

Bull ESCALA

Disk Expansion Unit Service Guide

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Bull ESCALA

Disk Expansion Unit Service Guide

Hardware

June 2000

**BULL ELECTRONICS ANGERS
CEDOC
34 Rue du Nid de Pie – BP 428
49004 ANGERS CEDEX 01
FRANCE**

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Communication Statements

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

Federal Communications Commission (FCC) Statement

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

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

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

EC Council Directive

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

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

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

International Electrotechnical Commission (IEC) Statement

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

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

VCCI Statement

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

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

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

Safety Notices

Definitions of Safety Notices

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

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

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

Placement of Safety Notices Inside This Guide

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

IT Power Systems

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

Disconnect Device (Isolation from Primary Power)

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

Laser Safety Information

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

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

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

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



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

About This Guide

Audience

This guide is addressed to people trained to perform service tasks on the system.

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

Overview of the Contents

This guide provides the description of the disk expansion unit hardware components and the instructions for their installation and/or replacement. A section is dedicated to the SCSI cables. The spare part list is also included.

- Chapter 1, **Disk Expansion Unit Hardware Components**, provides a presentation of the disk expansion unit with the name and a brief description of each system component. In addition, it gives detailed information about the location of all the disk expansion unit internal connectors.
- Chapter 2, **Disk Expansion Unit Hardware Maintenance**, provides the procedures necessary to add, replace or remove the disk expansion unit components.
- Chapter 3, **SCSI Cables Description and Connection**, describes the SCSI cables connection rules for the disk expansion unit, and gives some SCSI configuration examples.
- Appendix A, **Spare Parts**, provides the hardware component part number cross-reference.

Related Publications

- *Disk Expansion Unit Quick Set Up* (86 A1 12PX), contains the step by step hardware procedures for the connection of the disk expansion unit to the base unit.
- *Using the Disk Expansion Unit* (86 A1 16PX), contains information about the disk expansion unit operability, features and upgrading.
- *AIX 4.3 System Management Guide: Operating System and Devices* (86 A2 99HX), explains the use of the System Management Interface Tool (SMIT) program.

Information which is also relevant to the disk expansion unit, can be found in the following documentation:

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

For any additional information you may need, please refer to the base unit documentation set.

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).

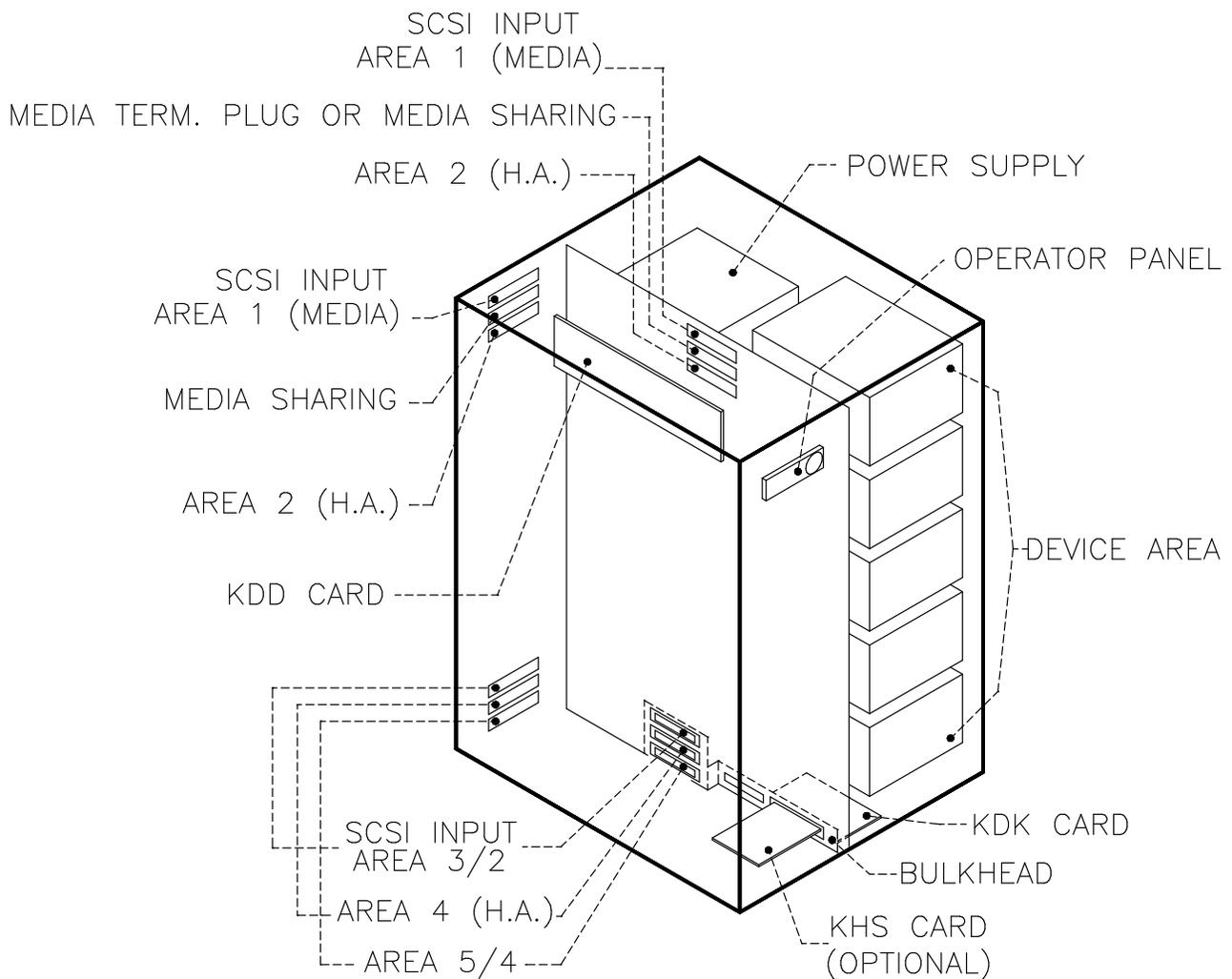
Chapter 1. Disk Expansion Unit Hardware Components

This section provides an overview of the disk expansion unit hardware components; it illustrates the location and gives a brief description of each component. In addition, it contains information about all the internal connectors.

- **Overview of the Disk Expansion Unit**, below
- **Description of the Hardware Components**, on page 1-2
- **Internal Connectors**, on page 1-7
- **Power Cords**, on page 1-13.

Overview of the Disk Expansion Unit

The figure below illustrates the location of the hardware components in the disk expansion unit.



Description of the Hardware Components

This section provides a brief description of the disk expansion unit hardware components. They are listed in alphabetical order.

- **Bulkhead SCSI Cables Sub-Assembly** below
- **Device Areas** on page 1-3
- **Disk Cage** on page 1-3
- **Disk Devices** on page 1-4
- **FD3 Back Plane** on page 1-4
- **KDD Card** on page 1-4
- **KDK Complex** on page 1-4
- **Key Mode Switch** on page 1-5
- **KHS Card** on page 1-5
- **KP2 Back Plane** on page 1-5
- **KP3 Back Plane** on page 1-5
- **Operator Panel** on page 1-5
- **Power Supply** on page 1-6
- **SCSI Repeater** on page 1-6.

Bulkhead SCSI Cables Sub-Assembly

The bulkhead SCSI cables sub-assembly is composed of the following components:

- The bulkhead
- The SCSI cables on the unit device area side (Area 5, Area 4 and Area 3 disk cables)
- The KDK complex with the relevant cables.

The bulkhead is a pass-through plate for the connection of the SCSI busses.

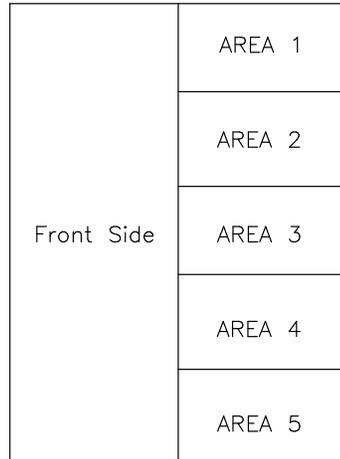
Furthermore, it connects the KHS card, if present, and any additional SCSI cables required for the disk expansion unit configuration.

