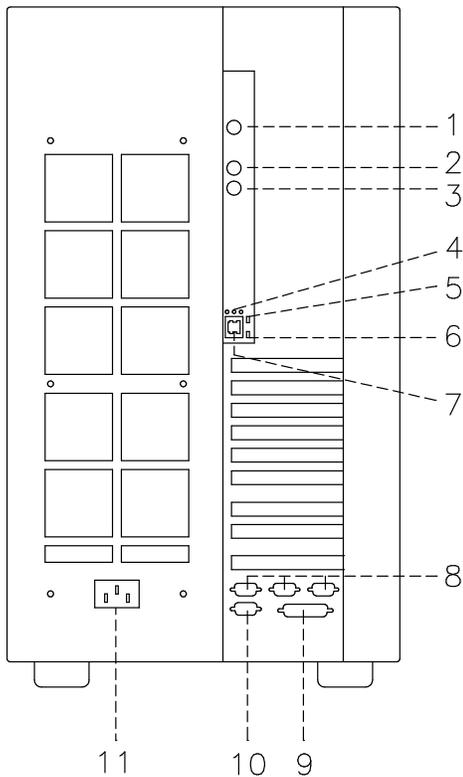
1   RS-485: for expansion unit connection

2   Mouse: 6-pin mini-DIN female

3   Keyboard: 6-pin mini-DIN female

4   Three (green) **LAN LED's**, from right to left: speed, link and half or full duplex connection

5   Transmit data (green) LED

6   Receive data (green) LED

7   LAN 10/100 M-bit: RJ-45

8   Three serial RS-232 ports 9-pin male, from right to left: COM1, COM2 and COM3

9   Parallel port: 25-pin female

10   Video graphics: SVGA 15-pin female

11   Power cord receptacle

Three LAN LED's, Transmit Data and Receive Data LED's
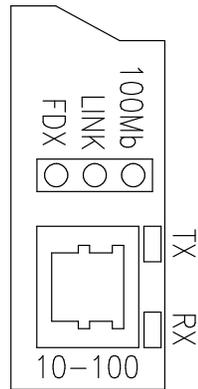
- 100Mb
    - Light on: 100 M-bit connection
    - Light off: 10 M-bit connection.
- LINK
    - Light on: cable plugged in the RJ-45 connector
    - Light off: no cable in the RJ-45 connector.
- FDX
    - Light on: full duplex connection
    - Light off: half duplex connection.
- TX
    - Light on or blinking: transmit data activity
    - Light off: no transmit data activity.
- RX
    - Light on or blinking: receive data activity
    - Light off: no receive data activity.

Operator Panel

The operator panel is installed in the front of the unit.
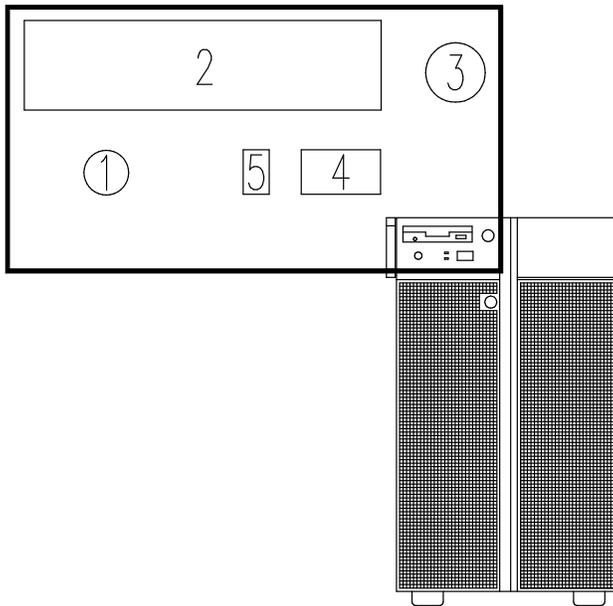
Operator Controls:

1   **Reset Button**, below

2   **3.5-Inch Diskette Drive**, on page 3-2

3   **Key Mode Switch**, on page 1-11

4   **Hexadecimal Display**, on page 1-12

5   **LED's**, on page 1-13

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 and 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 unit (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 unit 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).

Key Mode Switch

The key mode switch provides four logical functions, which are enabled only when AC power is present in the base unit.

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	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 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.

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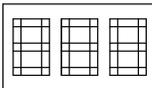
What the hexadecimal display shows and the way it shows it (blinking, steady), depends on the system status:

- **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.

LED's

The system base unit 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.

System Features Overview

Base Unit Features

The following list summarizes the features provided by the system base unit:

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 power supply
- Support for an integrated modem using the ISA slot.

Hard Disk Drives

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

Media Drives

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

PCI/ISA Controllers

- Up to nine PCI cards
- One ISA card.

Memory

- From 256M bytes to 4G bytes.

CPU's

- Up to two CPU cards.

Operating System

- AIX 4.3 or higher.

Disk Expansion Unit

- Up to two disk expansion units.

Disk Expansion Unit Features

Hard Disk Drives

- Up to twelve 1-inch hard disks.

Media Drives

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

Chapter 2. System Setup Procedure

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

- **Connecting Devices**, below
- **Inserting the Operator Panel Key**, on page 2-7
- **Connecting the Power Cord**, on page 2-9
- **Starting the System for the First Time**, on page 2-10.

Note: If you need to connect expansion units to the system base unit, proceed as follows:

1. Set up the system base unit, 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 system base unit operates correctly, perform the installation and connection of the expansion units:

   – For the disk expansion units, please refer to the *Disk Expansion Unit Quick Set Up* leaflet

   – For other expansion units, please refer to the documentation delivered with those units.

Connecting Devices

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

- **Connecting Terminals**, on page 2-2
- **Connecting Keyboard and Mouse**, on page 2-4
- **Connecting Printers**, on page 2-5
- **Connecting PCI Controller Cables**, on page 2-6.

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:

System Rear Side
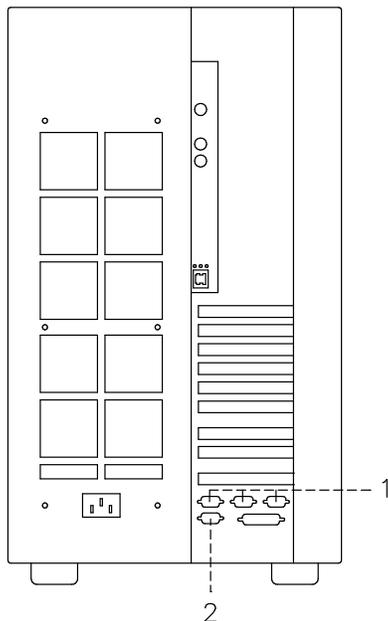
1   From right to left: COM1, COM2, COM3 serial ports

2   SVGA port

The following table summarizes the function of the terminal ports available on the system:

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.
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.
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.
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 the system:

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

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

   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 may 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

System Rear Side
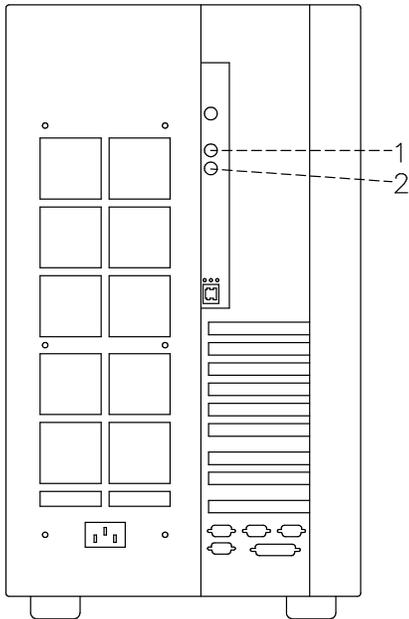
1 Mouse

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 base unit. Do not force the cable plug into the socket.
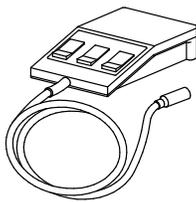
Connect the keyboard to the dedicated connector at the rear of the base unit. Do not force the cable plug into the socket.
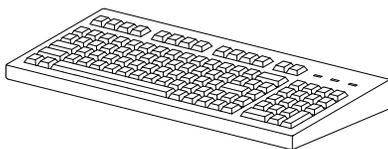
Connecting Printers

If you need to connect a printer to the system:

1. Connect the printer to the proper connector on the rear of the base unit, 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).

System Rear Side
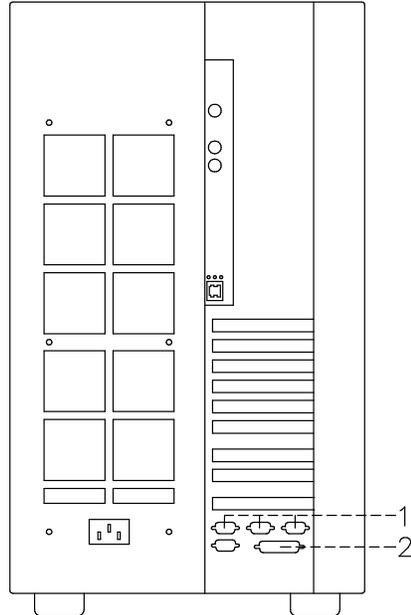
1   Serial ports

2   Parallel port

You can also connect printers to a SCSI port (if PCI controllers housing SCSI ports are installed inside the system unit), 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.*

Connecting PCI Controller Cables

If you need to connect one or more PCI controller cables for external connections, please refer to the specific documentation delivered with each controller.

If you need to connect SCSI cables, refer to the *Maintenance Guide* or to the *Disk Expansion Unit Service Guide*, for disk expansion unit SCSI connections.

Inserting the Operator Panel Key

Two pairs of keys are supplied with the system.

One pair is used as the operator panel key which enables the power on/off function and the operation mode. These functions are managed by the key controlled switch which is named key mode switch.

The second pair of keys is used to mechanically lock/unlock the device shutter.

Operator Panel Keys

Device Shutter Keys
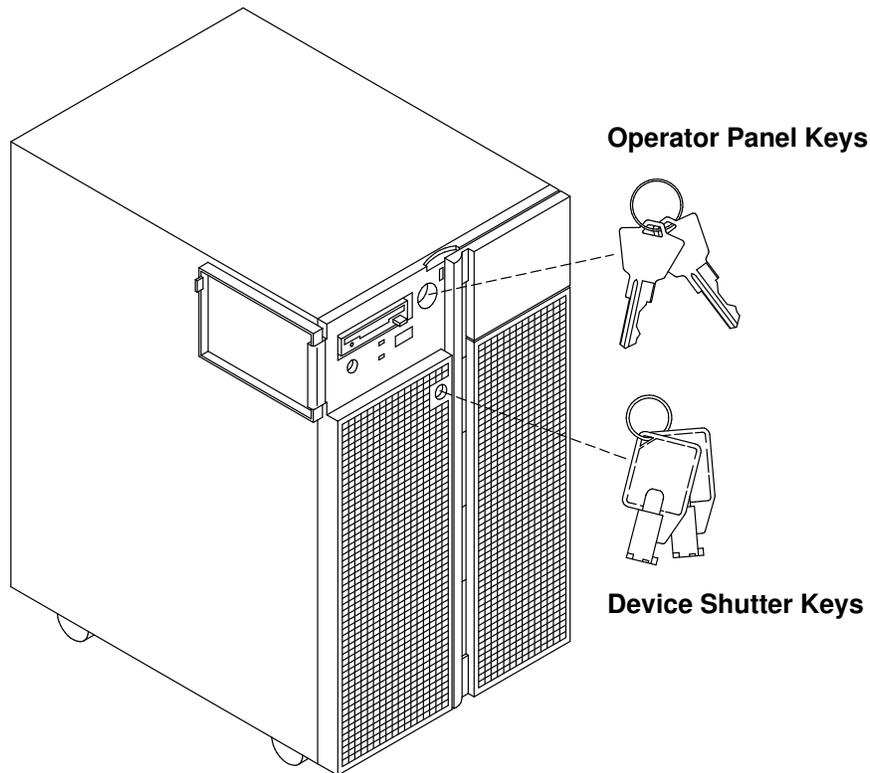
Put the device shutter keys in a safe place because these are not needed now. To go on with the system setup procedure you are required only to insert one of the operator panel keys in the key mode switch.

Insert the operator panel key performing the following steps:

1. Gain access to the operator panel firmly gripping the front bezel and opening it to the left.
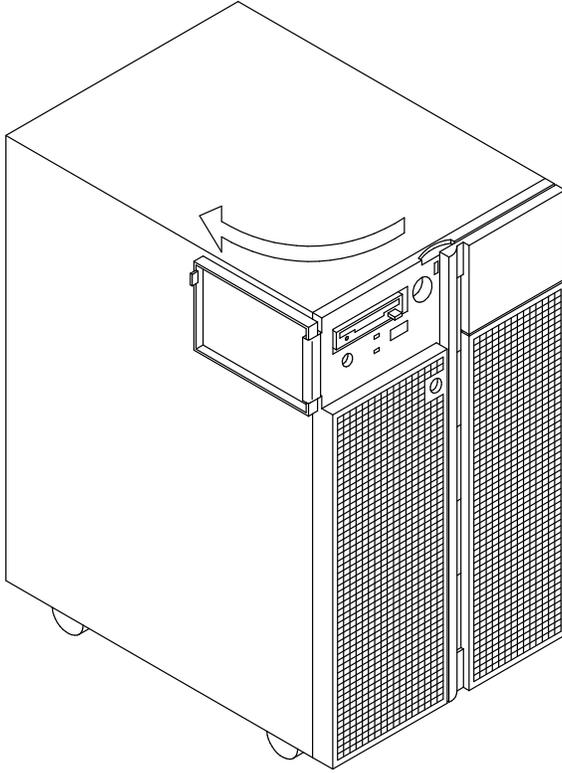
2. Insert the operator panel key in the key mode switch in the position shown in the figure.
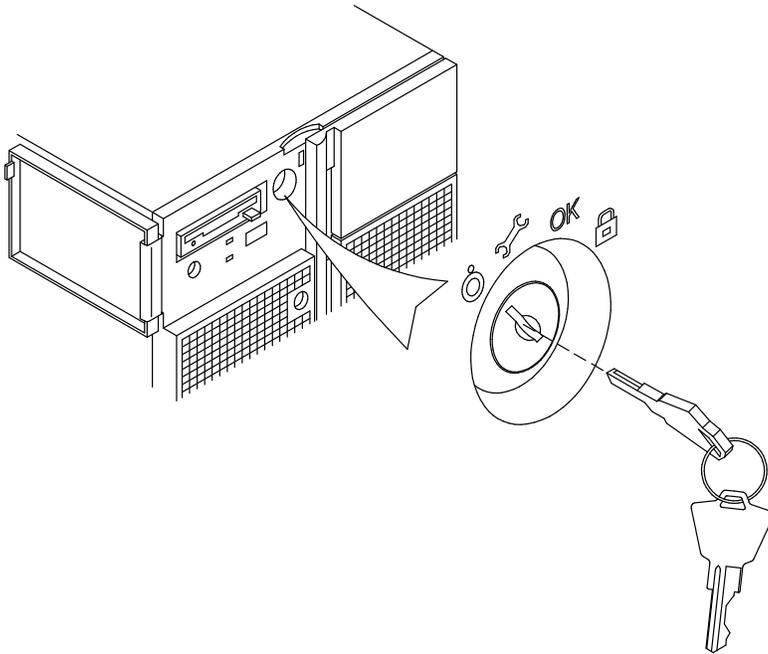
Connecting the Power Cord

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

1. Make sure that the key mode switch is set to the Power Off position and all external devices connected to the system are powered off.
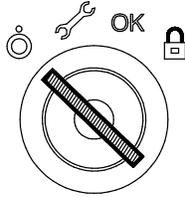
2. Identify the power receptacle toward the bottom of the rear of the system.

3. Connect the power cord supplied with the system, first to the system unit, and then to the wall outlet as shown in the figure.
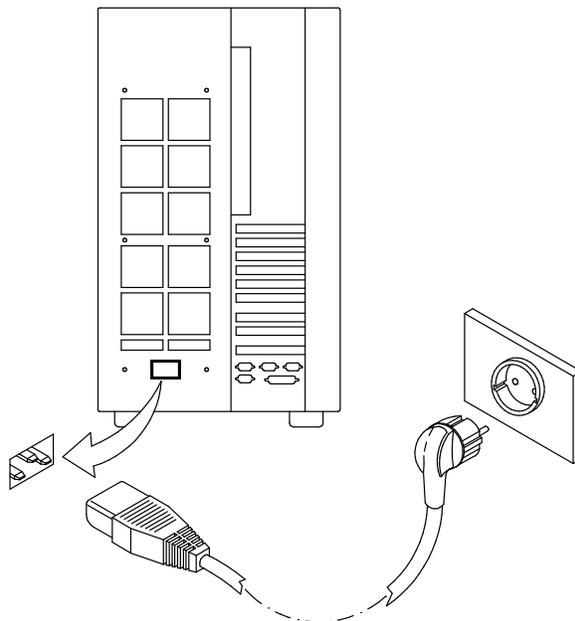
CAUTION:
An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Starting the System for the First Time

- **<u>Checking the Software Status</u>**, below

- **<u>First Startup of a Pre-Installed System</u>**, on page 2-11.

Checking the Software Status

The software for your system can be:

- Pre-installed

- Not-installed.

By default, the system software is pre-installed on your system, when you receive it. This makes the 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 unit. 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 your system 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 system unit and all power cords (including the system unit one) to the proper power outlets, as previously described in this guide.

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

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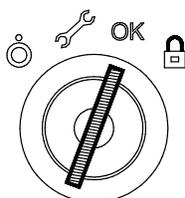
4. After some minutes, each terminal connected to the system displays a screen asking you to identify your system console. A specific key is indicated for each terminal. Press the specified key on the terminal you want to use as the system console. Press a key on only one terminal.

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 *Disks and Tapes Configuration Information* guide, delivered with the system.

Using the 3.5-Inch Diskette Drive

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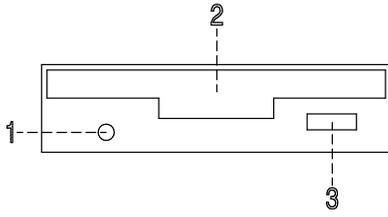
1	In-use light	Lights when the system is accessing the drive
2	Diskette slot	Where the diskette is inserted
3	Unload button	Used to unload the diskette from the drive

Note: Do not stop the system unit 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 upward and with the bevelled corner on your right and away from you.