Notes:

1. For a detailed description of the KDK complex, refer to **KDK Complex**, on page 1-4.
2. For exhaustive information about the SCSI cables installed on the unit device area side, refer to **SCSI Cables Description and Connection**, on page 3-1.
3. For more information about the bulkhead, refer to **Bulkhead Location**, on page 3-4.

Device Areas

The disk expansion unit has five device areas which are located vertically, on the right of the front side of the unit.



Looking at the disk expansion unit front, device areas are identified as follows:

- Area 1 hosts up to two media devices, such as a CD-ROM drive, 4 mm tape drive, 8 mm tape drive, or MLR tape drive
- Areas 2, 3, 4 and 5 may host a disk cage housing either up to two 1.6-inch hard disk devices or up to three 1-inch hard disk devices.

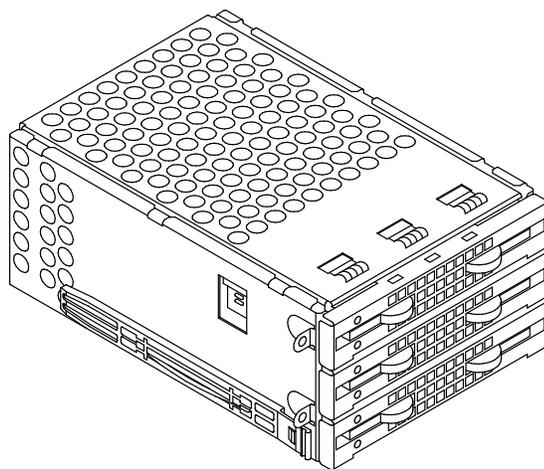
Note: The device configuration rules and upgrading and/or replacement procedures are described in the base unit documentation set.

Disk Cage

A disk cage is a metallic box used to install hard disk devices. Each disk cage occupies one device area. Different types of disk cage are supported:

- KP2 cage, to connect up to two 1.6-inch hard disk devices
- KP3 cage and FD3 cage, to connect up to three 1-inch hard disk devices.

The figure illustrates a disk cage hosting up to three 1-inch hard disk devices.



Disk Devices

The disk cages can house different kinds of hard disk devices, with different characteristics, such as storage capacity, operation mode, transfer rate, etc.

Disk devices can be either ULTRA-2/LVD or ULTRA/SE devices. The type of used disks depends on and is the same as the type of disks used in the base unit.

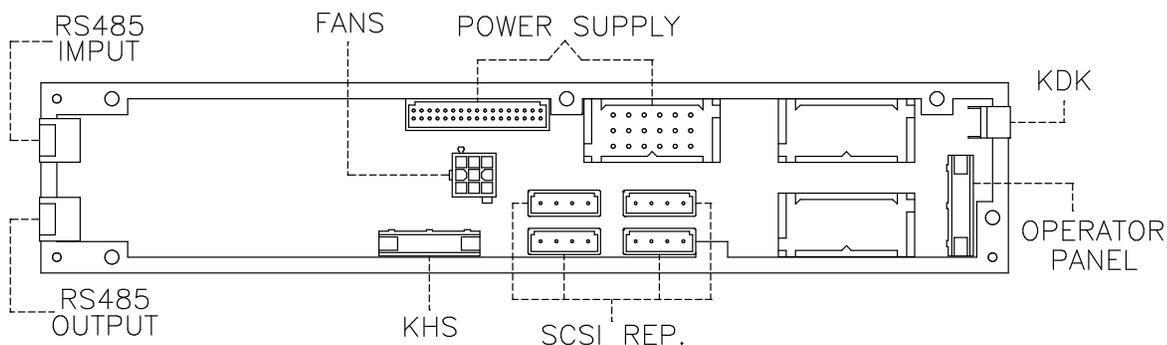
For further details about the device characteristics, refer to the *Disks and Tapes Configuration Information* guide.

FD3 Back Plane

The FD3 back plane is a card that is placed on the rear side of the disk cage. The FD3 back plane supports up to three 1-inch ULTRA-2/LVD disk devices. For further information, refer to **Disk Cage**, on page 1-3.

KDD Card

The KDD card provides the connectors which manage the power supply, the operator panel, the KDK card and the RS-485 interconnection. Moreover, it is equipped with a connector used to interconnect the KHS card, if this is installed in the disk expansion unit. In addition, the KDD card provides four connectors dedicated to the SCSI repeaters.



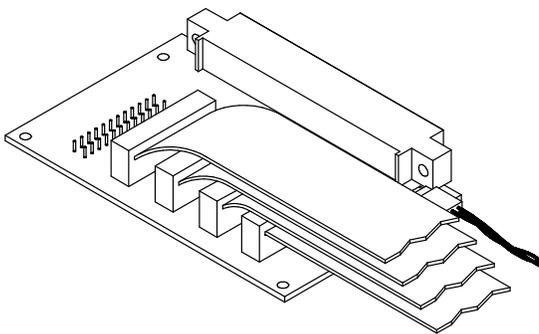
The KDD card also houses the control logic for the key mode switch, and it dialogues with the BUMP through the RS-485 interconnection.

KDK Complex

The KDK complex is composed of the KDK card and four flat cables connected to it. The KDK card is plugged into the bulkhead's leftmost connector on the disk expansion unit right side. In addition, it houses the SCSI reset cable, which is interconnected to the KDD card.

The KDK complex main functionalities are the following:

- Definition of the disk devices SCSI-ID
- Interface between the disk cages and the KHS card (if the latter is present).



Note: The KDK complex is part of the bulkhead SCSI cables sub-assembly.

Key Mode Switch

The key mode switch provides three logical functions, spread on four physical positions, which are enabled only when AC power is present.

-  **Local Standby**

This function is spread on two physical positions which can be used without distinction in Local Control only.

- **R Remote Control**

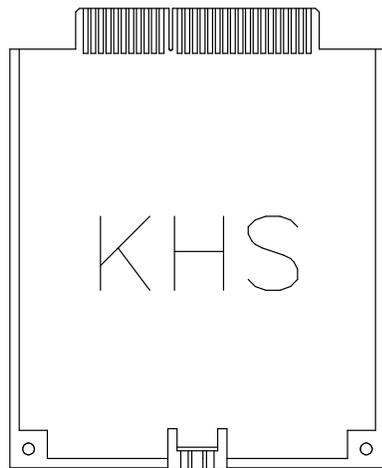
- **L Local Control**

Note: Exhaustive information about the use of the key mode switch is given in the *Using the Disk Expansion Unit* guide.

KHS Card

The KHS card is an optional card which is directly plugged in the dedicated connector on the bulkhead only in presence of a RAID configuration, as it acts as RAID controller card interface.

It is also connected to the KDD card by means of a dedicated flat cable.



KP2 Back Plane

The KP2 back plane is a card that is placed on the rear side of the disk cage. The KP2 back plane supports up to two 1.6-inch ULTRA/SE disk devices. For further information, refer to [Disk Cage](#), on page 1-3.

KP3 Back Plane

The KP3 back plane is a card that is placed on the rear side of the disk cage. The KP3 back plane supports up to three 1-inch ULTRA/SE disk devices. For further information, refer to [Disk Cage](#), on page 1-3.

Operator Panel

The operator panel houses one green LED, indicating the power on state of the disk expansion unit and a key mode switch used to set the power control of the disk expansion unit through the RS-485 interconnection.

The functions of the operator panel are described in the *Using the Disk Expansion Unit* guide.

Power Supply

The disk expansion unit is equipped with one power supply module. The power supply module provides power and power regulation to all the disk expansion unit components.

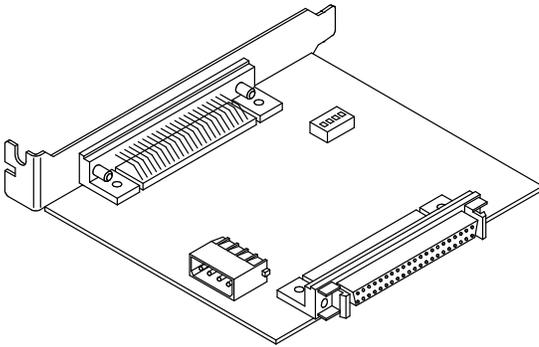
The power supply module is composed of a mechanical box structure with an AC inlet receptacle, input AC filtering, a power converter card assembly and output cables. The mechanical box structure includes two internal cooling fans.

Two models of power supply modules are supported:

- A standard power supply module. It contains one card that manages the power of the expansion unit. If this card is faulty, the expansion unit activity is stopped.
- A redundant power supply module. It contains two cards that share among them the unit power management. If one of these cards is faulty, the other one takes in charge the power management of the whole disk expansion unit, so the system activity continues.

SCSI Repeater

The SCSI repeater is a card used to overcome the SCSI bus length limit. It is used for some High Availability configurations.



Internal Connectors

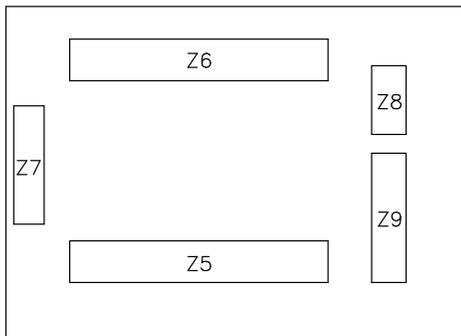
This section illustrates the internal connectors of the disk expansion unit, giving their location and a description of each of them, such as type of connector and function(s). The cards are listed in alphabetical order.

- **FD3 Back Plane** on page 1-8
- **KDD Card** on page 1-9
- **KDK Card** on page 1-10
- **KHS Card** on page 1-10
- **KP2/KP3 Back Plane** on page 1-11
- **SCSI Repeater** on page 1-12.

FD3 Back Plane

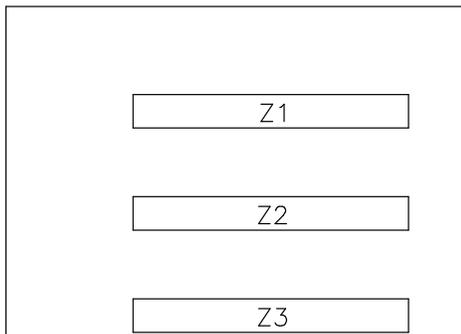
FD3 back plane houses connectors on both the external and the internal sides.

FD3 External Side



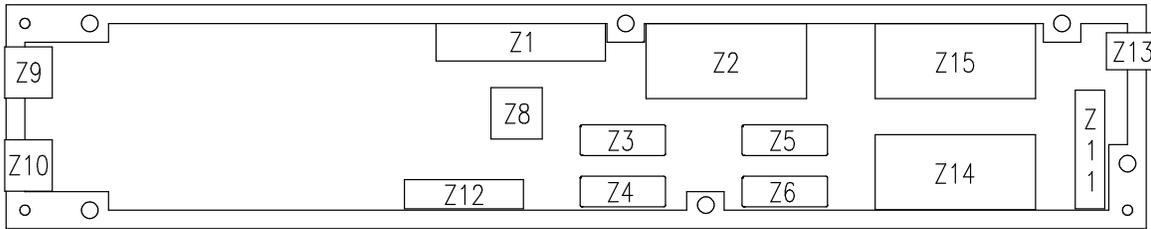
Reference in the Figure	Type of Connector	Function
Z5	68 contacts, female	SCSI input connector
Z6	68 contacts, female	SCSI output connector
Z7	4 contacts, power, male	Disk cage power connector
Z8	10 contacts, male	Reserved for future use
Z9	20 contacts, male	KDK complex interconnection

FD3 Internal Side



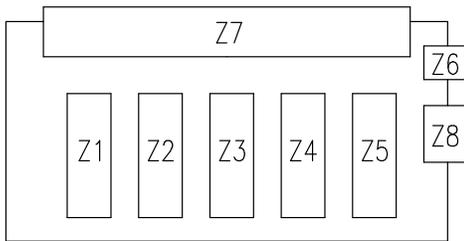
Reference in the Figure	Type of Connector	Function
Z1	80 contacts, SCA, female	1-inch hard disk drive interconnection
Z2	80 contacts, SCA, female	1-inch hard disk drive interconnection
Z3	80 contacts, SCA, female	1-inch hard disk drive interconnection

KDD Card



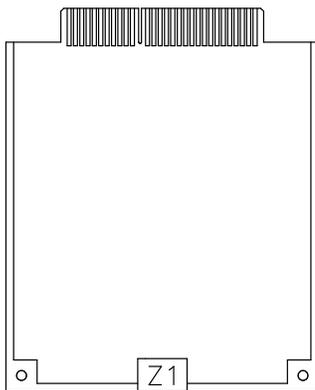
Reference in the Figure	Type of Connector	Function
Z1	34 contacts, male	Power supply interconnection
Z2	18 contacts, male, power	Power supply interconnection
Z3	4 contacts, male, power	SCSI repeater interconnection by means of the appropriate cable
Z4	4 contacts, male, power	SCSI repeater interconnection by means of the appropriate cable
Z5	4 contacts, male, power	SCSI repeater interconnection by means of the appropriate cable
Z6	4 contacts, male, power	SCSI repeater interconnection by means of the appropriate cable
Z8	3x3 contacts, male, power	Fan modules interconnection
Z9	6 contacts, PS/2 type, mini DIN, female	RS-485 input port for unit interconnection
Z10	6 contacts, PS/2 type, mini DIN, female	RS-485 output port for unit interconnection
Z11	10 contacts, male	Operator panel interconnection
Z12	10 contacts, male	KHS card interconnection by means of the appropriate cable
Z13	4 contacts, male	KDK complex interconnection by means of the appropriate cable
Z14	18 contacts, male, power	Not used
Z15	18 contacts, male, power	Not used

KDK Card



Reference in the Figure	Type of Connector	Function
Z1	20 contacts, male	Disk cage interconnection by means of the appropriate cable
Z2	20 contacts, male	Disk cage interconnection by means of the appropriate cable
Z3	20 contacts, male	Disk cage interconnection by means of the appropriate cable
Z4	20 contacts, male	Disk cage interconnection by means of the appropriate cable
Z5	20 contacts, male	Disk cage interconnection by means of the appropriate cable
Z6	3 contacts, male	KDD card interconnection by means of the appropriate cable
Z7	50 contacts, CARD EDGE, female	Bulkhead interconnection
Z8	4 contacts, male	Not used

KHS Card

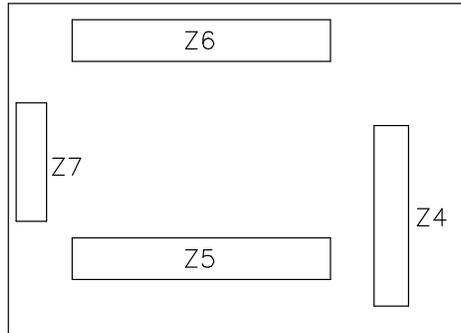


Reference in the Figure	Type of Connector	Function
Z1	10 contacts, male	KDD card interconnection by means of the appropriate cable

KP2/KP3 Back Plane

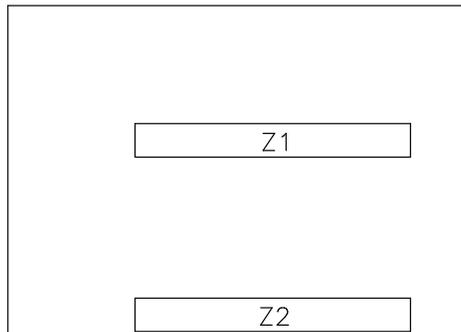
KP2/KP3 back plane houses connectors on both the external and the internal sides.