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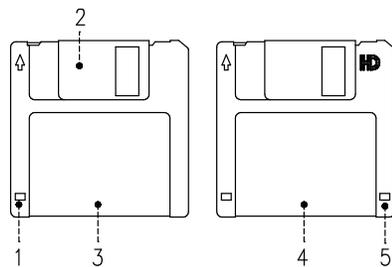
1	Write-protect slot
2	Sliding metal shutter
3	1.0M-Byte diskette
4	2.0M-Byte diskette
5	Rectangular cutout (only for 2.0M-Byte diskette)

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
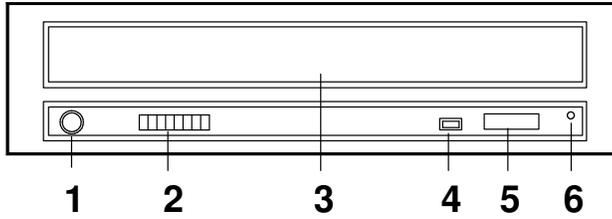
1	Headphone socket	Used for connect headphones to your CD-ROM drive
2	Volume control	Used to control the level of the audio signal from the headphone socket
3	Drive door	Prevents dust from entering into the drive
4	Busy LED indicator	Used to indicate the condition of the drive
5	Unload button	Used to 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 date 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 upward 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.
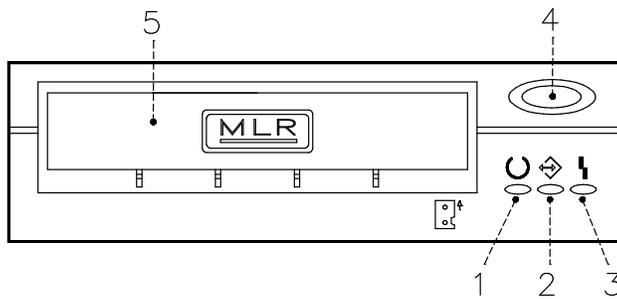
1	Ready LED (green)	
2	Activity LED (green)	
3	Error LED (amber)	
4	Unload button	
5	Drive door	

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**, 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.

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 at your right side and the window side of the cartridge facing up.

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 data 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 in the following table.

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˚F (-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 7/14GB 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.
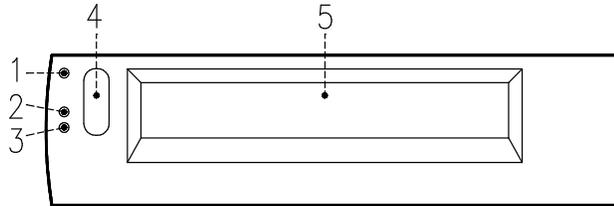
1   Error LED (amber)

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**, 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.

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 up.

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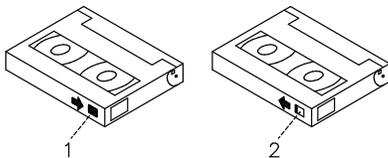
| 1 | Window closed | Write-protect tab set |
| 2 | Window open | Write-protect tab not set |

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% RH

  – 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.
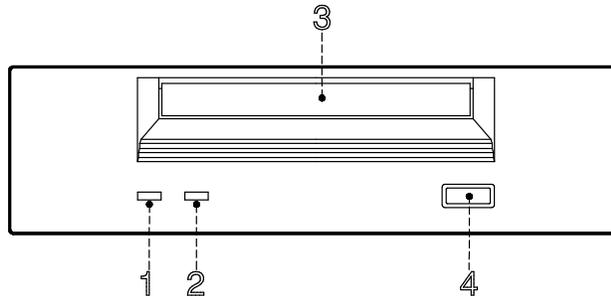
1 Tape LED (green)

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 up.

2. Slide the tape cartridge into the opening on the front of the 4 mm 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.
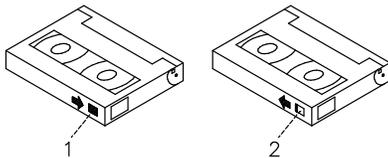
1	Window closed	Write-protect tab not set
2	Window open	Write-protect tab set

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 3-16, 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 nonstop 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, see page 3-13.

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, see page 3-13.

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

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

1. Grasp the edges of the 4 mm cleaning cartridge with the window side of the cartridge facing up.

2. Slide the cleaning cartridge into the opening on the front of the 4 mm tape drive until the loading mechanism pulls the cartridge into the drive.

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

1. The cleaning tape is loaded into the tape path.

2. The drive is cleaned by moving the cleaning tape forward for approximately 30 seconds.

3. The tape is unloaded and the cleaning cartridge is ejected from the tape drive when the cleaning operation is complete.

4. A successful cleaning operation is indicated when the clean/attention light (amber) goes off, see page 3-13 (if it was activated before the cleaning operation).

Using Hard Disk Drives

The hard disk drives are located in the device area on the right side of the unit 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.

Open the device shutter by turning the device shutter key to the right, to access the hard disks.
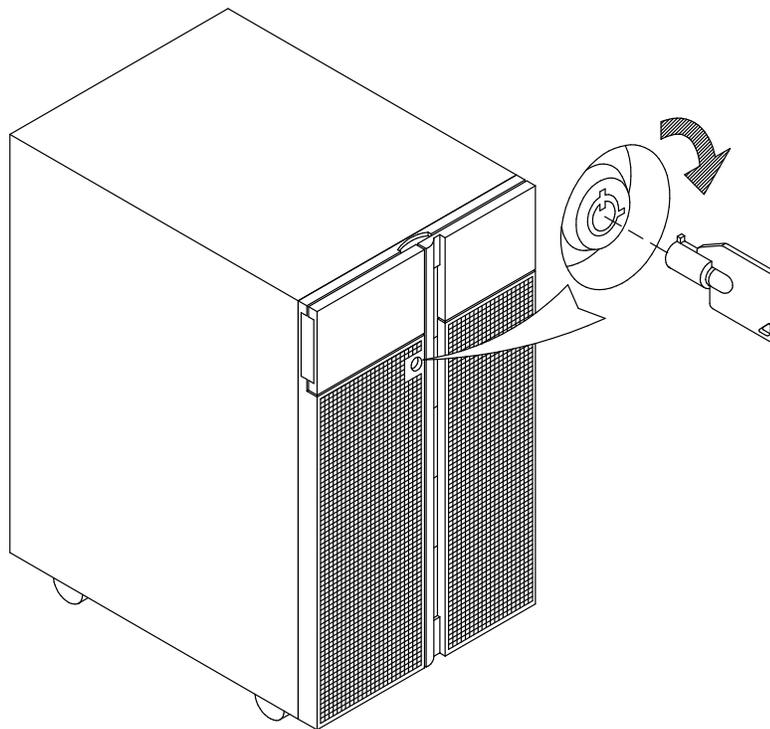
Note: If you need to install or remove the disk devices, refer respectively to **Hard Disk Drive Installation**, on page 6-23, or **Hard Disk Drive Removal**, on page 6-30.

Using the Keyboard

There are several keyboards available with the system unit. 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.
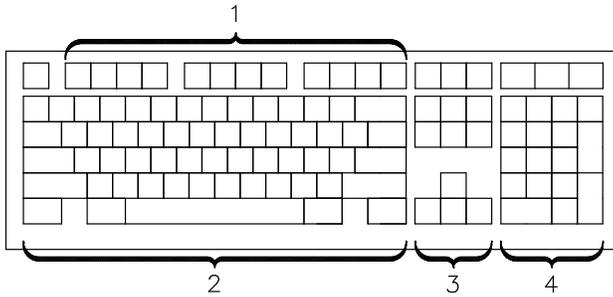
The keyboard is divided into four sections:

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 base unit, 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 unit.
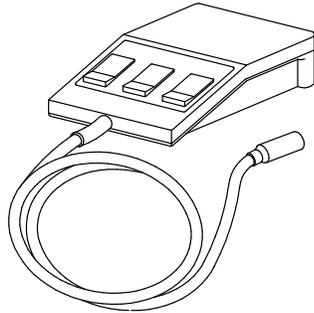
Consult your application publication for the exact use of the mouse.

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 base unit, 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 your system.

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

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. If a disk expansion unit is connected, be sure that its key mode switch is properly set. For detailed information, please refer to the *Using the Disk Expansion Unit* guide.

2. Be sure that the system unit, all external devices and expansion units (if any), are connected to the proper power outlets.

3. Switch on the external devices (if connected).

4. Switch on the system console.

5. Power on the system setting the base unit key mode switch to the Normal position.
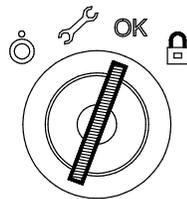
6. The system begins its normal startup routine and is ready for use.

7. You can now log into the system.

Note: In case you power on the system by setting the key mode switch to the Service position, you enter the operating system diagnostic mode.

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 your system configuration. Do not press any keys while you are waiting, as this may cause unexpected results.

When the login prompt appears on the display:

1. Type your login name and press the Enter key or click on the OK button.

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

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

   If the system displays:

   login incorrect

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

Stopping the System

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

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

2. Ensure that the media drives 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 base unit key set to the Secure position. Remember, before rebooting the system, to set the base unit 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 base unit key mode switch to the Power Off position.

Note: If nobody needs to use the system, remove the key, to prevent unauthorized reset of the system.

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 reinitializes 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
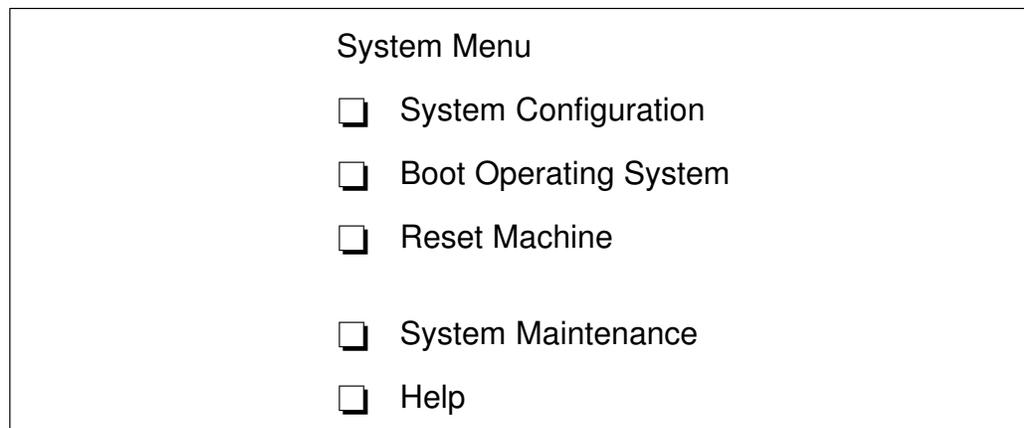
Operating Procedures

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 system 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 paragraphs list 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 rear side of the unit, as shown in the figure.

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.
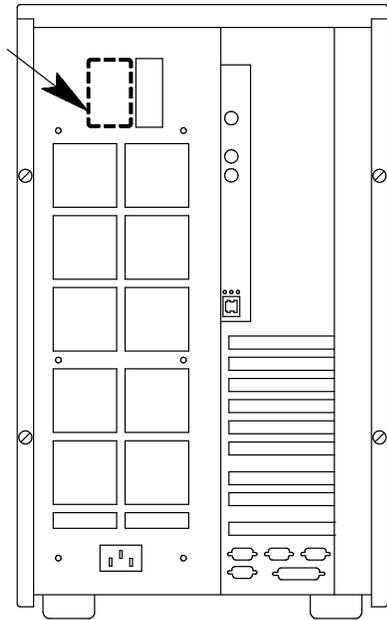
What To Do When a Problem Occurs

Problem Description	Possible Cause	Solution
System Power		
The system does not power on	The system power cord is not connected to an AC outlet.	*Connect the power cord to a working AC outlet.*
	The system power cord is not properly connected.	*Properly connect the power cord to the system unit 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 1 minute.		

Problem Description	Possible Cause	Solution
Keyboard		
The keyboard does not function	The keyboard is not connected to the system 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

- **Memory Configuration**, below
- **CPU Configuration**, on page 5-3
- **Controller Configuration**, on page 5-4
- **Device Configuration**, on page 5-7.

Memory Configuration
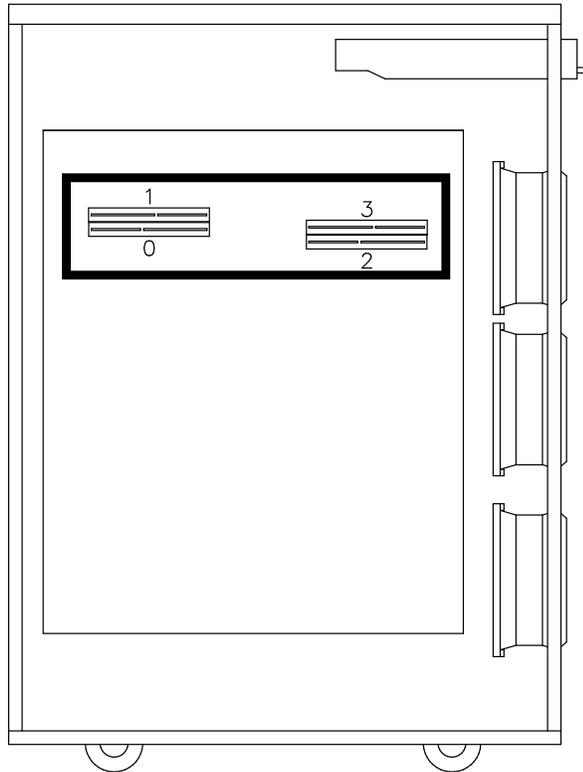
There are four memory connectors on the system planar. They house four memory risers.

There are two types of memory risers:

- **FSM** risers, housing eight standard synchronous DIMM connectors; these risers are used for memory configurations requiring more than one memory bank.
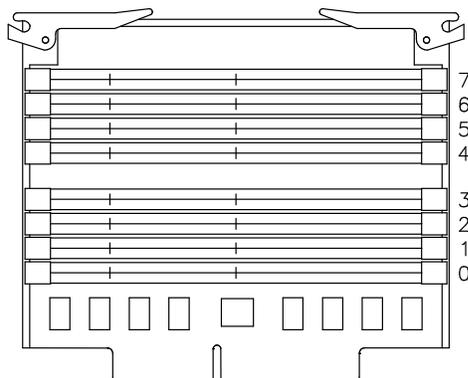
- **FRE** risers, housing one standard synchronous DIMM connector; these risers are used for entry memory configurations requiring only one memory bank.
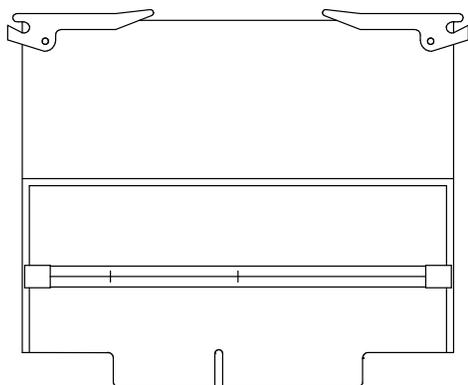
Note: It is not possible to install memory DIMM's directly on the system planar.

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 Bytes memory DIMM's).

Maximum memory bank capacity is 512M Bytes (4x128M Bytes memory DIMM's).

Maximum memory capacity is 4G Bytes.

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

Each system supports up to two CPU cards which are installed on the system planar dedicated slots.
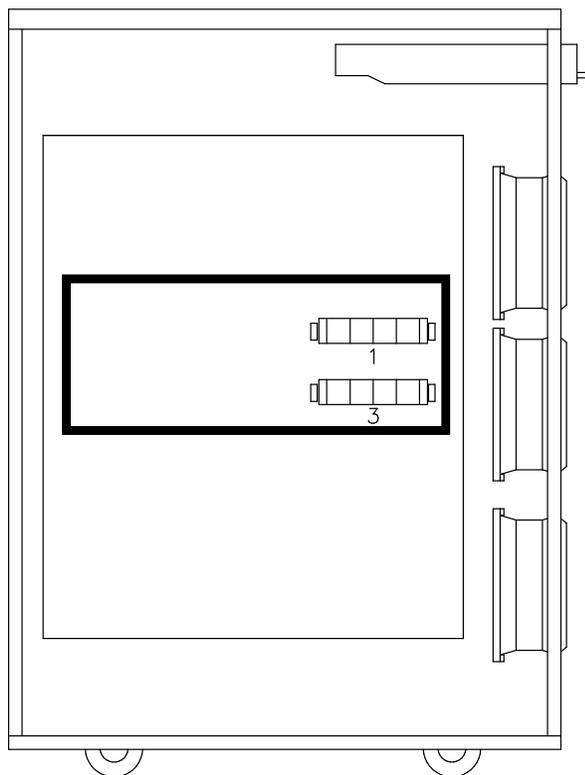
The CPU cards must be homogeneous.

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	3

Controller Configuration

- **PCI/ISA Controller Bus Dependences**, below

- **PCI/ISA Controller List,** on page 5-6.

PCI/ISA Controller Bus Dependences

The system base unit can house up to nine PCI controller cards having the characteristics described below:

- Up to four, 64 bit, 33 MHz, PCI controllers

- Up to five, 32 bit, 33 MHz, PCI controllers.

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

Note: PCI slot 8 can be used only if the ISA slot is not used and vice-versa.
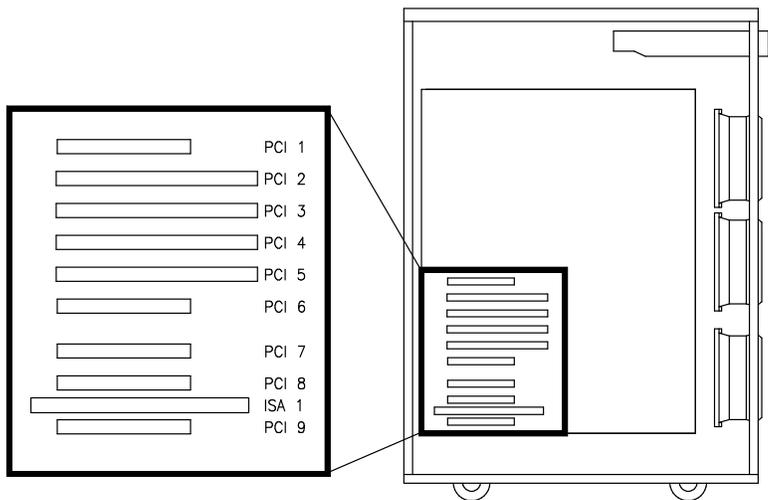
The system provides two native PCI local busses (PCI0, PCI1). PCI bus 0 generates an additional PCI bus through a PCI to PCI bridge (PCI0_1). It also generates an ISA bus through a PCI to ISA bridge.