KP2/KP3 External Side



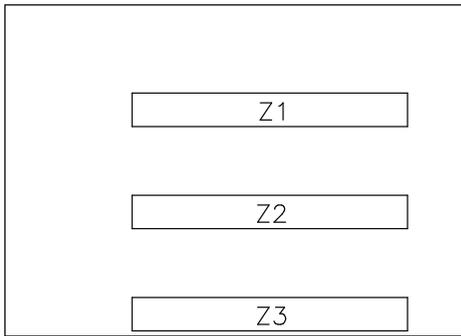
Reference in the Figure	Type of Connector	Function
Z4	<i>20 contacts, male</i>	<i>KDK complex interconnection</i>
Z5	<i>68 contacts, female</i>	<i>SCSI input connector</i>
Z6	<i>68 contacts, female</i>	<i>SCSI output connector</i>
Z7	<i>4 contacts, power, male</i>	<i>Disk cage power connector</i>

KP2 Internal Side



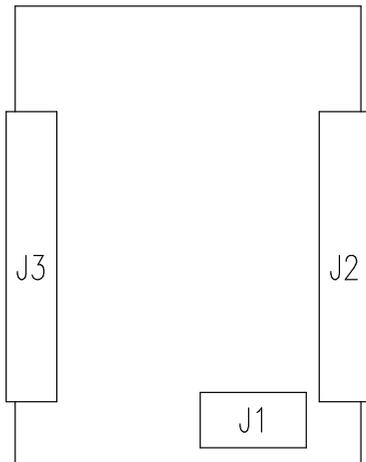
Reference in the Figure	Type of Connector	Function
Z1	<i>80 contacts, SCA, female</i>	<i>1.6-inch hard disk drive interconnection</i>
Z2	<i>80 contacts, SCA, female</i>	<i>1.6-inch hard disk drive interconnection</i>

KP3 Internal Side



Reference in the Figure	Type of Connector	Function
Z1	80 contacts, SCA, female	1-inch hard disk drive interconnection
Z2	80 contacts, SCA, female	1-inch hard disk drive interconnection
Z3	80 contacts, SCA, female	1-inch hard disk drive interconnection

SCSI Repeater



Reference in the Figure	Type of Connector	Function
J1	4 contacts, power	KDD card interconnection by means of the appropriate cable
J2	68 contacts, female	Connection to the disk expansion unit bulkhead by means of the appropriate cable
J3	68 contacts, female	Connection to the dedicated RAID connector on the base unit, by means of the appropriate cable

Power Cords

The power cord types supported by the system are:

- “Europe”
- “UK” (United Kingdom)
- “US” (United States).

Each power cord supports a specific electric voltage and frequency.

The system power cords are provided with a grounded attachment plug to avoid electrical shock.

CAUTION:

This product is equipped with a 3-wired power cable and plug for the user’s safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.

CAUTION:

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices attached 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.

For more details, refer to:

- **Europe Power Cord Characteristics**, on page 1-14
- **UK Power Cord Characteristics**, on page 1-15
- **US Power Cord Characteristics**, on page 1-16.

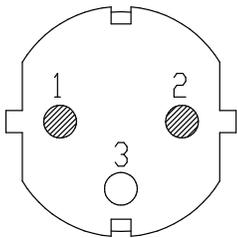
Europe Power Cord Characteristics

Length:	2.5 meters (100 inches)
Voltage rating:	250 V
Frequency:	50 Hz
Current:	16 A
Compliance:	The conditions of use of the cord must be in accordance with both CEE and CENELEC publications. The cord assembly shall meet the requirements of both the NF C 32-201 and ASTM B33.63 specifications.

Male Plug Characteristics

The Europe power cord male plug is a two pole plug with dual earthing contacts, having a voltage rating of 250 V and a current of 16 A. It is compliant with the CEE7 VII standard.

Pin-Out Information

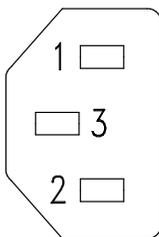


- 1 Neutral (Blue)
- 2 Line (Brown)
- 3 Earth (Green/Yellow)

Female Plug Characteristics

The system side power cord female plug has a voltage rating of 250 V and a current of 10 A. It is compliant with the CEE 22 Sht V IEC 320 Sht C13 standard.

Pin-Out Information



- 1 Line (Brown)
- 2 Neutral (Blue)
- 3 Earth (Green/Yellow)

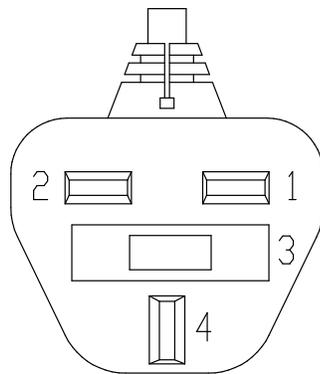
UK Power Cord Characteristics

Length:	2.5 meters (about 100 inches)
Voltage rating:	250 V
Frequency:	50 Hz
Current:	10/13 A
Compliance:	The conditions of use of the cord must be in accordance with both CEE and BS publications. The cord assembly shall meet the requirements of both the NF C 32-201 and ASTM B33.63 specifications.

Male Plug Characteristics

The UK power cord male plug is a two pole plug with one earthing contact. It is equipped with a 10/13 A fuse in accordance with the ASTA BS1362 requirements. It is compliant with the BS1363 standard.

Pin-Out Information

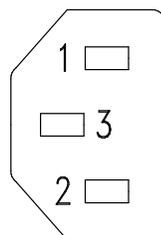


- 1** Line (Brown)
- 2** Neutral (Blue)
- 3** Fuse Clips
- 4** Earth (Green/Yellow)

Female Plug Characteristics

The system side power cord female plug has a voltage rating of 250 V and a current of 10 A. It is compliant with the CEE 22 Sht V IEC 320 Sht C13 standard.

Pin-Out Information



- 1** Line (Brown)
- 2** Neutral (Blue)
- 3** Earth (Green/Yellow)

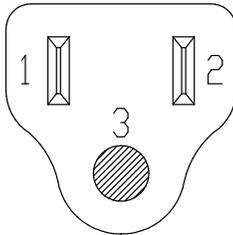
US Power Cord Characteristics

Length:	2.5 meters (about 100 inches)
Voltage rating:	125 V
Frequency:	60 Hz
Current:	13 A
Compliance:	The conditions of use of the cord must be in accordance with both the IEC 950 and UL 1950 standards. The cord assembly shall be UL recognized and CSA certified. It shall meet the requirements of the ASTM B33.63 specifications.

Male Plug Characteristics

The US power cord male plug is a two pole plug with one earthing contact. It has a voltage rating of 125 V and a current of 13 A. It is a type NEMA 5-15P plug.

Pin-Out Information

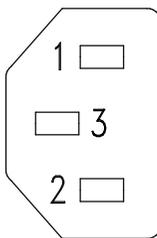


- 1** Line (Black)
- 2** Neutral (White)
- 3** Earth (Green/Yellow)

Female Plug Characteristics

The system side power cord female plug has a voltage rating of 250 V and a current of 10 A. It is compliant with the CEE 22 Sht V IEC 320 Sht C13 standard.

Pin-Out Information



- 1** Line (Black)
- 2** Neutral (White)
- 3** Earth (Green/Yellow)

Chapter 2. Disk Expansion Unit Hardware Maintenance

This section describes the procedures necessary to add, replace or remove the disk expansion unit hardware components, and that require the intervention of technicians or trained people.

These components are listed in **List of Hardware Components**, on page 2-12.

This section also describes what to do before handling any hardware component, how to power on/off the system, how to remove and re-install the unit panels.

All these operations are detailed in **Preliminary and Restart Operations**, on page 2-2, while specific reference-marks to them are included in each procedure.

Preliminary and Restart Operations

- **How to Handle Hardware Components**, below
- **Preliminary Operations**, on page 2-3
- **Disk Expansion Unit Panels**, on page 2-5
- **Restart Operations**, on page 2-10.

How to Handle Hardware Components

Tools Needed

You should have the following tools available before starting installation and removal procedures on the disk expansion unit.

- 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 = 145mm)
- A torx screwdriver for torx screws Ø 2.5 mm
- A torx screwdriver for torx screws Ø 3 mm
- A torx screwdriver for torx screws Ø 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: 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, a CPU card, a media device or a fixed hard disk, because these are sensitive to electrostatic discharge.

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

Preliminary Operations

These preliminary operations must be performed whenever you are going to maintain the disk expansion unit.

1. Identify the disk expansion unit through its serial number if this is required for technical assistance. The serial number is written on the rating plate label placed on the rear side of the unit.

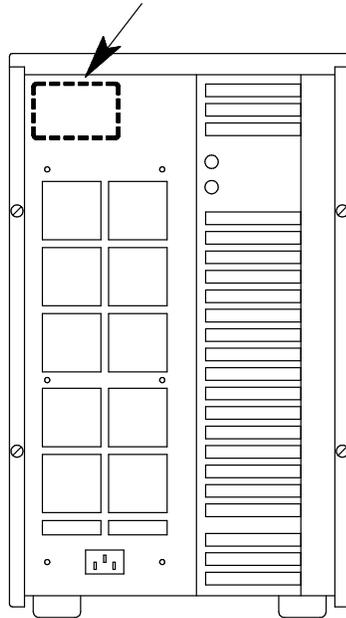
Its format is XAN - Kxx - Mnnnnn where:

Kxx is the system run code defined by the manufacturer

M is a character that identifies the system model

nnnnn is the system serial number (5 digits).

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



2. Exit any applications that are running. Consult the application guides for instructions.
3. Check that the media drives, if any, do not contain any media.
4. Stop the disk expansion unit or the whole system, following the appropriate procedure.
 - If the disk expansion unit power is remotely controlled, it is always necessary to stop the whole system, as described below:
 - Exit the operating system using the appropriate **shutdown** command. Refer to the operating system documentation for details.
 - Set the key mode switch of the base unit to the Power Off position. Skip to **step 5**.
 - If the disk expansion unit is locally controlled, two situations can occur:
 - For standard and High Availability configurations, it is possible to stop the disk expansion unit only, if its resources are not vital for the system activity, as described below.

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

Notes:

- a. If you need more detailed information about the SMIT program, please refer to *AIX 4.3 System Management Guide: Operating System and Devices, Logical Volumes and System Management Interface Tool* sections.
- b. Once the maintenance operations are completed, you must restore the original device configuration. For details, please refer to **Restart Operations**, on page 2-10.

Set the key mode switch of the disk expansion unit to the  (Local Standby) position. Skip to **step 7**.

- For RAID configurations, it is always necessary to stop the whole system, as described below.

Exit the operating system using the appropriate **shutdown** command. Refer to the operating system documentation for details.

Set the key mode switch of the disk expansion unit to the  (Local Standby) position.

Set the key mode switch of the base unit to the Power Off position. Skip to **step 5**.

5. Make sure the power switches for all the external devices connected to the stopped system unit(s), if any, are set to OFF.
6. Unplug the power cord to all the external devices connected to the stopped system unit(s) from the outlet, if any.
7. Unplug the stopped system unit(s) power cord.

CAUTION:

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

8. Disconnect all external cables from the disk expansion unit. Keep trace of these connections.
9. Ensure that the two wheels on the rear of the system units are locked to improve the system stability.

CAUTION:

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

DANGER

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

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

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

Disk Expansion Unit Panels

- **Front Panel**, below
- **Lateral Panel**, on page 2-8.

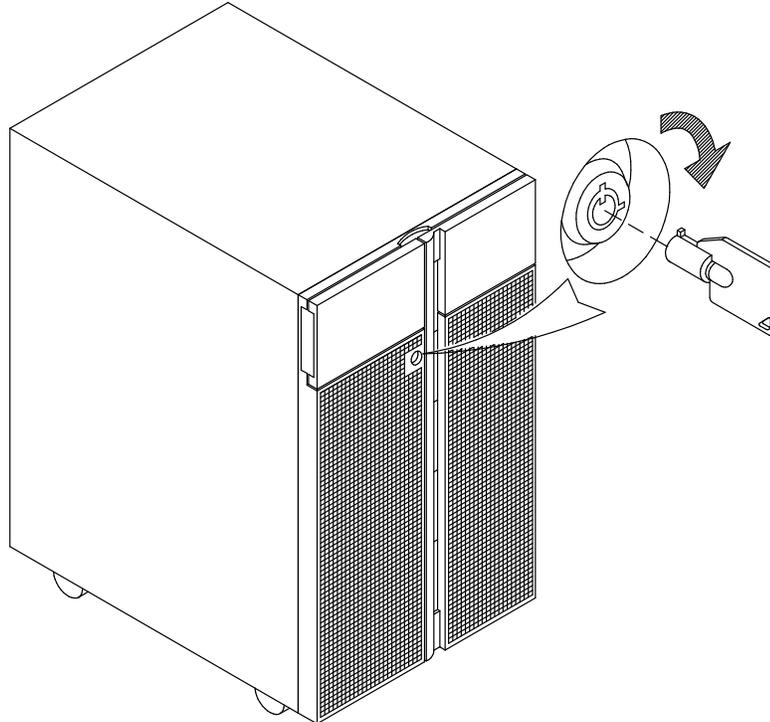
CAUTION:

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

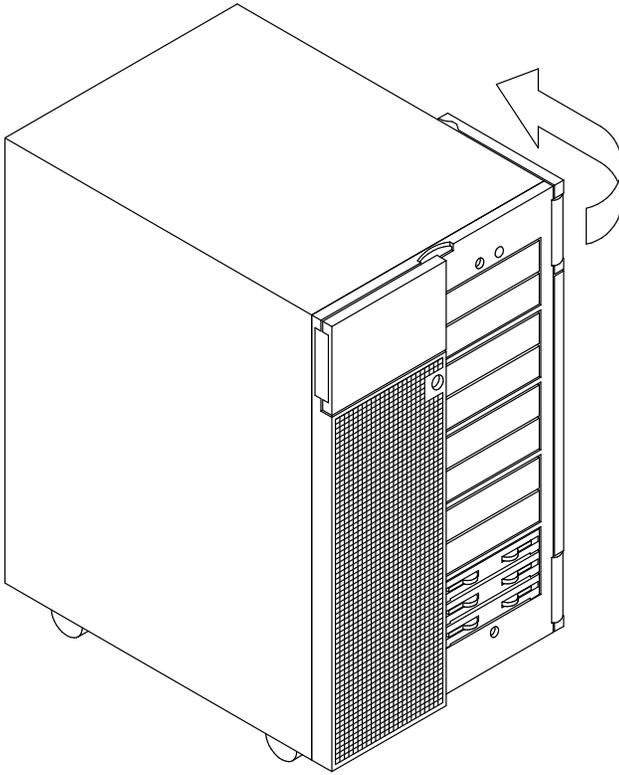
Front Panel

Removal

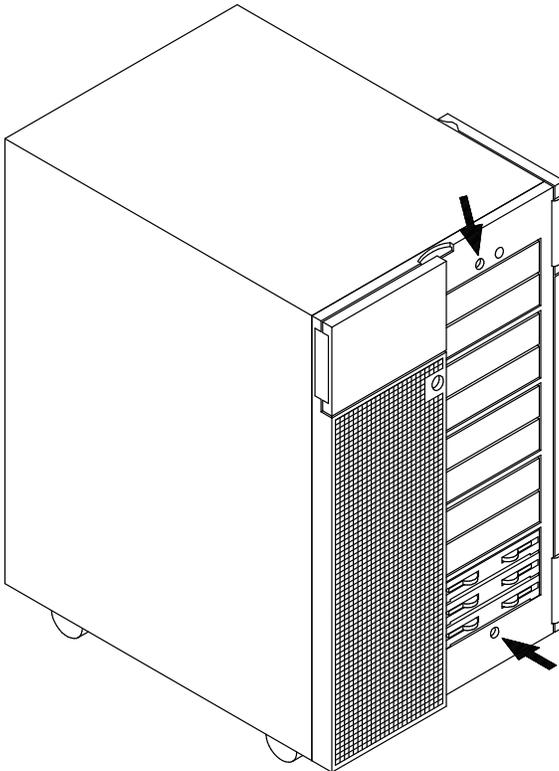
1. Insert the device shutter key and turn it to the right. This unlocks the device shutter of the front panel.