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

Bus ID	Controller Card Slot #	Slot Type
PCI #1	PCI1	PCI 32 bit
	PCI2	PCI 64 bit
	PCI3	PCI 64 bit
	PCI4	PCI 64 bit
PCI #0	PCI5	PCI 64 bit
PCI #0_1	PCI6	PCI 32 bit
	PCI7	PCI 32 bit
	PCI8	PCI 32 bit
	PCI9	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

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

- Install the graphic controller, if any, before the RAID controller (e.g., if the RAID controller is installed in PCI slot 4, install the graphic one in PCI slot 2)

- 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, 8 and 9 can house only short format controllers (Matrox, being a medium-long format controller, is allowed in PCI slot 8)

- RAID LVD controller cannot be installed after the PCI bridge, therefore it is not allowed in slots 6, 7, 8 and 9

- 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.

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

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 5-6, for the list of supported controllers and related labels.

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 is 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
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

Device Configuration

- **Media and Disk Configuration Rules**, below
- **RAID Configurations**, on page 5-9
- **Native High Availability Configurations**, on page 5-9
- **SCSI-ID Configuration**, on page 5-10
- **Examples of SCSI Connections**, on page 5-12.

Media and Disk Configuration Rules

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

```
┌───────────┬───────────┐
│           │           │
│           │  AREA 1    │
│           │           │
│           ├───────────┤
│           │           │
│           │  AREA 2    │
│           │           │
│           ├───────────┤
│Front Side │  AREA 3    │
│           ├───────────┤
│           │           │
│           │  AREA 4    │
│           │           │
│           ├───────────┤
│           │           │
│           │  AREA 5    │
│           │           │
└───────────┴───────────┘
```

- Area 1 hosts up to two 1.6 inch media drives
- Area 2 may host either up to two 1.6 inch media drives or up to three1 inch hard disk drives
- Areas 3, 4 and 5 may host up to three 1 inch hard disk drives each.

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.

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

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

The system base unit provides two native SCSI busses.

The first bus, ULTRA/SE (Single Ended), SCSI-0, controls media drives installed in Area1 (and Area 2, if any).

The second bus, ULTRA-2/LVD, SCSI-1, is used to control disks installed in Area 5 and Area 4.

SCSI hard disk drives can also be controlled by additional SCSI controller cards.

Each SCSI bus used to manage disks supports the connection of up to two disk cages, that means up to six 1 inch hard disk drives.

The table which follows summarizes the possible SCSI connections inside the system unit:

SCSI BUS	Area 1	Areas 1 - 2	Area 2	Areas 2 - 3	Area 3	Area 4	Area 5	Areas 4 - 5
SCSI-0 (media)	yes	yes	no	no	no	no	no	no
SCSI-1 (disks)	no	no	no	no	no	no	yes	yes
1st RAID bus	no	no	no	yes	yes	no	no	no
2nd RAID bus	no	no	no	no	no	no	yes	yes
Additional ULTRA-2/LVD SCSI bus	no	no	no	yes	yes	no	no	no
Additional ULTRA/SE bus (native HA conf. only)	no	no	no	yes	yes	no	yes	yes

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

- Install the system disk drive in the upper slot of Area 5 of the base unit

- Install devices beginning always from the upper free slot inside the area

- Within the disk configuration of Areas 3 and 2, install 18G byte disks, if any, according to the following sequence:

  - Area 3:
    - top   (ID 0)
    - middle (ID 1)
    - low   (ID 2)

  - Area 2:
    - top   (ID 8)
    - low   (ID A)
    - middle (ID 9)

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

Refer to **SCSI-ID Configuration**, on page 5-10, for details about the SCSI-ID identification that the device will acquire once it is installed and for some suggestions about the device installation sequence.

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

RAID Configurations

The RAID feature is supported by a specific RAID controller card.

One or more hard disk drives can be configured in a redundant array. In case of a hard disk drive failure, the data stored on the faulty device can be recovered from the other devices owned by the array.

Note: RAID controllers do not support native High Availability configurations.

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

Refer to the specific RAID documentation for the setup procedures.

You can find examples of RAID connections in **Connections in RAID Configuration**, on page 5-19.

Native High Availability Configurations

The system supports some native High Availability configurations, where the full availability is guaranteed by the physical interconnection and software management of two systems in such a way that, if one system fails, the other system takes the control and all the activity goes on without interruption.

Notes:

1. Native High Availability configurations are not supported by RAID controllers.

2. Native High Availability configurations can also include expansion units. Please refer to the expansion unit specific documentation for details and examples.

3. Native High Availability configurations are not supported by ULTRA-2/LVD controllers. ULTRA/SE controllers must be used instead.

Refer to the specific native High Availability package documentation for the setup procedures.

You can find examples of native High Availability connections in **Connection in Native High Availability Configuration**, on page 5-21.

SCSI-ID Configuration

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

- **Hard Disk Drive SCSI-ID**, on page 5-11.

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

MEDIA DRIVE CONFIGURATION TABLE

Device Area	Physical Position	SCSI-ID
1	M1	6
	M2	5
2	M3	4
	M4	3
3	-	-
	-	-
4	-	-
	-	-
5	-	-

Legend:
Mn = M media drive
      n number giving the installation sequence of the devices inside the system unit.

Hard Disk Drive SCSI-ID

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

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

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

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

The suggested sequence fills in:

• First Areas 5 and 4, which can be managed by the embedded SCSI-1 controller, and

• Then Areas 3 and 2, which must be managed by an additional SCSI controller.

If you install one additional SCSI controller, even if all the disk devices you have could be managed by the embedded SCSI-1 controller, the suggestion is to balance the load between the two controllers (e.g., if you have four disk devices and two controllers, install two disk devices in Area 5 and the other two in Area 3).

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

HARD DISK DRIVE CONFIGURATION TABLE

Device Area	Physical Position	SCSI-ID
1	-	-
	-	-
2	D10	8
	D11*	9
	D12*	A
3	D7	0
	D8	1
	D9	2
4	D4	8
	D5	9
	D6	A
5	D1 (system disk)	0
	D2	1
	D3	2

Legend:
Dn = D hard disk drive
n number giving the installation sequence of devices inside the system unit.

* Revert the installation sequence of D11 and D12, in case of 18G byte disk.

Examples of SCSI Connections

Some examples of standard 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 SCSI connections inside the base unit.

For each example, both the SCSI controller to bulkhead connections (on the system left side) and the bulkhead to device area connections (on the system right side) are illustrated.

It is assumed that any SCSI cables inside the system unit are properly in place.

For details on SCSI cables and bulkhead locations mentioned in these examples, please refer to **SCSI Cables Description and Connection**, in the *Maintenance Guide*.

Note: The examples given in the following pages refer to the base unit only. If your system configuration includes also one or more disk units, you can find the relevant examples in the *Disk Expansion Unit Service Guide*.

Media Device in Area 1 (CD-ROM)

SCSI Controller to Bulkhead Connection
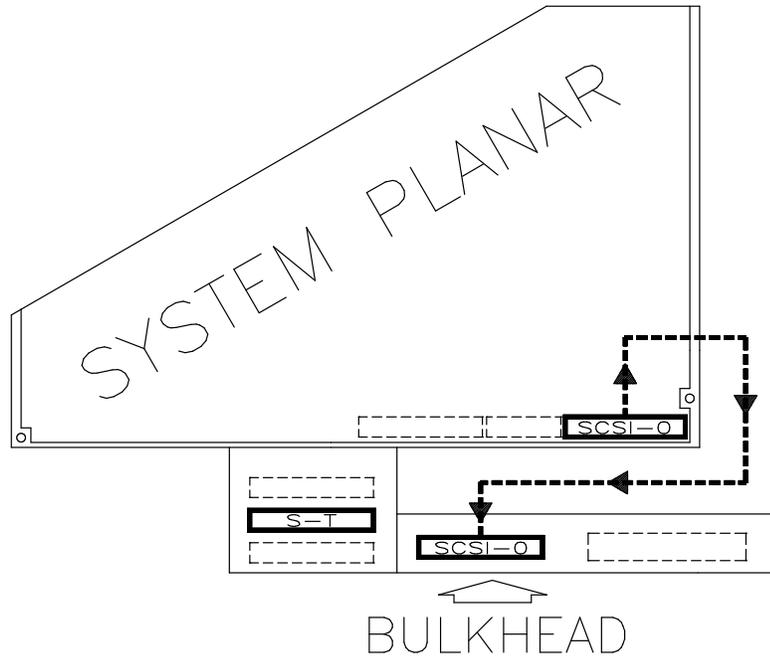
SYSTEM PLANAR

SCSI-0

S-T

SCSI-0

BULKHEAD

Bulkhead to Device Area Connection

AREA 1

AREA 2

AREA 3

AREA 4

AREA 5
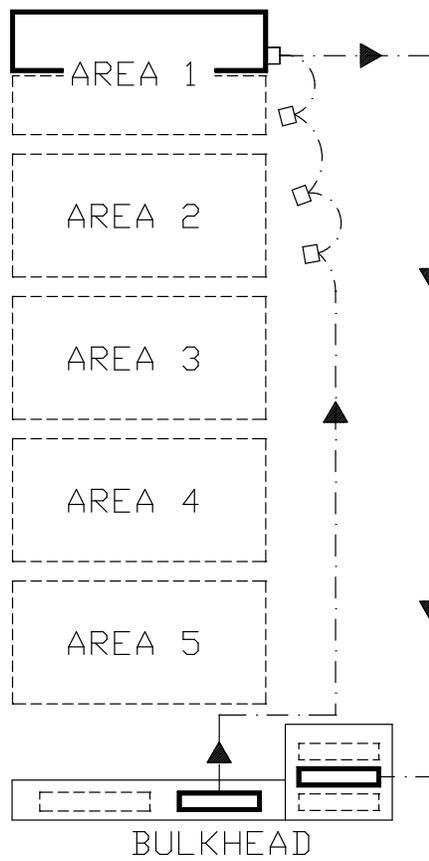
BULKHEAD

Legend:
S-T SE terminating plug
SCSI-0 Native SCSI bus for media devices

Media Devices in Area 1/Area 2

SCSI Controller to Bulkhead Connection
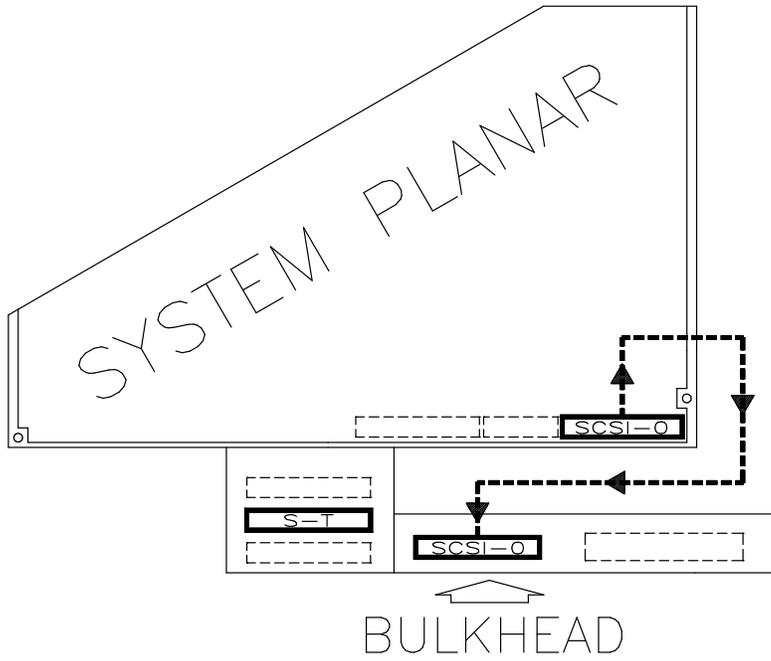
SYSTEM PLANAR

SCSI−0

S−T

SCSI−0

BULKHEAD

Bulkhead to Device Area Connection

AREA 1

AREA 2

AREA 3

AREA 4
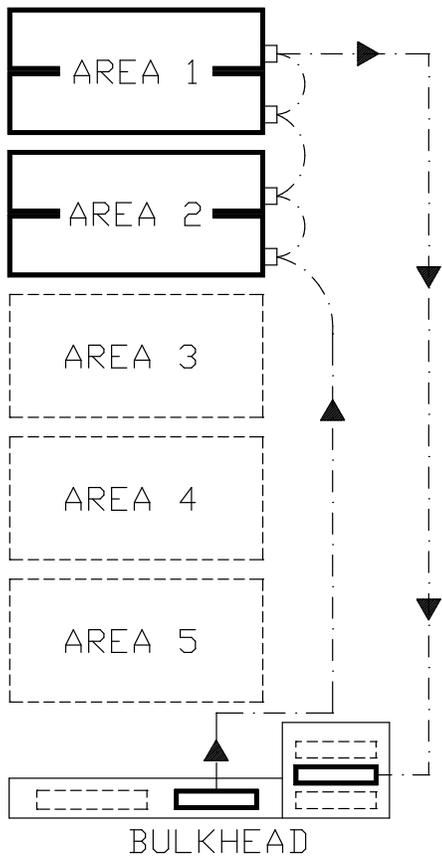
AREA 5

BULKHEAD

Legend:
S-T SE terminating plug
SCSI-0 Native SCSI bus for media devices

Disk Devices in Area 5

SCSI Controller to Bulkhead Connection
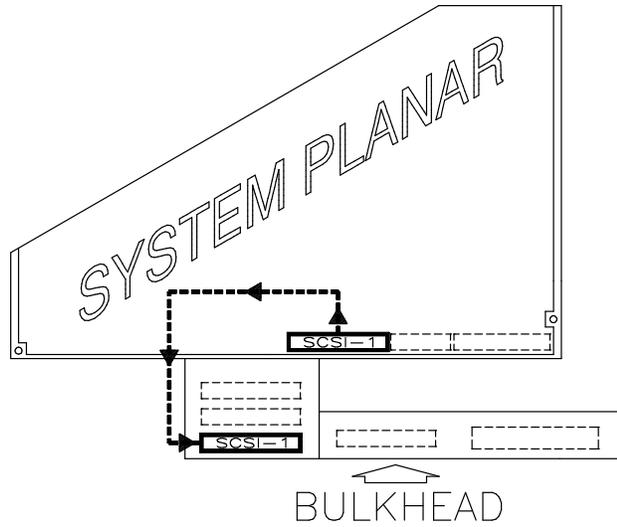
Bulkhead to Device Area Connection
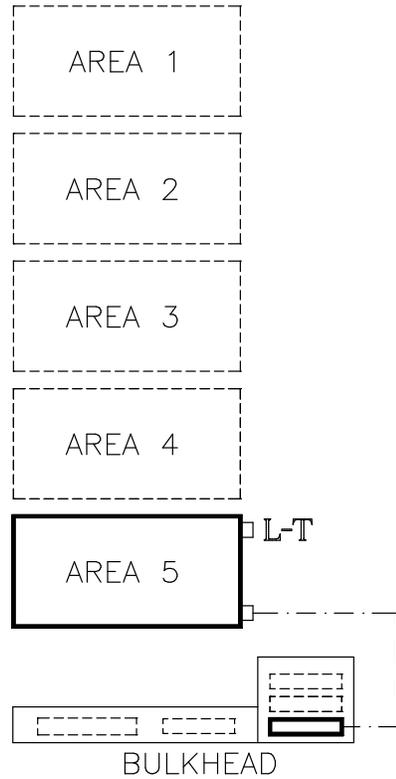
Legend:
L-T LVD/SE terminating plug
SCSI-1 Native SCSI bus for disk devices

Disk Devices in Area 5/Area 4

SCSI Controller to Bulkhead Connection

SYSTEM PLANAR

SCSI—1

SCSI—1

BULKHEAD

Bulkhead to Device Areas Connection

AREA 1

AREA 2

AREA 3

AREA 4   L-T

JC

AREA 5
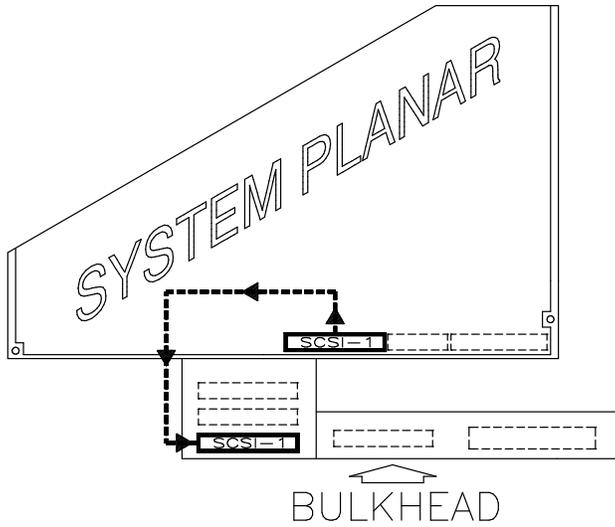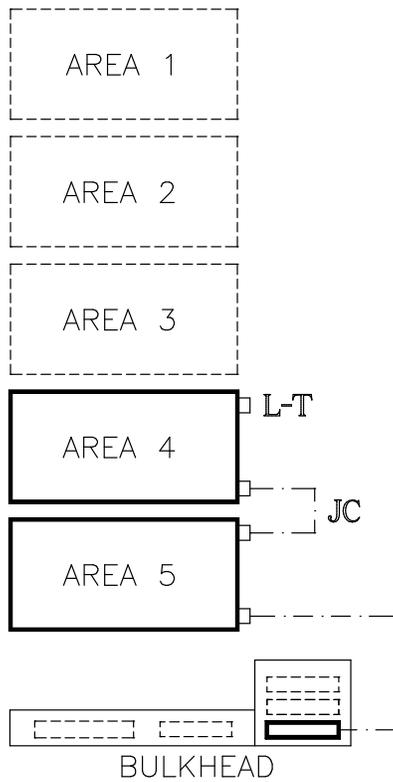
BULKHEAD

Legend:
L-T LVD/SE terminating plug
JC Jumper cable
SCSI-1 Native SCSI bus for disk devices