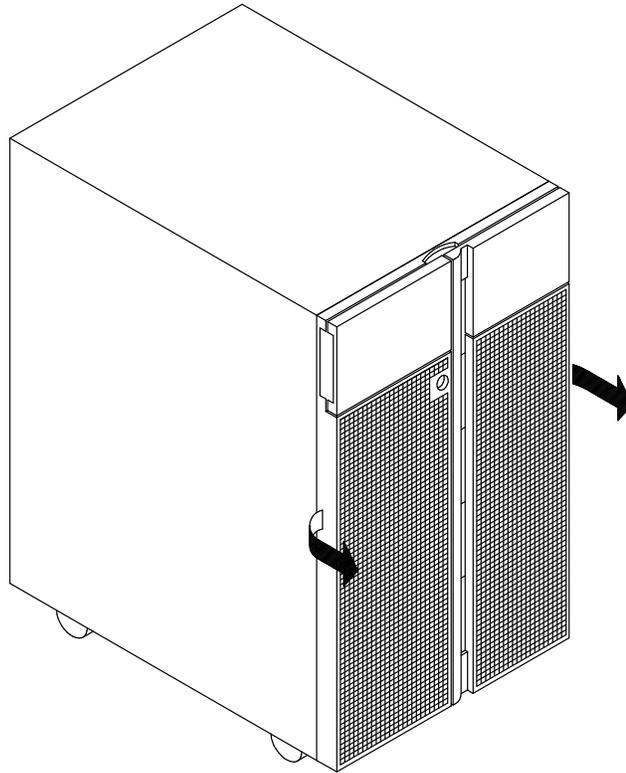
2. Open the device shutter of the front panel.



3. Loosen the retaining screws to unlock the front panel from the chassis.



4. Close the device shutter.
5. Grip the front panel at the sides and slide it towards you.



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. Secure the front panel to the system chassis tightening its retaining screws.
5. Close the device shutter.
6. Insert the device shutter key and turn it to the left. This locks the device shutter of the front panel.
7. Remove the device shutter key and store it.

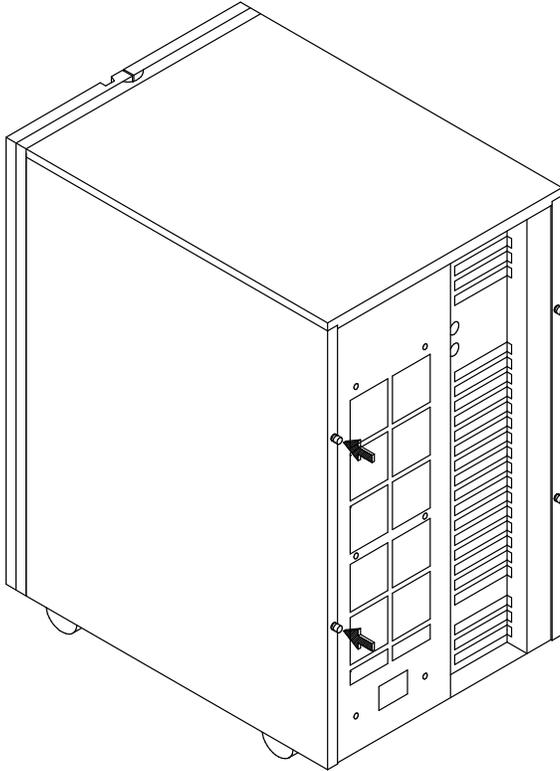
Warning: Remember to store the device shutter key safely to avoid any possible system misuse.

Lateral Panel

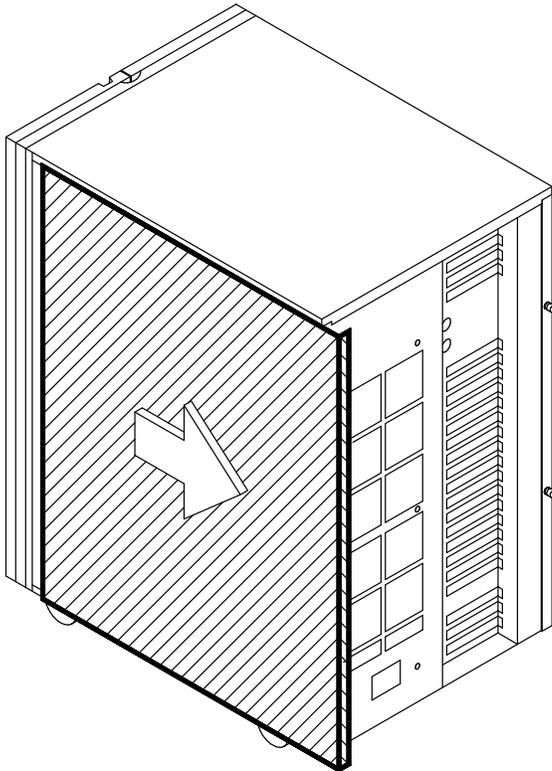
Removal

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

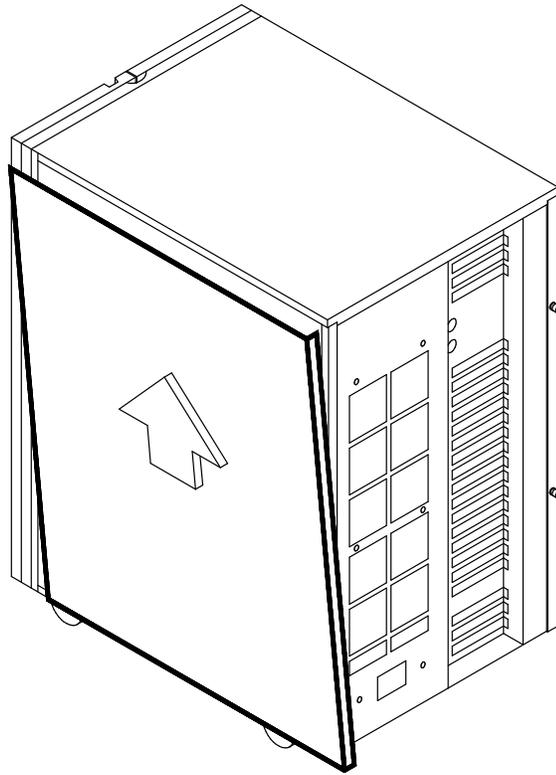
1. Accessing the unit from the rear, unscrew the two retaining screws located on the panel frame of the lateral panel to be removed.



2. Gently slide the panel towards you.



3. The panel will tilt automatically outward.



4. Lift the panel from the chassis and remove it.

Installation

1. Accessing the unit from the rear, hook the retaining brackets on the lateral panel with the corresponding retainers on the chassis.
2. Push the panel towards the unit.
3. Firmly slide the panel into the unit until the retaining brackets are locked.
4. Tighten clockwise the two retaining screws located on the panel frame.

Restart Operations

The following operations must be performed after all maintenance operations on the disk expansion unit are concluded.

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

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

Follow the appropriate procedure, accordingly.

CAUTION:

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

Remote Control

The following procedure must be followed if the whole system is powered off.

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

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

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

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

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

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

Local Control

If the Base Unit is Operating

1. Make sure the disk expansion unit key mode switch is set to the  position (Local Standby).

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

2. Connect any required external cables to the disk expansion unit.
3. Connect the power cord of the disk expansion unit to the power outlet.

4. Power on the disk expansion unit by setting the key mode switch to the **L** position (Local Control).
5. Logically add all devices of the disk expansion unit to the device configuration database, through the SMIT program.