Disk Devices in Area 3

SCSI Controller to Bulkhead Connection
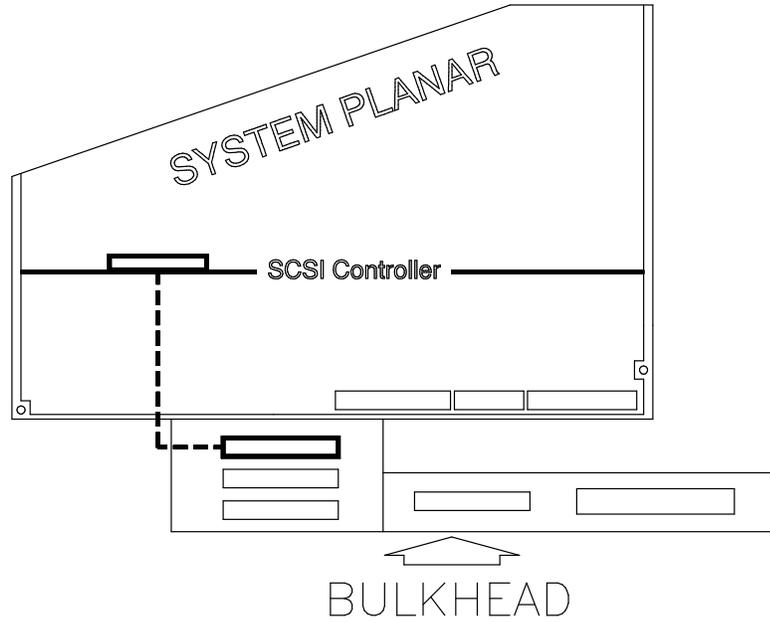
Bulkhead to Device Area Connection
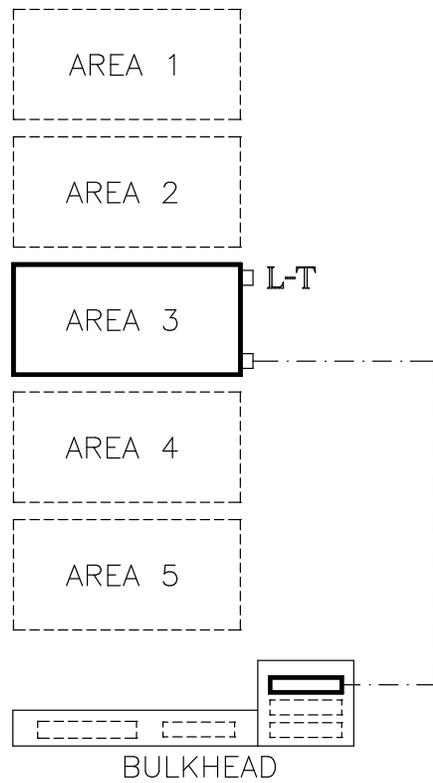
Legend:
L-T LVD/SE terminating plug

Disk Devices in Area 3/Area 2

SCSI Controller to Bulkhead Connection
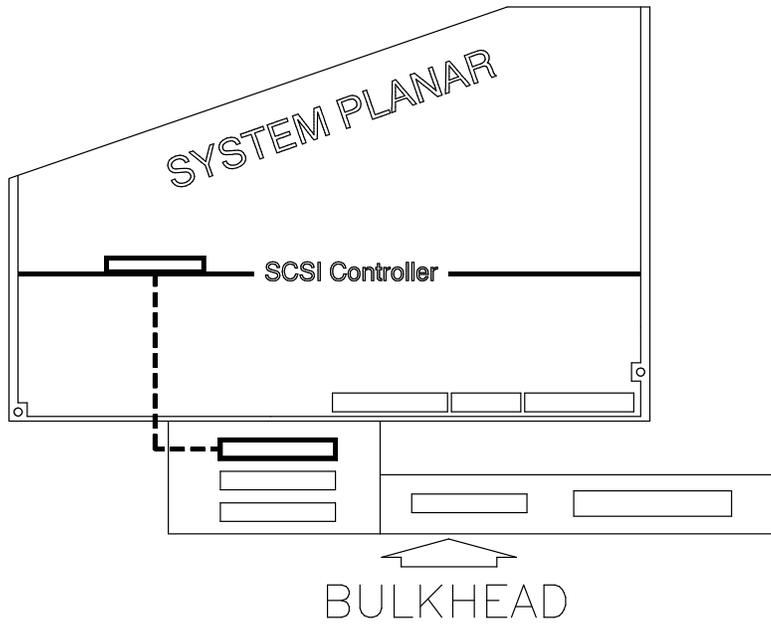
Bulkhead to Device Areas Connection
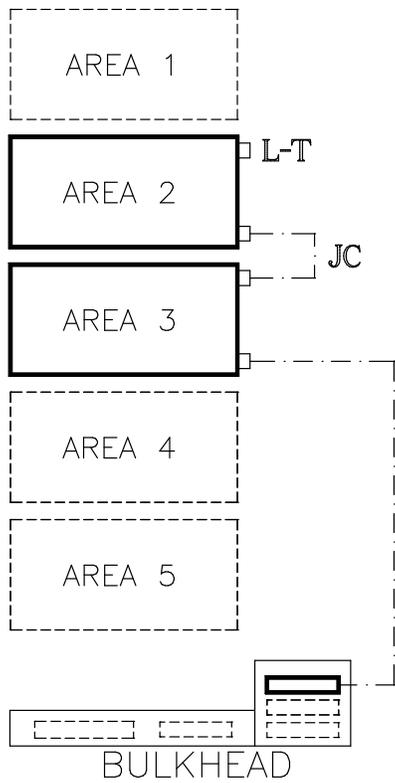
Legend:
L-T LVD/SE terminating plug
JC Jumper cable

Connections in RAID Configuration

Connections in a RAID configuration are performed by means of a RAID controller installed in a PCI slot on the system planar.

Note: If you have a RAID configuration including one or more disk expansion units, you can find the relevant procedures in the *Disk Expansion Unit Service Guide*.

RAID Controller Managing Two SCSI Busses
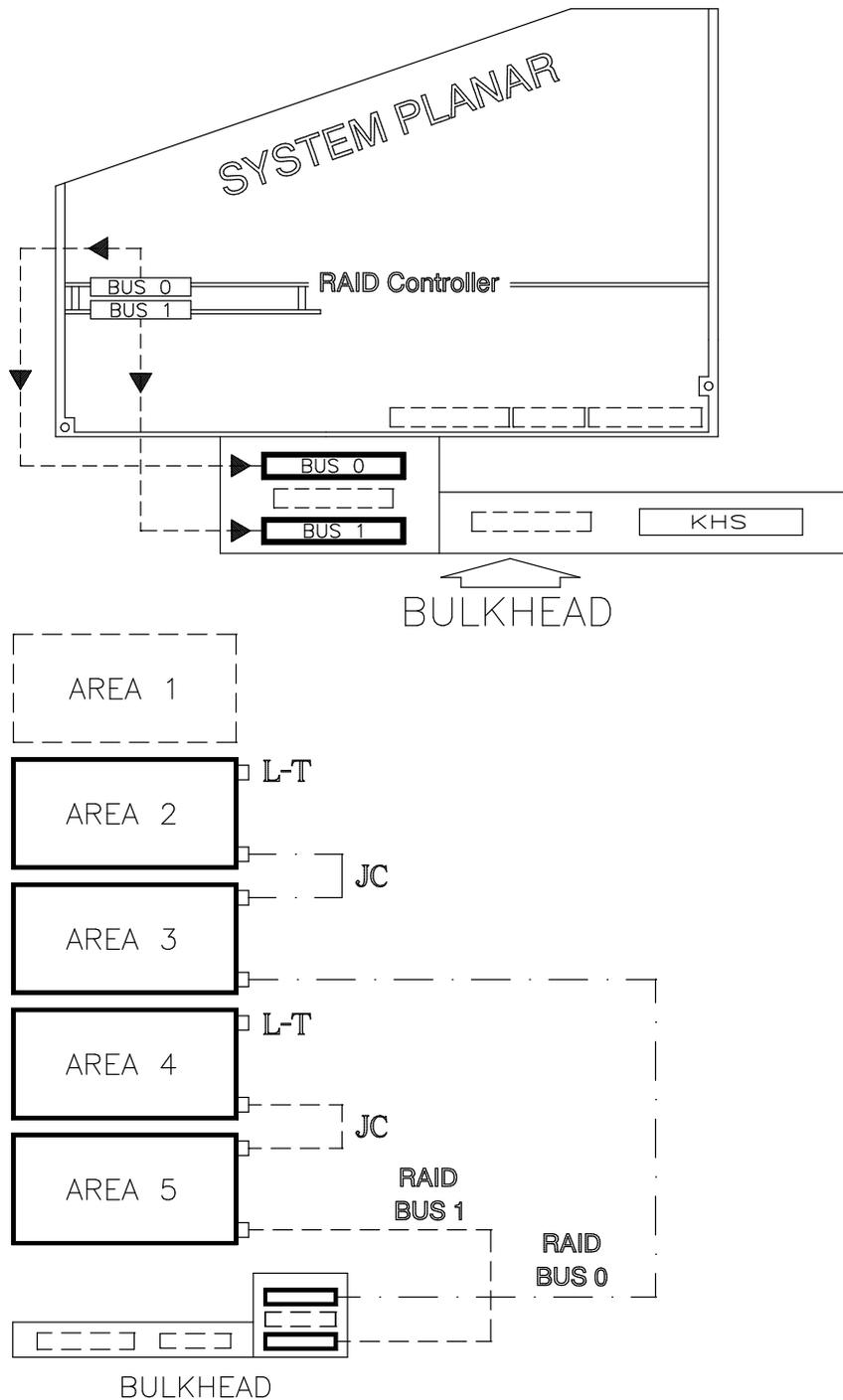
Legend:
L-T LVD/SE terminating plug
JC Jumper cable

RAID Controller Managing One SCSI Bus

SYSTEM PLANAR

BUS 0 — RAID Controller

BUS 0

KHS

BULKHEAD

AREA 1

AREA 2   L-T

JC

AREA 3

AREA 4

AREA 5

RAID
BUS 0

BULKHEAD
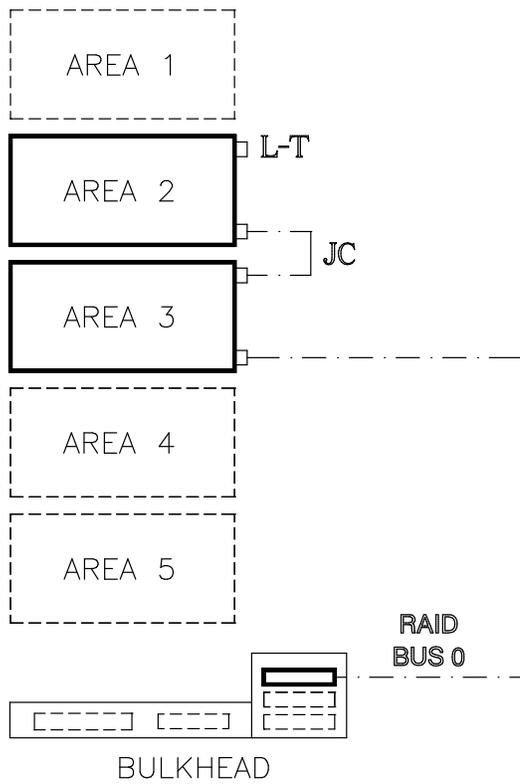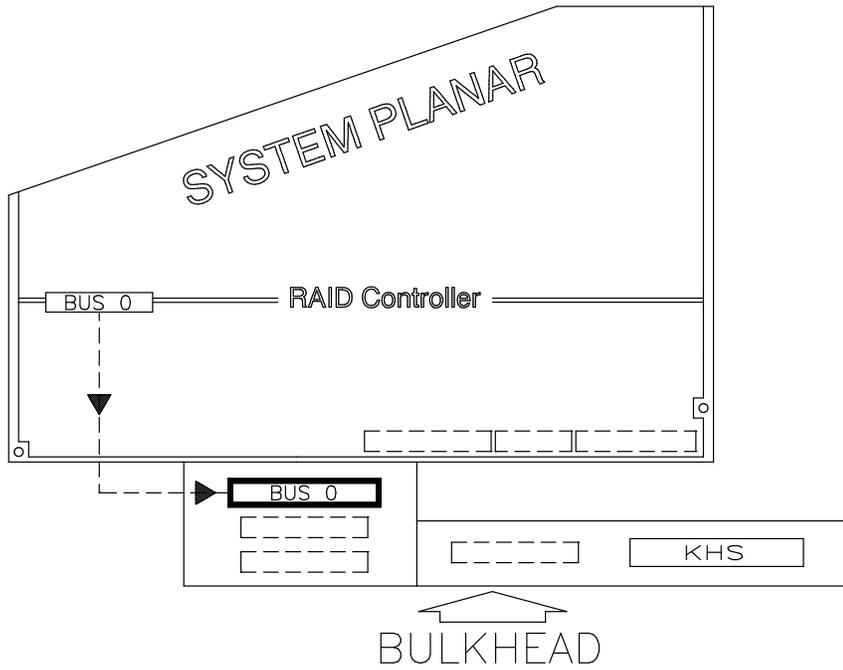
Legend:
L-T LVD/SE terminating plug
JC Jumper cable

Connection in Native High Availability Configuration

Notes:

1. These paragraphs deal only with physical connections of High Availability configurations. Please refer to the *Bull ESCALA PowerCluster & HA Solutions Setup Guide*, for additional information.

2. Native High Availability configurations are not supported by RAID controllers.

3. Native High Availability configurations are not supported by ULTRA-2/LVD controllers; ULTRA/SE controllers must be used instead.

4. The following drawing indicates the use of SE terminating plugs (**S-T**). Notice that also LVD/SE terminating plugs (**L-T**) can be used; the bus will work anyway in ULTRA/SE mode, being the controller a ULTRA/SE one.

The following example shows the connection of disk devices in Areas 3 and 2 of two base units, in a native High Availability configuration.

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

In addition, it is assumed that all device areas of both the base units are fully configured. In particular, Areas 5, 4, 3 and 2 contain hard disk devices, while Area 1 contains two media devices.

The following steps must be performed to accomplish the connections relevant to this configuration.

1. Access each base unit from the right side.

2. Make sure the bulkhead to device area connections are done, as indicated in the following figure.
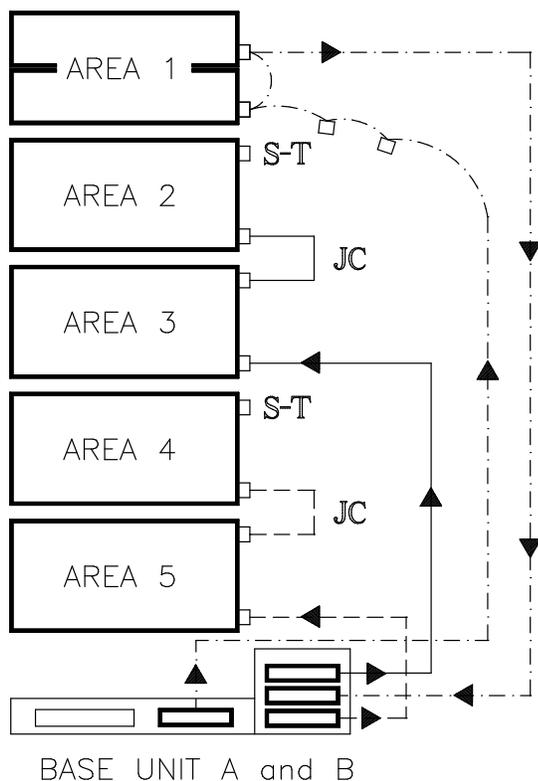
BASE UNIT A and B

Legend:
S-T SE terminating plug
JC Jumper cable

3. Access each base unit from the left side.

4. Ensure that two dedicated PCI controllers are properly installed in each base unit. In particular, be sure that each controller in BASE UNIT A is installed in the same position of the controller to which it is to be connected in BASE UNIT B.

   – For each base unit, the first controller activates the SCSI bus for hard disk devices installed in Areas 3 and 2 and is connected to the second controller of the other base unit.

   – For each base unit, the first controller (the one with both internal and external connections) needs a H.A. wrap plug plugged in the additional SCSI connector present on its internal cable; the second controller (the one with external connection only) needs a H.A. wrap plug plugged on the controller itself.

Note: High Availability configurations foresee the presence of two controllers on the same SCSI bus. Be sure that the two controllers are not configured with the same SCSI ID. Please refer to the *Bull ESCALA PowerCluster & HA Solutions Setup Guide* for information on SCSI ID setting.

5. Activate the SCSI busses for the internal device areas of each base unit. In particular, be sure that the PCI controller for disk devices installed in Areas 3 and 2 is connected to the corresponding connector on the bulkhead.

6. Perform the connections between the two base units.
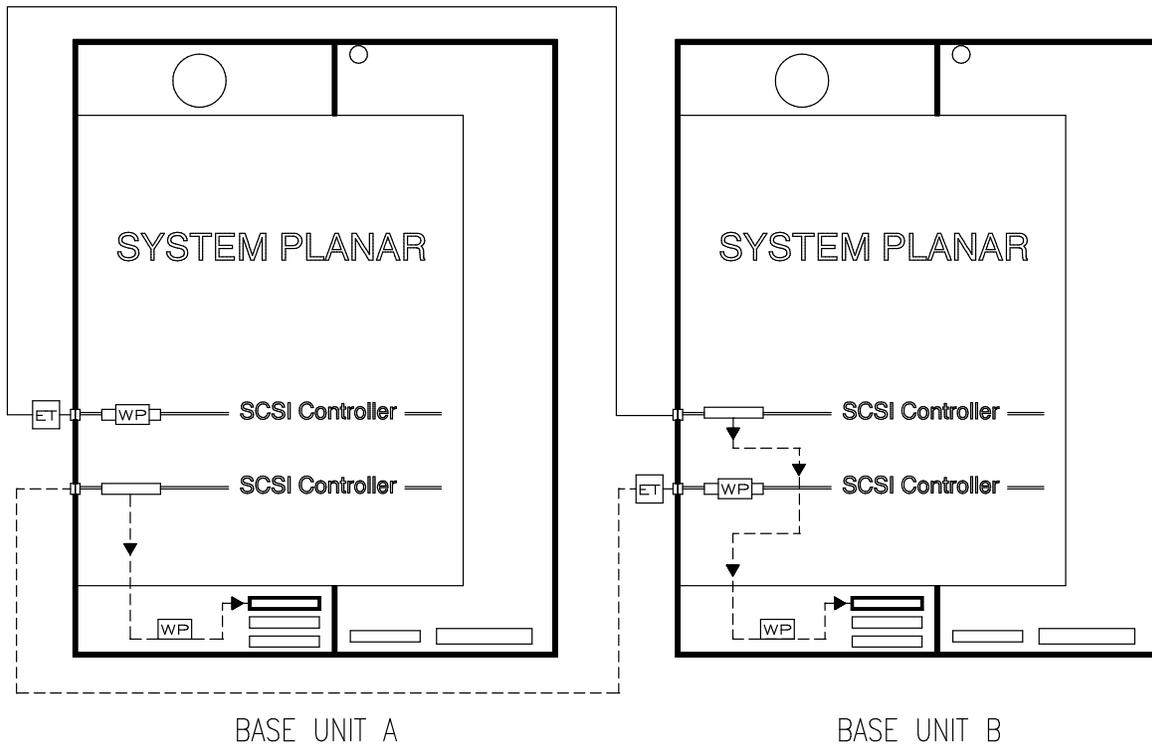
Legend:
WP   H.A. Wrap Plug
ET   External SCSI Terminating Plug. It is an active terminator already attached to the PassThru Terminator Cable

Chapter 6. Expanding the System Configuration

- **Preparing the System for an Upgrade**, below

- **Memory Upgrading**, on page 6-10

- **CPU Upgrading**, on page 6-13

- **Controller Upgrading**, on page 6-15

- **Device Upgrading**, on page 6-19.