Note: If you need more detailed information, please refer to *AIX 4.3 System Management Guide: Operating System and Devices, Logical Volumes and System Management Interface Tool* sections.

If the Base Unit is Stopped

1. Make sure that the disk expansion unit(s) key mode switch is set to the  position (Local Standby).

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

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

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

List of Hardware Components

- **Bulkhead SCSI Cables Sub-Assembly**, on page 2-13
- **Disk Cage**, on page 2-15
- **KDD Card**, on page 2-20
- **Key Mode Switch**, on page 2-21
- **KHS Card**, on page 2-24
- **Operator Panel**, on page 2-27
- **Power Supply**, on page 2-29
- **SCSI Repeater**, on page 2-32.

Note: The procedures related to the media and disk devices are not included in this guide. They are described in the base unit documentation set, in the **Expanding the System Configuration** section.

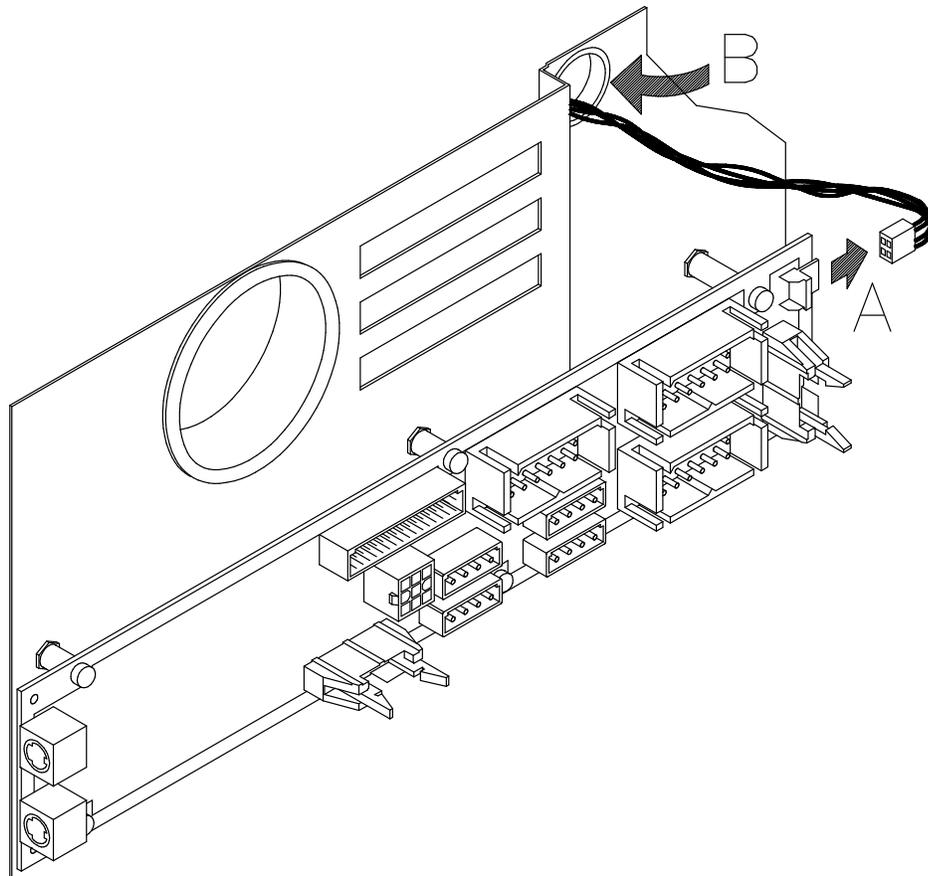
Bulkhead SCSI Cables Sub-Assembly

- **Removal**, below
- **Installation**, on page 2-14.

Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

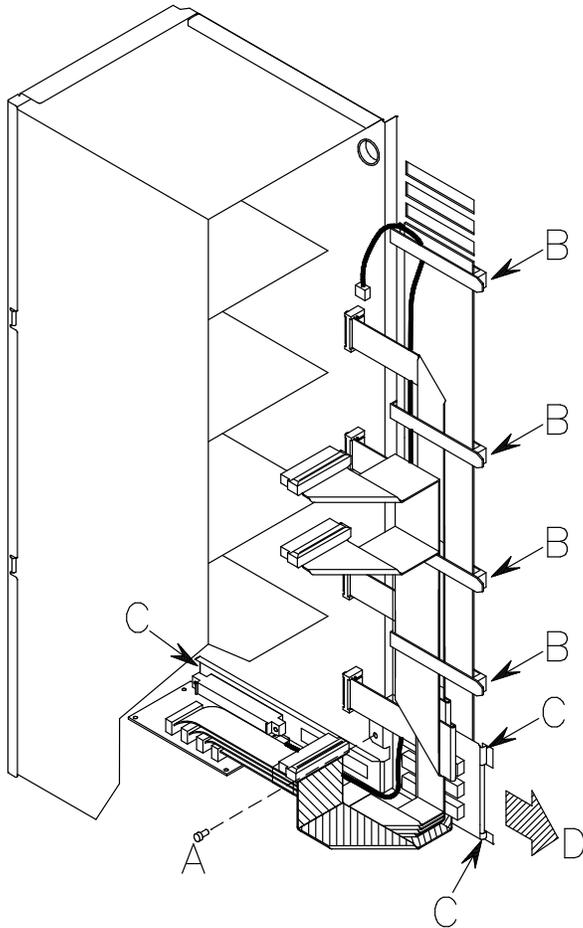
Removal

1. Remove both the lateral panels, as described in **Lateral Panel**, on page 2-8.
2. Accessing the disk expansion unit from the left, disconnect all cables from the bulkhead left side.
3. Disconnect the SCSI reset cable connector from the KDD card, as shown at A in the figure, then make the cable pass through the opening indicated by B.



4. Remove the power supply following the steps described in **Power Supply, Removal**, on page 2-29.
 5. Accessing the disk expansion unit from the right, unplug all signal cables of each disk cage and media device installed in it.
- Note:** It is strongly recommended to keep trace of these connections.
6. Unscrew the retaining screw used to secure the bulkhead to the unit chassis. This is shown at A in the figure.

7. Unanchor the plastic retainers marked with B in the figure, to release the bulkhead vertical structure and any related cables from the unit.
8. Unhook the tongues marked with C in the figure from the corresponding holes on the unit chassis, to completely release the bulkhead from the unit.
9. Slide the bulkhead with the KDK complex and any SCSI cables still connected to it out of the unit, as indicated by D in the figure.



Installation

1. To re-install the bulkhead SCSI cables sub-assembly, follow the steps detailed in the **Removal** procedure in the reverse order.
2. Perform the **Restart Operations**, as described on page 2-10.

Disk Cage

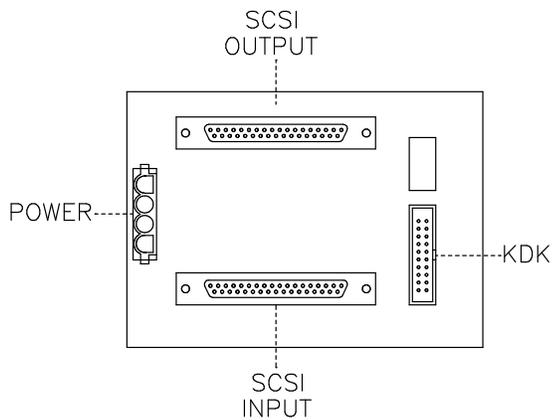
- **Removal**, below
- **Installation**, on page 2-18.

Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

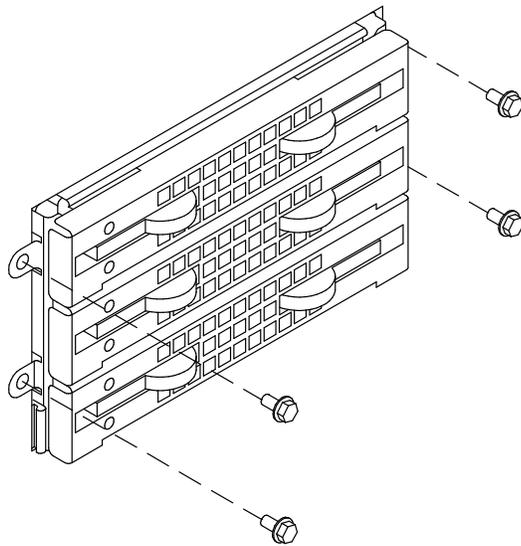
Note: The figures illustrate a FD3 disk cage model complete of three disk carriers. The procedures apply to KP2, KP3 and FD3 disk cage models.