Preparing the System for an Upgrade

- **How to Approach the System**, below

- **How to Handle Hardware Components**, on page 6-2

- **Preliminary and Restart Operations**, on page 6-3.

How to Approach the System

This schematic of the system shows the working areas.

System Lateral Left View and Front View
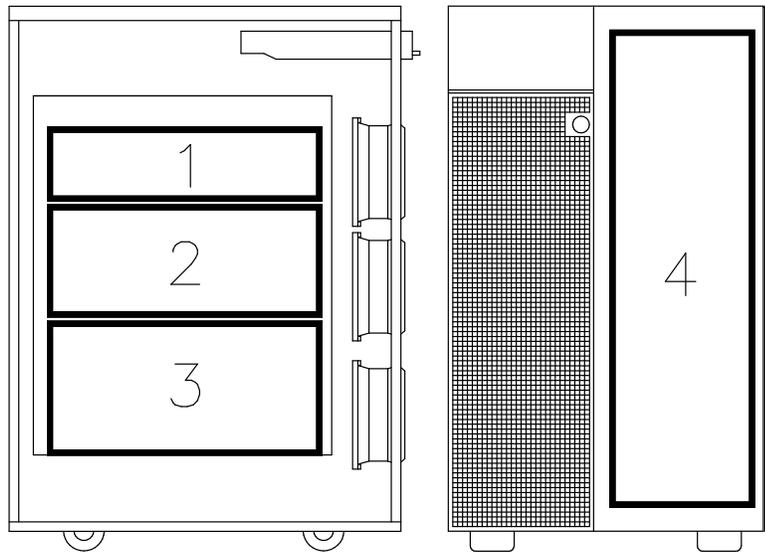
1	Memory
2	CPU's
3	Controllers
4	Devices

Warning: Before handling any hardware component, be sure you know the procedures described in **How to Handle Hardware Components**, on page 6-2 and **Preliminary Operations**, on page 6-3.

How to Handle Hardware Components

Tools Needed

You should have the following tools available before starting installation and removal procedures on the system.

- 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 system.

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

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

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

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

How to Use the Antistatic Wrist Strap

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

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

Preliminary and Restart Operations

- **Preliminary Operations**, below
- **System Panels**, on page 6-4
- **Restart Operations**, on page 6-9.

Preliminary Operations

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

Note: If at least one disk expansion unit is connected to your system, please refer to the *Disk Expansion Unit Service Guide* to perform the correct preliminary operations, according to your system configuration.

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 6-33.

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

2. Power off the system by turning the key mode switch to the Power Off position.

3. Make sure the power switches for all the external devices connected to the system unit, if any, are set to OFF and unplug their power cords, unless they are included in a High Availability configuration (their control is shared between two systems).

4. Unplug the power cord to the system unit from the outlet.

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

5. Ensure that the two wheels on the rear of the system are locked to improve stability of the system.

Note: 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 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.

System Panels

One of these situations can exist:

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

  - **<u>Device Shutter Opening</u>**, below
  - **<u>Device Shutter Closing</u>**, on page 6-5
  - **<u>Front Panel Removal</u>**, on page 6-6
  - **<u>Front Panel Installation</u>**, on page 6-7
  - **<u>Lateral Panel Removal</u>**, on page 6-7
  - **<u>Lateral Panel Installation</u>**, on page 6-9.

Device Shutter Opening

1. Insert the device shutter key and turn it to the right.
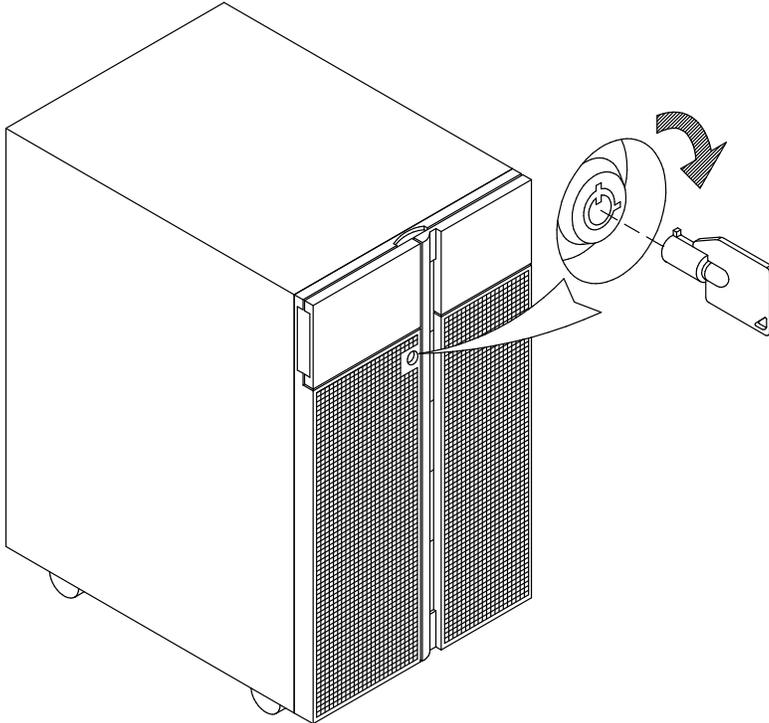
2. Open the device shutter of the front panel.
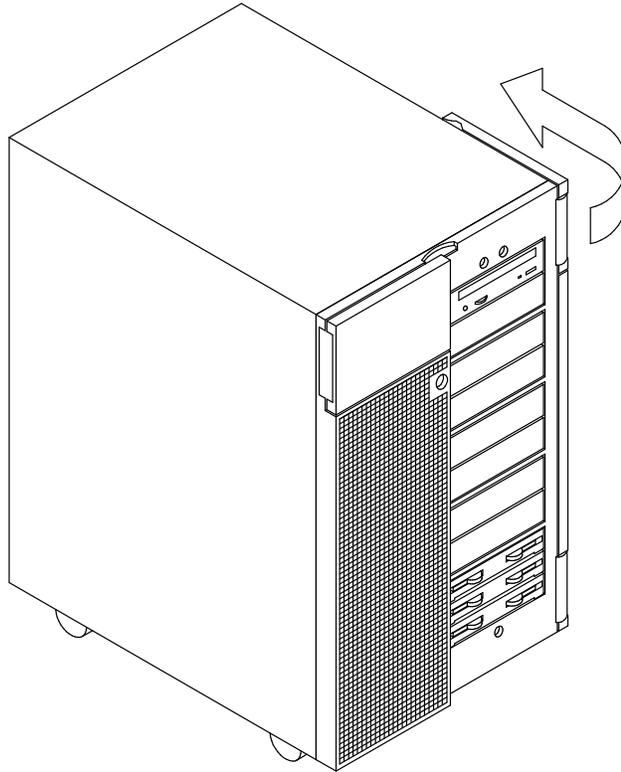
Device Shutter Closing

1. Close the device shutter.

2. Insert the device shutter key and turn it to the left.

3. Remove the device shutter key and store it.

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

Front Panel Removal

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

2. Open the device shutter of the front panel.

3. Loosen the two retaining screws.
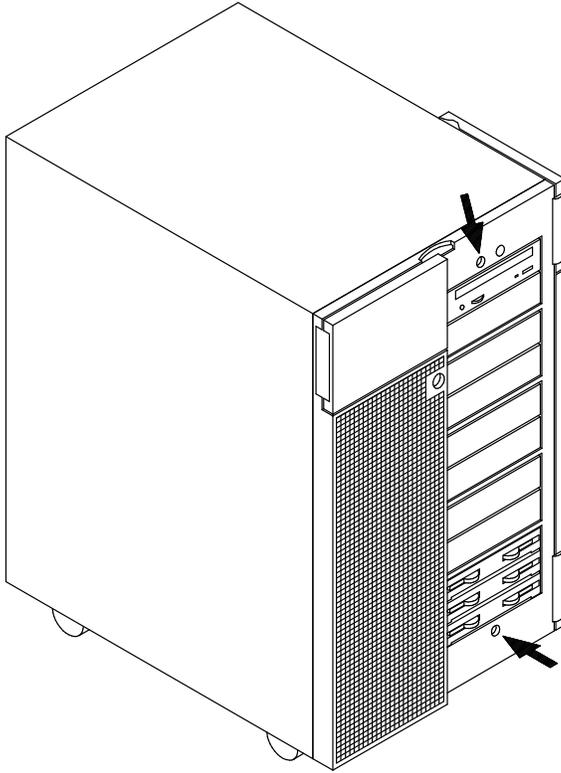
4. Close the device shutter, grip the front panel at the sides and slide it towards you.
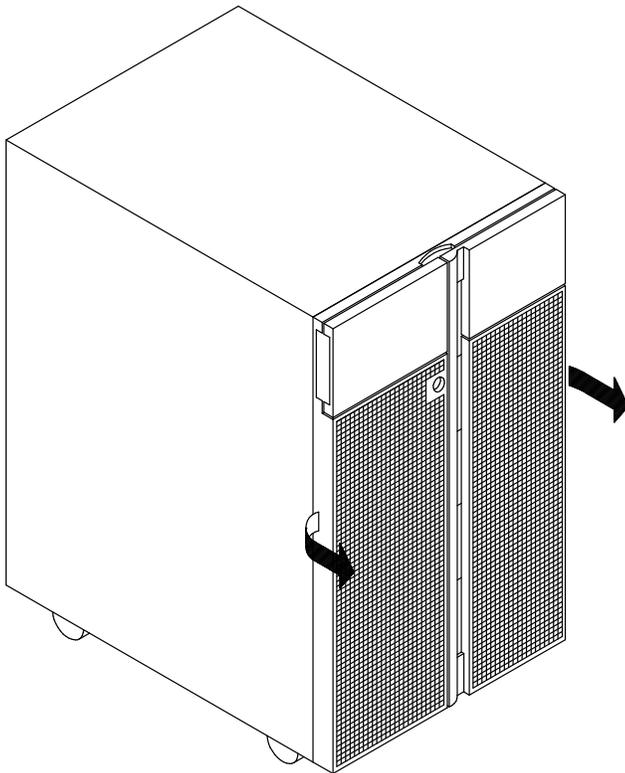
Front Panel Installation

1. Grip the front panel at the sides and position it in the corresponding retainers on the chassis.

2. Push the front panel towards the chassis until it is well seated.

3. Open the device shutter.

4. Tighten the two retaining screws.

5. Close the device shutter.

6. Insert the device shutter key and turn it to the left.

7. Remove the device shutter key and store it.

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

Lateral Panel Removal

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

1. Access the system from the rear.

2. Unscrew the two retaining screws located on the panel frame of the lateral panel to be removed.
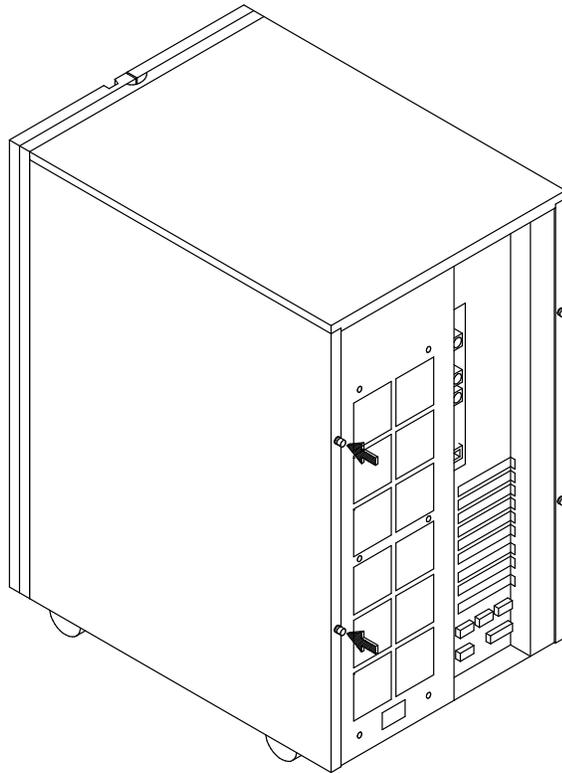
3. Gently slide the panel towards you.
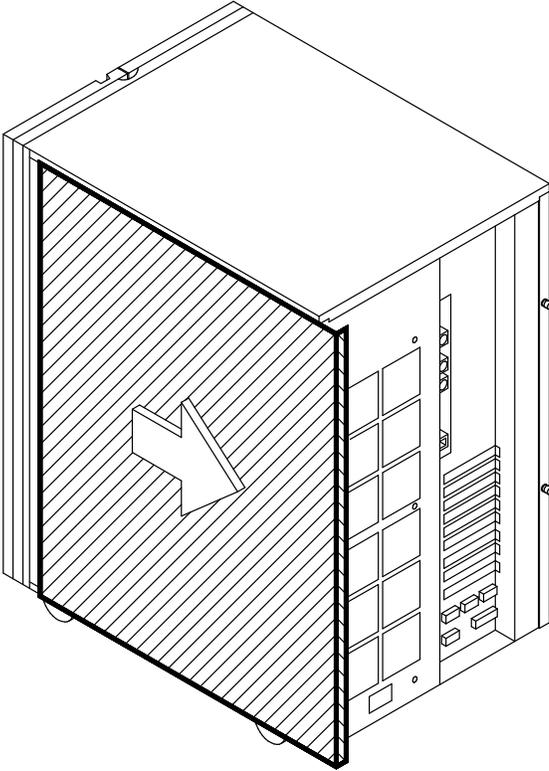
4. The panel will tilt automatically outward.
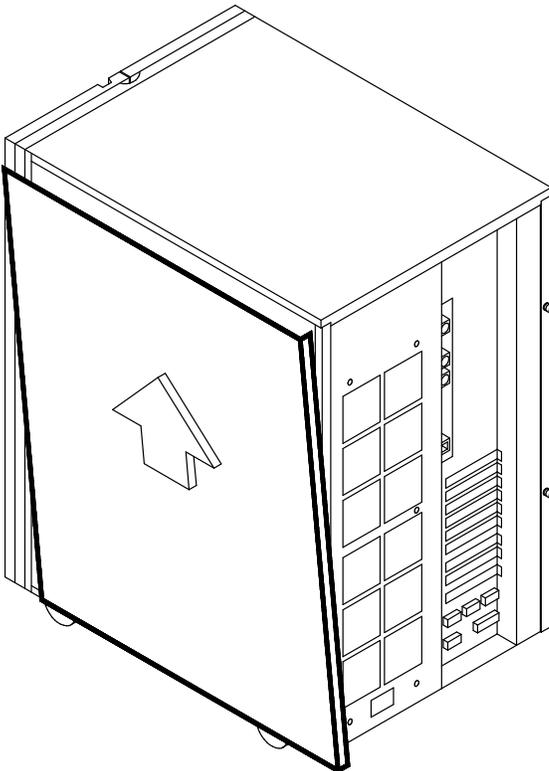
5. Lift the panel from the unit and remove it.

Lateral Panel Installation

1. Access the system from the rear.

2. Hook the retaining brackets on the panel with the corresponding retainers on the chassis.

3. Push the panel towards the unit.

4. Firmly slide the panel into the system until the retaining brackets are locked.

5. Tighten clockwise the panel retaining screws located on the panel frame.

Restart Operations

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

Note: If at least one disk expansion unit is connected to the system, please refer to the *Disk Expansion Unit Service Guide* to perform the correct restart operations, according to the system configuration.

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

1. Plug the power cord of the system unit into the outlet.

2. Plug in the power cords of all the external devices connected to the system unit into the outlet, if any.

3. Make sure the power switches for all the external devices connected to the system unit, if any, are set to ON.

4. Power on the machine by turning the key mode switch to the Normal or Service position (use the Service position, if you want to enter the operating system diagnostic mode).

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

Memory Upgrading

The system memory can be expanded by adding one or more memory banks to the existing configuration. This operation may also require the replacement of the memory risers, in case the single-bank memory risers (FRE risers) are installed.

Warning: Before handling any memory bank, be sure you know the configuration rules described in **Memory Configuration**, on page 5-1.

Adding a Memory Bank on Memory Risers

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 6-7).

3. Wear the antistatic wrist strap. It is recommended not to touch the finger connector (for details, if needed, see **How to Handle Hardware Components**, on page 6-2).

1st step: Memory risers removal

1. Check the LED's of the risers and wait until they are off. Notice that this could take several minutes.

2. Using the hooked clips of the memory riser, unplug one memory riser and slide it out of the metallic structure.
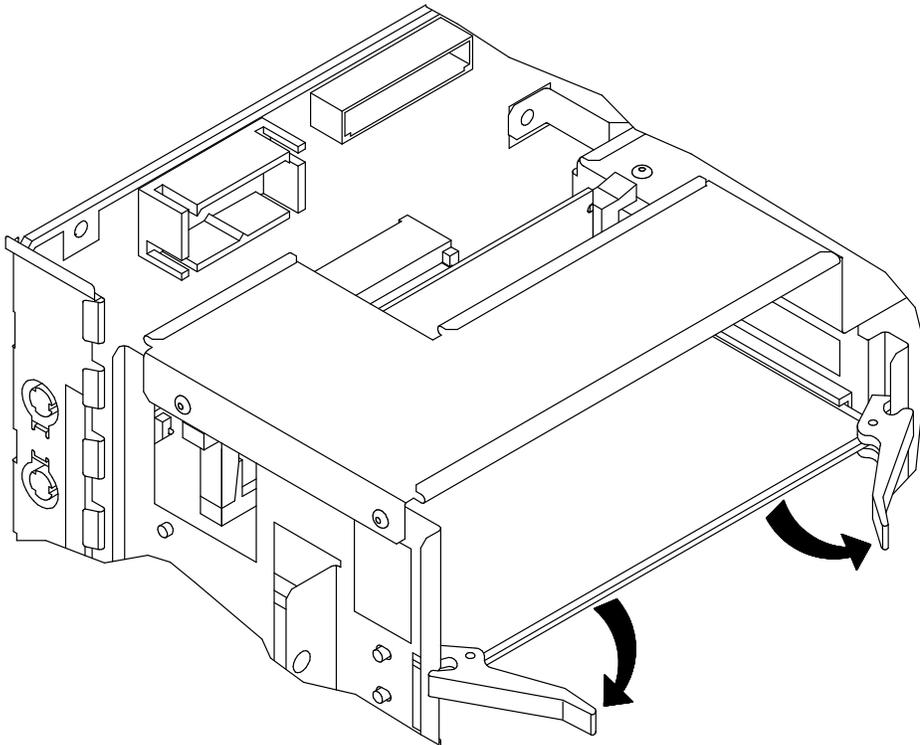
3. Lay it down on an antistatic envelope until all operations on it are concluded.

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

If you need to replace the memory risers, remove the memory present on the old risers, following the instructions below; if this is not the case, skip to the **Installation of memory banks on memory risers** step, on page 6-11. You may also need to execute this operation, in case the memory bank configuration must be reorganized, according to the rules described in **Memory Configuration**, on page 5-1.

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

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

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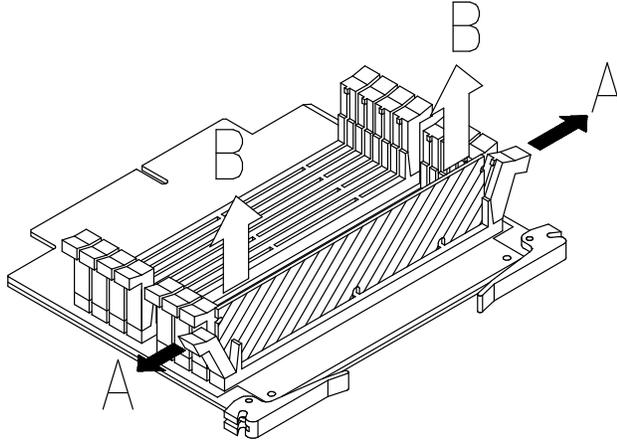
3. Repeat the steps for each of the 4 memory DIMM's (one per memory riser).

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

3rd step: Installation of memory banks on memory risers

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

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

3. Firmly push the memory DIMM down (A) until it is seated into the memory DIMM connector and the two levers automatically close (B).
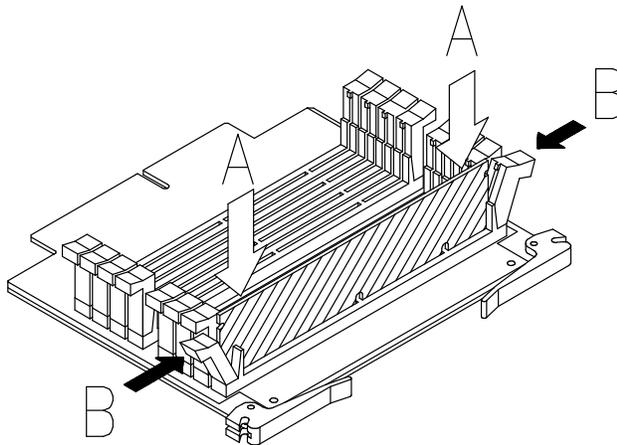
4. Repeat the steps for each of the 4 memory DIMM's (one per memory riser).

5. Repeat the steps for all the banks to be installed.

6. Make sure that all the little levers of the memory riser are well closed, in particular the ones that are left empty.

4th step: Memory risers installation

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

2. Grip one memory riser by the hooked clips and align it with the designated memory connector on the system planar.

3. Tilt the hooked clips until these are anchored to the metallic structure and push the memory riser until the finger connector is firmly seated into the memory connector on the system planar.
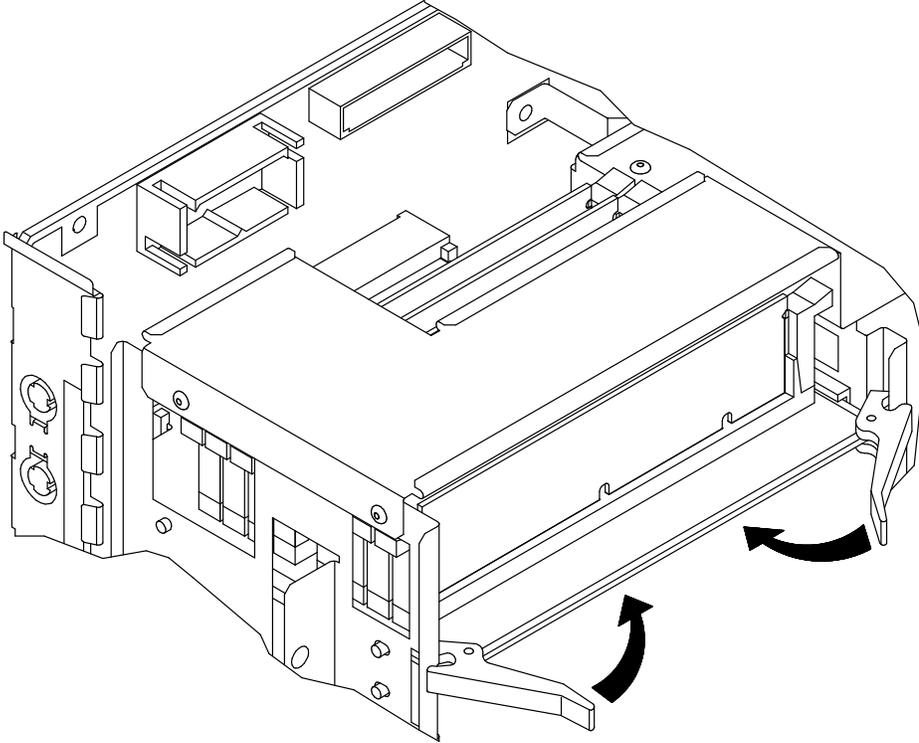
4. Repeat the steps for each of the 4 memory risers.

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

1. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 6-9).

2. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

3. 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 configuration rules. If the problem persists, refer to the *Maintenance Guide* for memory test execution or call your Service Representative for assistance.

CPU Upgrading

- **CPU Installation**, below

- **CPU Removal**, on page 6-14.

Warning: Before handling any CPU card, be sure you know the rules described in **CPU Configuration**, on page 5-3.

CPU Installation

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

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 6-7).

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 6-2).

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

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

6. Grip the CPU card by the hooked clips and align it with the designated CPU card connector on the system planar. The CPU card must be inserted with the component side facing the top of the system unit.

7. Tilt the hooked clips until these are anchored to the metallic structure and push the CPU card until the finger connector is firmly seated into the CPU card connector on the system planar.
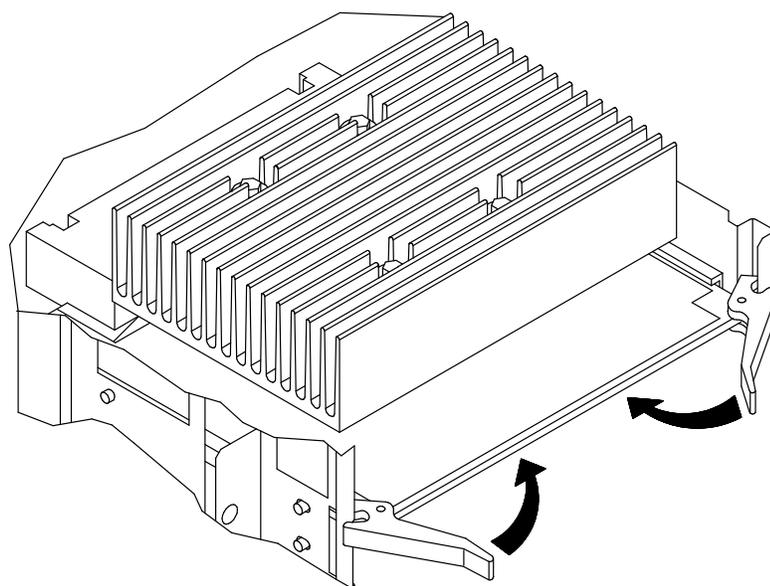
8. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 6-9).

9. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

10. 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.

CPU Removal

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

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 6-7).

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 6-2).

4. Check the CPU card LED and wait until it is off. Notice that this could take several minutes.

5. Using the hooked clips of the CPU card, unplug the CPU card and slide it out of the metallic structure.
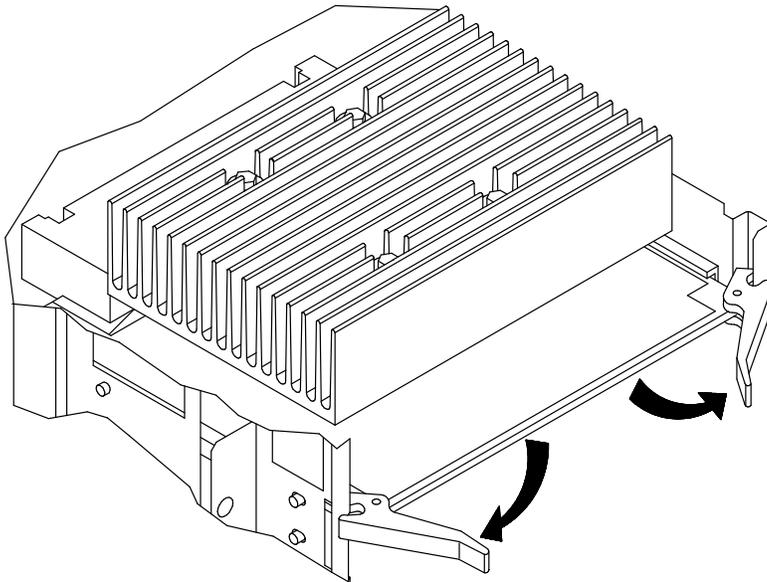
6. Store the removed CPU card in an antistatic envelope.

7. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 6-9).

8. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

Controller Upgrading

- **Controller Installation**, below
- **Controller Removal**, on page 6-17
- **SCSI Controller for Internal Devices**, on page 6-18.

Controller Installation

Warning: Before handling any controller card, be sure you know the rules described in **Controller Configuration**, on page 5-4.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations,** on page 6-3).

2. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal,** on page 6-7).

3. Wear the antistatic wrist strap. It is recommended not to touch the card components and the finger connector (for details, if needed, see **How to Handle Hardware Components,** on page 6-2).

4. Loosen the PCI/ISA slot cover retaining screw (A) of the designated controller card slot and slide it out (B).
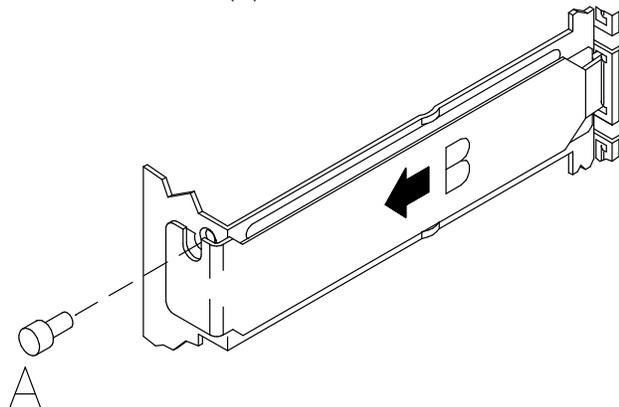
Warning: It is recommended to store the removed slot cover for possible re-installation.

5. If the spring shifts while removing the PCI/ISA slot cover, re-install it executing the following steps.

   a. Position the spring.
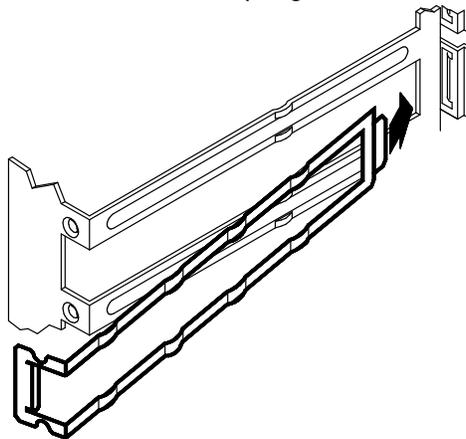
b. Push the spring, until it is well seated.
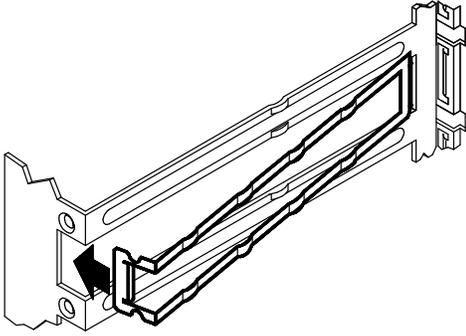
6. Lay the controller card on an antistatic envelope and set the jumpers or switches, if any, according to your configuration requirements. Refer to the documentation delivered with the controller.

7. Grip the controller card by the edges.

8. Align and slide the controller card into the designated controller card connector on the system planar.

9. Firmly push the controller card towards the system planar until its finger connector is plugged in securely.

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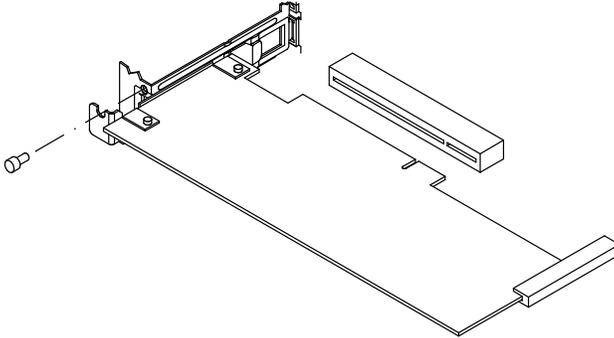
11. Connect any connector cable to the controller card just installed, if any.

Note: If you need to install a SCSI controller to manage internal devices, see **SCSI Controller for Internal Devices**, on page 6-18.

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

12. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation,** on page 6-9).

13. Perform a system power on (for details, if needed, see **Restart Operations,** on page 6-9).

14. 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).

Controller Removal

1. Before powering off the system, you may need to perform some software operations (e.g. unload current controller configuration). Refer to the operating system documentation.

2. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

3. Remove the left lateral panel (for details, if needed, see **Lateral Panel Removal**, on page 6-7).

4. Wear the antistatic wrist strap. It is recommended not to touch the card components and the finger connector (for details, if needed, see **How to Handle Hardware Components**, on page 6-2).

5. Disconnect any connector cable from the controller card, if any.

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

Note: If you need to remove a SCSI controller managing internal devices, see **SCSI Controller for Internal Devices**, on page 6-18.

6. Loosen the retaining screw used to lock the controller card.

7. Firmly grip the controller card by the edges and slide it out of the slot.
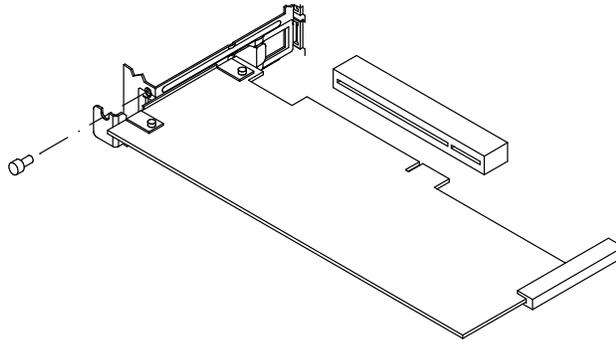
8. Lay the controller card on an antistatic envelope and record the settings of any jumpers or switches, if these are present.

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

If the controller card just removed will be replaced with another one, skip to **Controller Installation**, **step 5**, on page 6-15, otherwise continue with the following steps.

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

10. Position the slot cover in the free slot (A) and secure it by tightening clockwise its retaining screw (B).
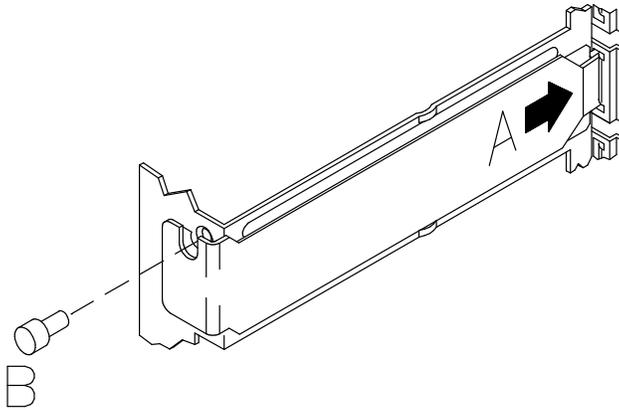
Warning: It is recommended to install a slot cover in any free controller card slot.

11. Re-install the left lateral panel (for details, if needed, see **Lateral Panel Installation**, on page 6-9).

12. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

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, you need to use the internal controller cable(s) to connect the internal connector(s) of the controller to the system bulkhead. This operation requires an overall knowledge of the system SCSI configuration.

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

The same applies to the SCSI controller removal.

Device Upgrading

- **Media Drive Installation**, below
- **Hard Disk Drive Installation**, on page 6-23
- **Media Drive Removal**, on page 6-27
- **Hard Disk Drive Removal**, on page 6-30
- **Device Hot Swapping**, on page 6-33
- **Adding a Disk Expansion Unit**, on page 6-35.

Media Drive Installation

Warning: Before handling any device, be sure you know the rules described in **Device Configuration**, on page 5-7.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

2. Remove the front panel and the right lateral panel (for details, if needed, see **Front Panel Removal**, on page 6-6 and **Lateral Panel Removal**, on page 6-7).

3. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see **How to Handle Hardware Components**, on page 6-2).

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

4. Remove the metal blank from the designated slot by loosening the screws used to retain the blank to the chassis.
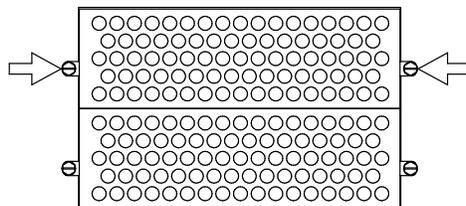
Warning: It is recommended to store the metal blank and screws for possible future re-installation.

5. Set the SCSI-ID of the media drive, as described in **Media Drive SCSI-ID**, on page 5-10.

6. Install the SCSI adapter on the SCSI connector of the media drive. This SCSI adapter is needed to adapt the SCSI connector of the media drive to the connector present on the SCSI cable.
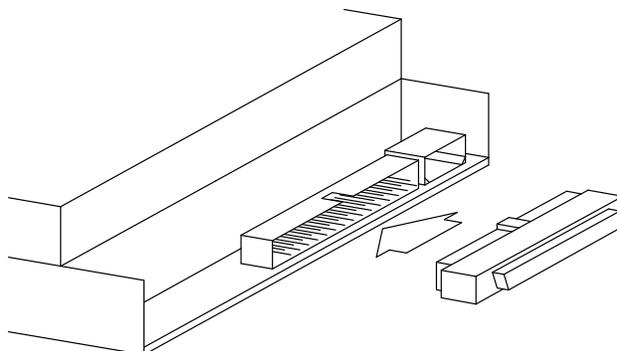
7. Install the media drive mounting kit. It consists of one metal spring, two plastic rails and two contact springs.
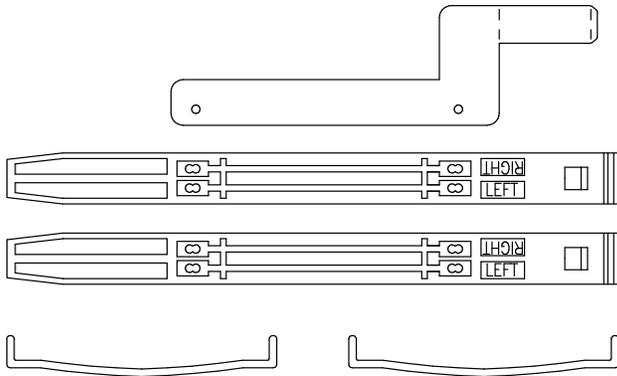
If the media drive that you are going to install is already equipped with the media drive mounting kit, skip to **step 12**, otherwise perform the following steps.

8. Identify the media drive mounting kit and fit together the plastic rails and the contact springs.
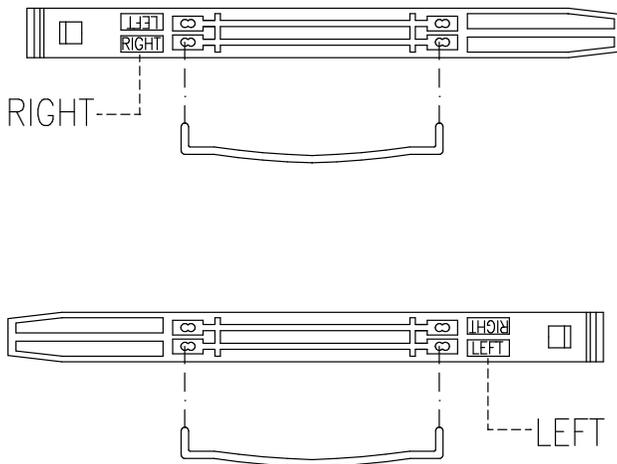
9. Lay the media drive down on a flat surface.

10. On the left side of the media drive, position the metal spring and then the plastic rail, assuring that the points of the contact spring match exactly with the holes present on the media drive side. Perform the same operations on the opposite side, positioning the plastic rail only.
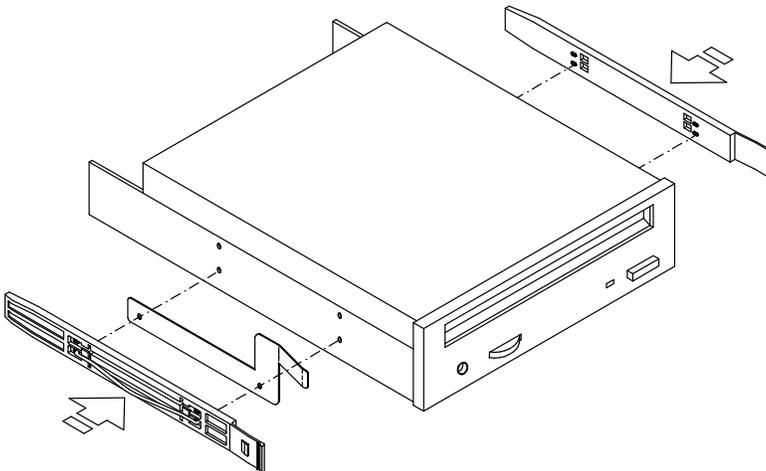
11. Firmly push the plastic rails towards the media drive.

12. Firmly grip the media drive by the edges. Identify the upper side of the media drive checking the orientation of any symbols or labels on the front panel of the media drive. Consult the documentation delivered with the media drive for any specific characteristic.

13. Align the device with its plastic rails in the designated slot and then slide it inside the unit.
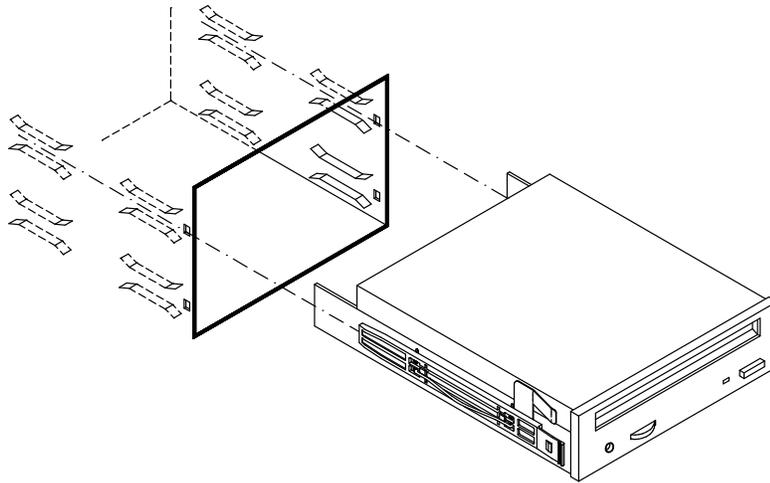
14. Firmly push the device until a click tells you that it is well seated.

15. Connect the first free connector of the split power cable (1) and the SCSI cable (2) to the media drive.
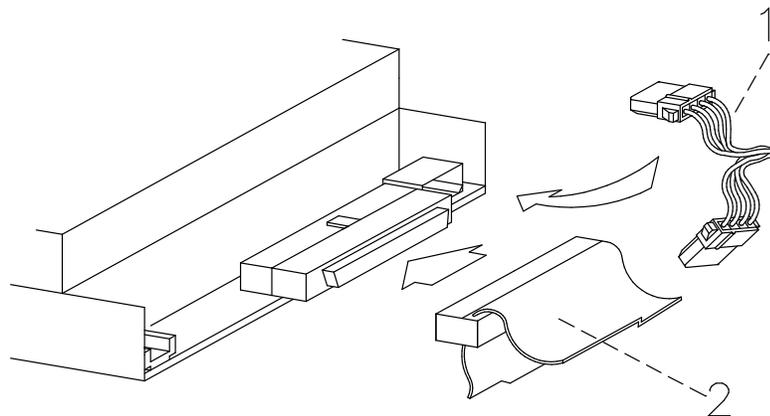
16. Remove the plastic blank on the front panel that corresponds to the slot in which you have just installed the media drive, by performing the following steps:
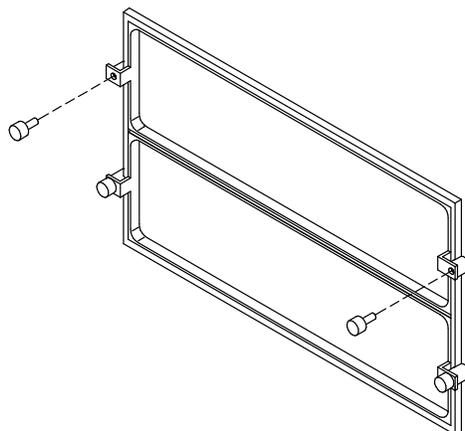
Warning: Store the removed plastic blank and screws for possible future re-installation.

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

17. Re-install the front panel and the right lateral panel (for details, if needed, see **Front Panel Installation**, on page 6-7 and **Lateral Panel Installation**, on page 6-9).

18. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

19. 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. install the device driver).

Hard Disk Drive Installation

- **Adding a Hard Disk Drive to a Disk Cage**, below

- **Adding a Disk Cage**, on page 6-26.

Adding a Hard Disk Drive to a Disk Cage

Warning: Before handling any device, be sure you know the rules described in **Device Configuration**, on page 5-7.

1. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

2. Open the device shutter (for details, if needed, see **Device Shutter Opening**, on page 6-4).

3. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see **How to Handle Hardware Components**, on page 6-2).

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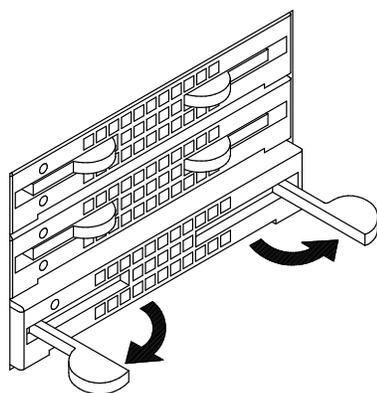
5. Unscrew the mounting screws provided with each installed disk carrier.
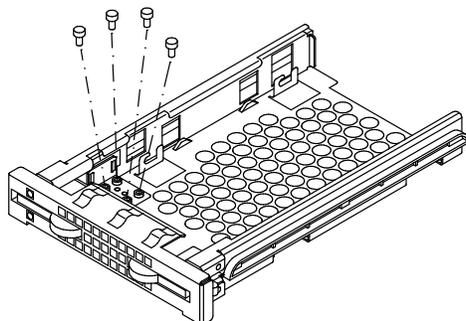
6. Grip the metal support of the light ducts and pull it out of the disk carrier.
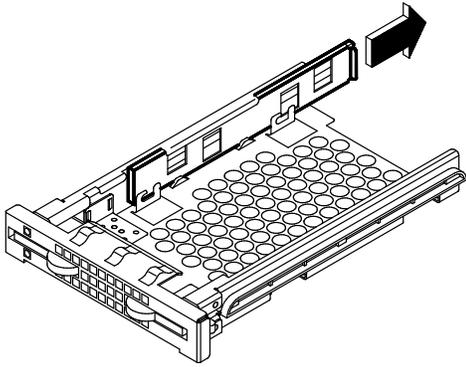
7. If you purchased the hard disk drive from a supplier other than your system supplier, be sure that the device itself has no SCSI-ID set, but has the motor delay jumper set. Refer to the documentation delivered with the device.

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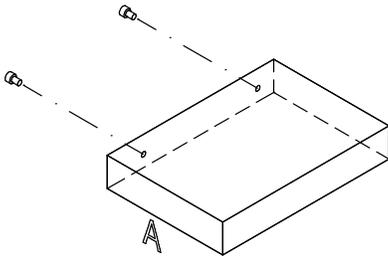
9. Slide the hard disk drive into the disk carrier making sure that the screw threads fit into the locking brackets of the disk carrier. The SCSI connector of the hard disk drive must be kept towards the rear of the disk carrier.
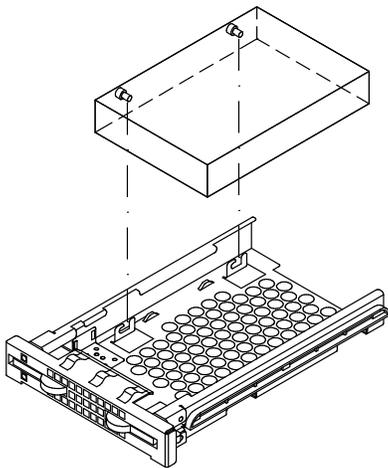
10. Lightly push the drive towards the front side of the disk carrier to seat the screws in the locking brackets (A). Secure the hard disk drive by tightening first the screws on the right side (B) and then the screws on the left side of the disk carrier (C).
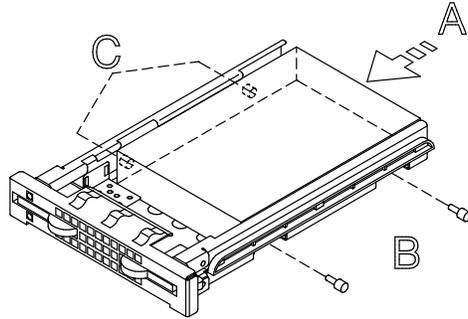
11. Grip the light duct support and slide it into its slide-way until a click tells you that it is well seated.
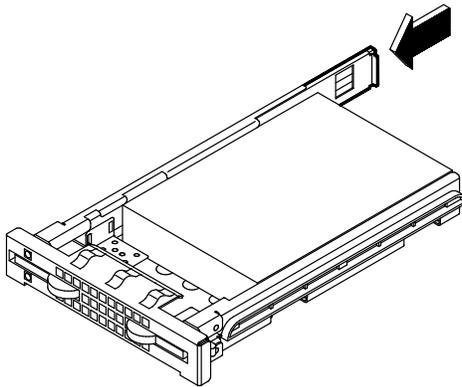
12. Firmly grip the disk carrier and slide it inside the empty slot of the disk cage.

13. Tilt the latches until these are anchored to the disk cage and lock the disk carrier by closing the latches.
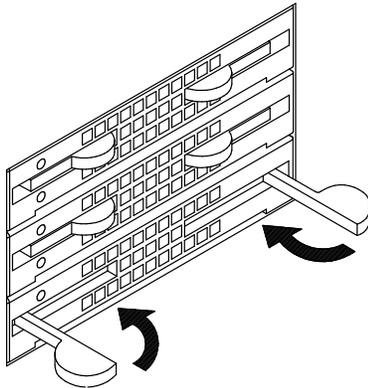
14. Refer to **Hard Disk Drive SCSI-ID**, on page 5-11, to know the SCSI-ID identification that the hard disk drive will acquire.

15. Remove the plastic blank on the front panel that corresponds to the slot in which you have just installed the hard disk drive by performing the following steps:
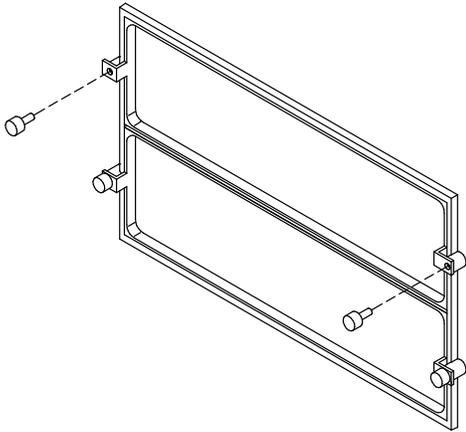
Warning: Store the removed plastic blank and screws for possible future re-installation.

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

16. Close the device shutter (for details, if needed, see **Device Shutter Closing**, on page 6-5).

17. Perform a system power on (for details, if needed, see **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).

Adding a Disk Cage

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

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

Media Drive Removal

1. Before executing a system shutdown, check that the media drive does not contain any media.

2. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

3. Remove the front panel and the right lateral panel (for details, if needed, see **Front Panel Removal**, on page 6-6 and **Lateral Panel Removal**, on page 6-7).

4. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see **How to Handle Hardware Components**, on page 6-2).

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

5. Disconnect the split power cable (1) and the SCSI cable (2) from the media drive rear.
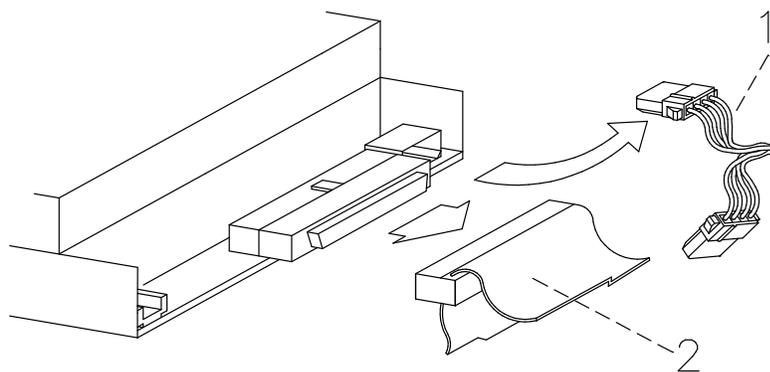
6. Pushing simultaneously the snaps at the sides of the media drive, slide it out from the slot.
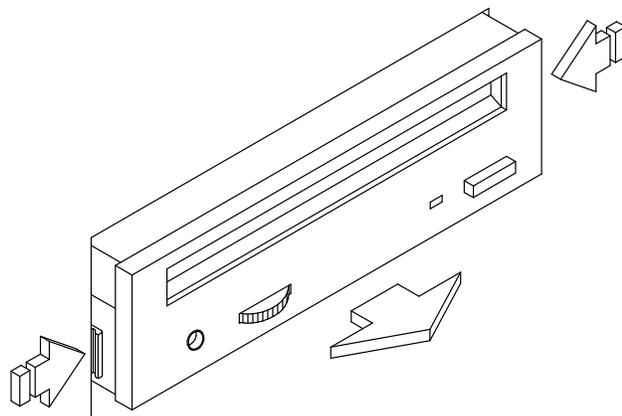
7. Lay the media drive down on a flat surface.

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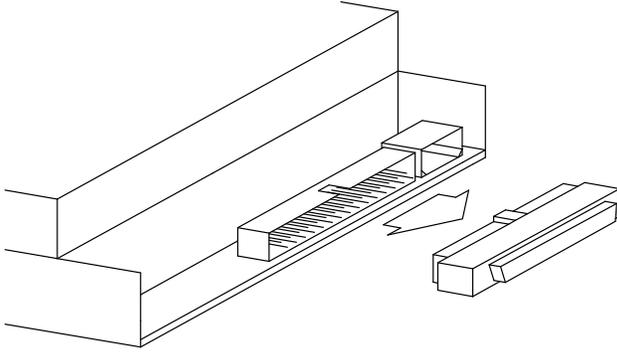
Warning: It is recommended to store the SCSI adapter for possible future re-installation.

9. Remove the media drive mounting kit performing the steps indicated below on each side of the media drive:

   – Insert a flat screwdriver between the contact spring and the plastic rail

   – Press the screwdriver blade towards the outside.
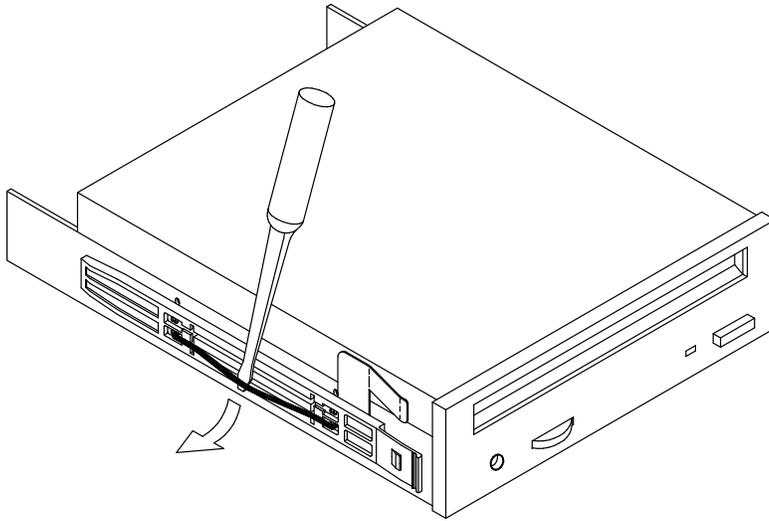
Warning: It is recommended to store the media drive mounting kit for possible future re-installation.

If you replace the media drive with a new one, record the SCSI-ID setting and skip to **Media Drive Installation**, **step 5**, on page 6-19.

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

   a. Store the removed media drive in an antistatic envelope.

   b. Install the appropriate metal blank on the chassis:

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

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

c. Install the plastic blank on the front panel in the corresponding free slot:

  – Accessing the front panel from its internal side, with the plastic blank facing the rear, insert it in the dedicated slot

  – Secure the plastic blank by tightening the two retaining screws.
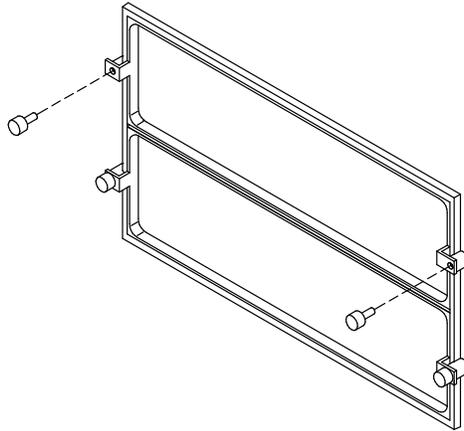
CAUTION:
It is recommended to protect any free device slot with the appropriate plastic and metal blanks. This is important for your safety and for the proper functioning of the air cooling system.

10. Re-install the front panel and the right lateral panel (for details, if needed, see **Front Panel Installation**, on page 6-7, and **Lateral Panel Installation**, on page 6-9).

11. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

Hard Disk Drive Removal

> **Note:** In case you are replacing a faulty hard disk drive, the hot swapping feature enables you to remove and replace it without stopping the system activity. The procedure is described in **Device Hot Swapping**, on page 6-33.

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 the operating system documentation.

2. Perform a system power off and unplug the unit power cord from the wall outlet (for details, if needed, see **Preliminary Operations**, on page 6-3).

3. Open the device shutter (for details, if needed, see **Device Shutter Opening**, on page 6-4).

4. Wear the antistatic wrist strap. It is recommended not to touch the components on the device back panel (for details, if needed, see **How to Handle Hardware Components**, on page 6-2).

5. Release the disk carrier from the disk cage by opening the latches on the front side.
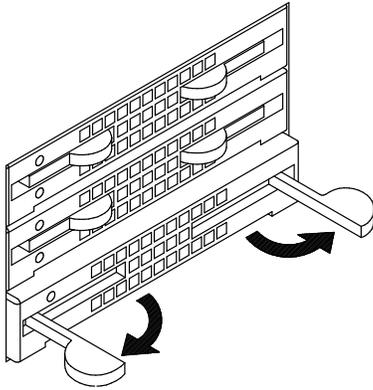
6. Slide the disk carrier out of the disk cage and lay it on a flat surface.

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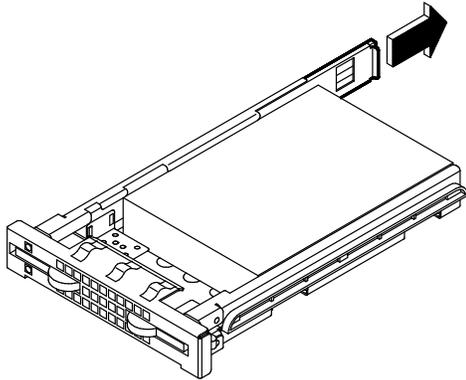
8. Unscrew the screws on the right side of the disk carrier and remove them.

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

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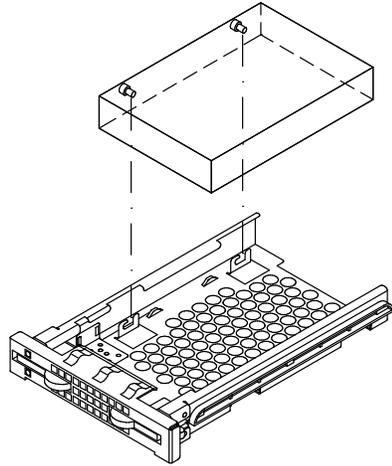
11. Lay the hard disk drive on a flat surface.

12. Unscrew the screws on the left of the hard disk drive. In the illustration, the front side of the hard disk is identified by character A (the SCSI connector is on the opposite side).
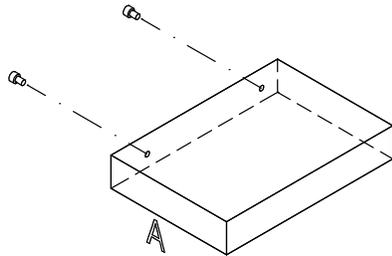
13. Store the removed device in an antistatic envelope.

If you replace the hard disk drive with a new one, refer to **Adding a Hard Disk Drive to a Disk Cage**, <u>**step**</u> **7**, on page 6-24.

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

a. Re-install the disk carrier:

– Grip the light duct support and slide it into its slide-way until a click tells you that it is well seated
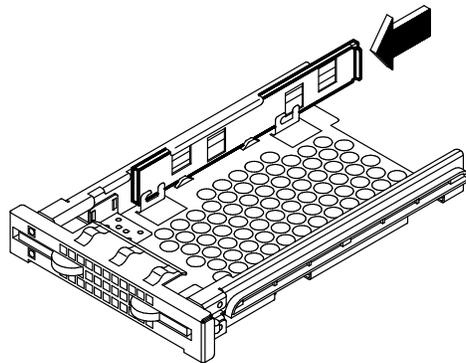
– Screw the mounting screws onto the disk carrier for future re-installation
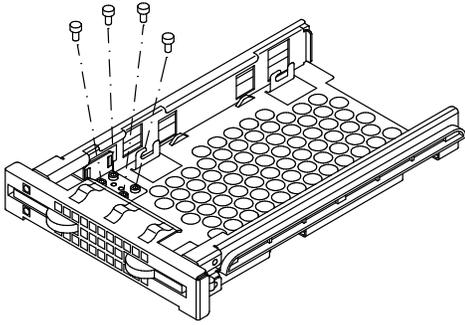
– Grip the disk carrier by the edges and slide it in the corresponding free slot

– Tilt the latches until these are anchored to the disk cage and lock the disk carrier by closing the latches.
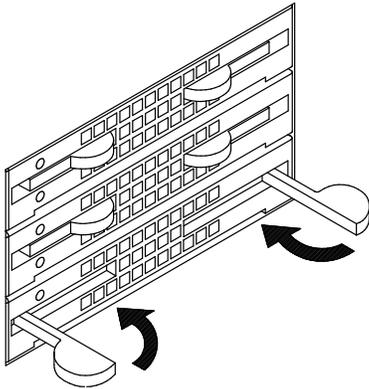
b. Install the plastic blank on the device shutter in the corresponding free slot:

– Accessing the device shutter from its internal side, with the plastic blank facing the rear, insert it in the dedicated slot

– Secure the plastic blank by tightening the two retaining screws.
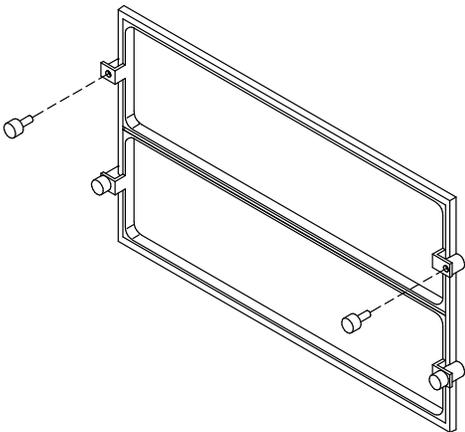
CAUTION:
It is recommended to protect any free device slot with the appropriate plastic blank. This is important for your safety and for the proper functioning of the air cooling system.

14. Close the device shutter (for details, if needed, see **Device Shutter Closing**, on page 6-5).

15. Perform a system power on (for details, if needed, see **Restart Operations**, on page 6-9).

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).

This feature is available, with different modalities, either if the system is working in RAID configuration or in not-RAID (normal or native High Availability) configuration.

- **Hot Swapping under Basic (JBOD) Configuration**, below
- **Hot Swapping under RAID Configuration**, on page 6-34.

Hot Swapping under Basic (JBOD) Configuration

Warning: Before handling any device, be sure you know the rules described in **Device Configuration**, on page 5-7.

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** and **System Management Interface Tool** sections.

3. Open the device shutter by turning the device shutter key to the right.

4. 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.

5. Physically remove the hard disk drive according to the instructions described in **Hard Disk Drive Removal step 5**, on page 6-30.

6. Replace the hard disk drive with a new one according to the instructions described in **Adding a Hard Disk Drive to a Disk Cage step 7**, on page 6-24.

7. Configure the new hard disk drive through the *SMIT* program (System Management, Devices, Add a Disk) and restore the original device configuration.

8. Check the blue/green LED is on; this means that the swapping procedure is successfully completed.

9. Close the device shutter by turning the device shutter key to the left and store it safely.

Hot Swapping under RAID Configuration

Warning: Before handling any device, be sure you know the rules described in **<u>Device Configuration</u>**, on page 5-7.

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

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

1. Open the device shutter by turning the device shutter key to the right.

2. Identify the faulty hard disk drive through the amber LED light on and steady.

3. Physically remove the hard disk drive according to the instructions described in **Hard Disk Drive Removal <u>step</u> 5**, on page 6-30.

4. Replace the hard disk drive with a new one according to the instructions described in **Adding a Hard Disk Drive to a Disk Cage <u>step</u> 7**, on page 6-24.

5. The rebuilding procedure of the data on the new hard disk drive starts automatically. The amber LED blinks until any operation on it is concluded.

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

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

7. Close the device shutter by turning the device shutter key to the left and store it safely.

Adding a Disk Expansion Unit

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

Each disk expansion unit has five device areas.

- The upgrading and removal procedures for devices in the disk expansion unit are the same ones described for the base unit in this guide, in **Device Upgrading**, on page 6-19.

- The configuration rules of the disk expansion unit device areas are detailed in the *Using the Disk Expansion Unit* guide.

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

Appendix A. System Specifications

Operating Specifications

The system base unit 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 38˚C (from 50˚F to 100.4˚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

Base Unit Power

950 VA

Operating Voltage

Voltage:	100 Vac to 127 Vac	Nominal, Auto ranging	+6%, -10%
	200 Vac to 240 Vac	Nominal, Auto ranging	+6%, -10%

Frequency range: 50 to 60 Hz ±3%

Current: Max 9.5 A at 100 Vac
Max 4.5 A at 200 Vac

Acoustic Noise

The values listed in the table below correspond to a system placed in a room having the temperature of 20°C (68°F), with a configuration including the following components:

- 1 CPU card
- 4 memory banks
- 3 PCI cards
- 3 hard disks
- 2 media devices.

	System Running	**System Idle**
Acoustic Power	Lw(A): 5.6 Bels	Lw(A): 5.4 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

- **System Units, Cards, Fans, CPU's, Memory and Sensors**, on page B-2
- **PCI/ISA Busses and Devices**, on page B-4
- **PCI Architecture Flow (I/O Subsystem**), on page B-5.

Each system device is mapped through location codes which identify 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** logically identifies a global system configuration (e.g., a configuration including a base unit and two disk expansion units)
    - **#** physically identifies the unit: **0** base unit, **1** first expansion unit, **2** second expansion unit.

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 system base unit
    - **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 Open Firmware, **Identifying Device Path**, in the *Maintenance Guide*.

System Units, Cards, Fans, CPU's, Memory and Sensors

Device	Open Firmware Node	Physical Location Code	AIX Location Code
System base unit	-	U1.0	00-00
First expansion unit	-	U1.1	00-00
Second expansion unit	-	U1.2	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	-
System base unit key mode switch	-	U1.0-P1-X2/L2	-
System base unit thermal sensor	-	U1.0-V1	-
First expansion unit thermal sensor	-	U1.1-V1	-
Second expansion unit thermal sensor	-	U1.2-V1	-
KHS card	-	U1.0-P1-X3	00-00
First expansion unit KDD card	-	U1.1-X1	00-00
Second expansion unit KDD card	-	U1.2-X1	00-00
System base unit fan 1	-	U1.0-F1	-
System base unit fan 2	-	U1.0-F2	-
System base unit fan 3	-	U1.0-F3	-
System base unit power supply	-	U1.0-V1	-
System base unit power supply fan 1	-	U1.0-V1/F1	-
System base unit power supply fan 2	-	U1.0-V1/F2	-
First expansion unit power supply	-	U1.1-V1	-
First expansion unit power supply fan 1	-	U1.1-V1/F1	-
First expansion unit power supply fan 2	-	U1.1-V1/F2	-
Second expansion unit power supply	-	U1.2-V1	-
Second expansion unit power supply fan 1	-	U1.2-V1/F1	-
Second expansion unit power supply fan 2	-	U1.2-V1/F2	-
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 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
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 system hosts two native PCI local busses (PCI0, PCI1). PCI bus 0 generates an additional PCI bus through a PCI to PCI bridge (bus 0_1) and one ISA bus through a PCI to ISA bridge (bus ISA).

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).

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	PCI 1	C	/pci@fe0f0090/*<controller>*@c	U1.0-P1-I4	20-60
PCI slot 5	PCI 0	7	/pci@fe0f0020/*<controller>*@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	11-00
PCI slot 7	PCI 0_1	1	/pci@fe0f0020/pci@5/*<controller>*@1	U1.0-P1-I7	11-08
PCI slot 8	PCI 0_1	2	/pci@fe0f0020/pci@5/*<controller>*@2	U1.0-P1-I8	11-10
PCI slot 9	PCI 0_1	3	/pci@fe0f0020/pci@5/*<controller>*@3	U1.0-P1-I9	11-18
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

PCI Architecture Flow (I/O Subsystem)

DPClev

PCI_0 Bus (Dev. ID 0)

PCI_1 Bus (Dev. ID 0)

PCI to ISA bridge (Dev. ID 1)

ISA Bus

ISA Slot

Diskette Drive Keyboard Mouse

FSB Card: BUMP Direct I/O NVRAM EPROM

KBB Card: COM1 COM2 COM3 Parallel Port

Native SCSI1 Disks (Dev. ID 2)

Native SCSI0 Media (Dev. ID 3)

MPIC Interrupt Controller (Dev. ID 4)

Native Graphic (Dev. ID 6)

PCI Slot 5 (Dev. ID 7)

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

PCI Slot 1 (Dev. ID 9)

PCI Slot 2 (Dev. ID A)

PCI Slot 3 (Dev. ID B)

PCI Slot 4 (Dev. ID C)

PCI to PCI bridge (Dev. ID 5)

PCI_0_1 Bus

PCI Slot 6 (Dev. ID 0)

PCI Slot 7 (Dev. ID 1)

PCI Slot 8 (Dev. ID 2)

PCI Slot 9 (Dev. ID 3)

System Planar

Glossary

A

A: Ampere.

AC: Alternating Current.

AIX: IBM's implementation of UNIX operating system.

ANSI: American National Standards Institute.

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

ASCII: American Standard Code for Information Interchange.

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.

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

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

C

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

chip: Synonym for integrated circuit (IC).

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 system, 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.

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

DIMM: Dual In-line Memory Module. It is the smallest component of the system memory. See also memory bank, riser.

disk cage: A metallic box which hosts 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.

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 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. 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-B: See system planar.

FRE: One-synchronous DIMM riser card. It is used for memory configurations requiring only one memory bank. See also riser.

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. It is used for memory configurations requiring more than one memory bank. See also riser.

FRU: Field Replaceable Unit.

FW: See firmware.

G

GUI: Graphical User Interface.

H

High Availability: A particular configuration which shares resources between two base units, so that if one base unit fails, the other one takes the control without interrupting any activity.

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

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.

KDD: A card installed in the disk expansion unit and interconnecting all the disk expansion unit resources. It manages also the input and output RS-485 connection between the base unit and the disk expansion unit(s).

KDK Complex: It is composed by the KDK card and four 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 the 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.

KPS: See power supply.

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 you 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 system panel where the 3-digit hexadecimal display and key mode switch 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.

PID: Product IDentification.

POST: Power On Self Test.

PowerPC: A standard RISC microprocessor family.

power supply (KPS): The system base unit is equipped with a power supply module, providing power and power regulation to all the system components. Optionally the redundancy features can be provided. See redundant power supply.

PPI: Parallel Port Interface.

PTE: Page Table Entries.

Q

No entries.

R

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 FRE, 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 unit interconnection. It is used for the connection of disk expansion unit(s).

RSF: Remote Services Facilities.

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-B): The planar which interconnects all the system 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

UART: Universal Asynchronous Receiver Transmitter.

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

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

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

UTC: Universal Time Coordinated.

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

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