Removal

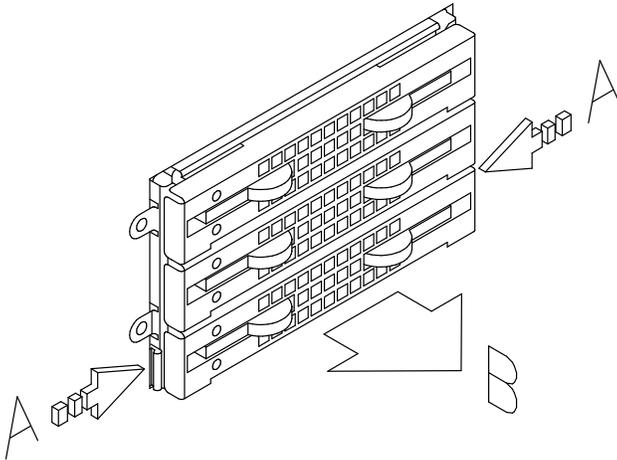
1. Remove the front panel and the right lateral panel of the disk expansion unit, as described in **Front Panel**, on page 2-5, and **Lateral Panel**, on page 2-8.
2. Accessing the disk expansion unit from the right, disconnect all cables from the disk cage rear connectors shown in the figure.



3. Loosen the retaining screws to unlock the disk cage from the chassis.

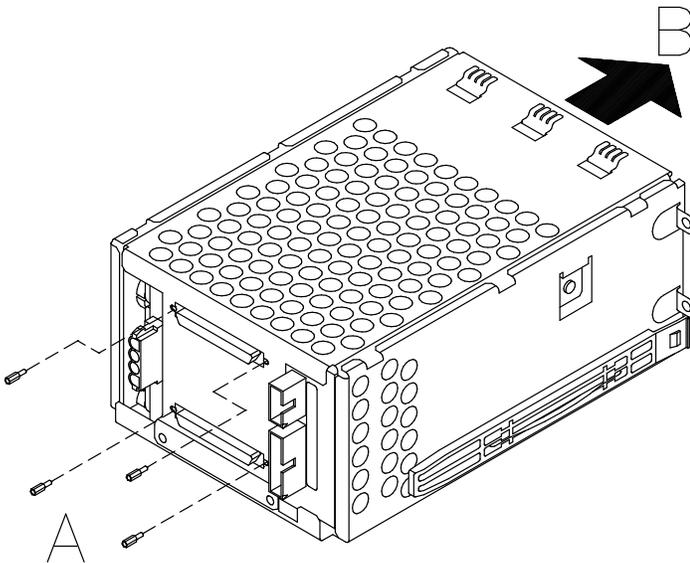


4. Simultaneously push the snaps at each side of the disk cage (as indicated by A) and slide it out of the slot (following the direction indicated by B).



Note: If you have removed the disk cage because you do not need it any more, skip to **step 9** of this procedure, otherwise continue with the following steps.

5. Lay the disk cage just removed on a flat surface.
6. Remove the disk carriers, one at a time, from the disk cage. Record their positions to keep the original configuration. The removal and installation procedures of disk carriers are described in the base unit documentation set.
7. Remove the back plane from the disk cage, performing the following steps:
 - a. Loosen the retaining screws used to secure the back plane to the disk cage, as indicated by A in the figure.
 - b. Gently push the back plane towards the front side of the disk cage and slide it out, as indicated by B in the figure.



8. At this point skip to **Disk Cage, Installation, step 3**, on page 2-18, and disregard the following steps.

9. Install the appropriate metal blanks on the chassis and the plastic blanks on the front panel in the corresponding free slot.

CAUTION:

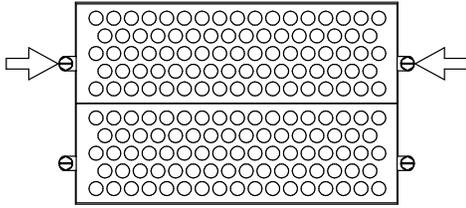
It is recommended to protect any free device slot with the appropriate plastic and metal blanks. This is important for your safety and for the proper functioning of the air cooling system.

10. Accessing the disk expansion unit from the right, check and perform the connection of the SCSI cables. For exhaustive information, please refer to **SCSI Cables Description and Connection**, on page 3-1.
11. Store the removed disk cage in an antistatic envelope.
12. Install the front panel and the right lateral panel, as described in **Front Panel**, on page 2-5, and **Lateral Panel**, on page 2-8.
13. Perform the **Restart Operations**, as described on page 2-10.

Installation

It is presumed that the front panel and the right lateral panel are already removed from the disk expansion unit. If not, follow the removal procedures described in **Front Panel**, on page 2-5, and in **Lateral Panel**, on page 2-8.

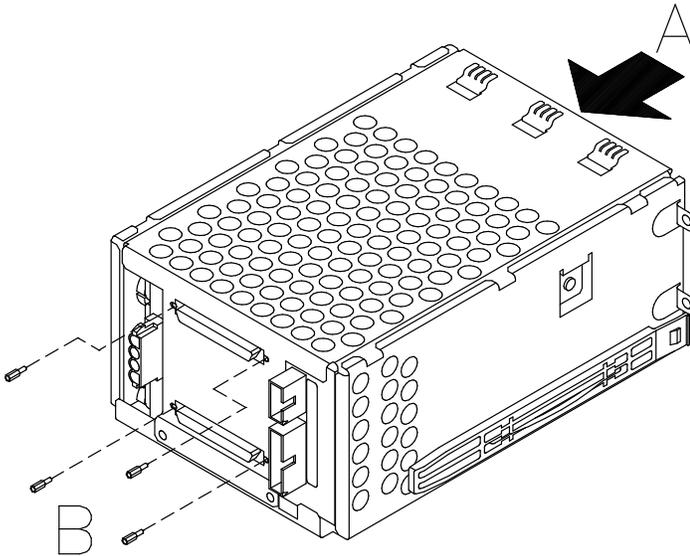
1. Remove the two metal blanks of the designated slot by loosening the screws that retain the blanks to the chassis.



2. Remove the two plastic blanks of the designated slot on the front panel.

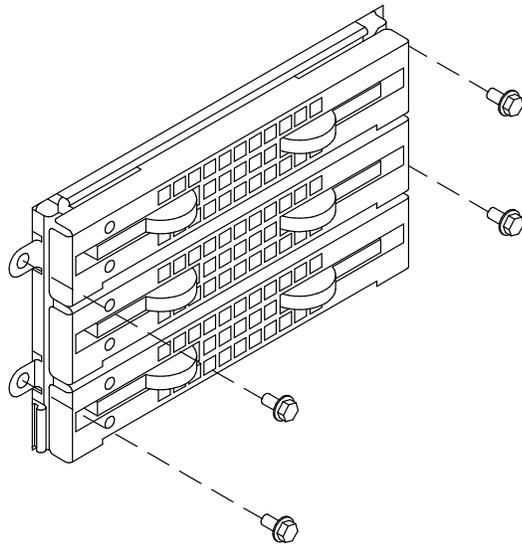
Note: It is recommended to store the metal and plastic blanks and screws for possible future re-installation.

3. Assemble the back plane and the disk cage metallic box performing the following steps:
 - a. Accessing the disk cage metallic box from the front, gently slide the back plane inside it keeping the disk carriers connectors towards the internal side of the disk cage. See A in the figure.
 - b. Secure the back plane to the disk cage metallic box, tightening clockwise the retaining screws indicated by B in the figure.

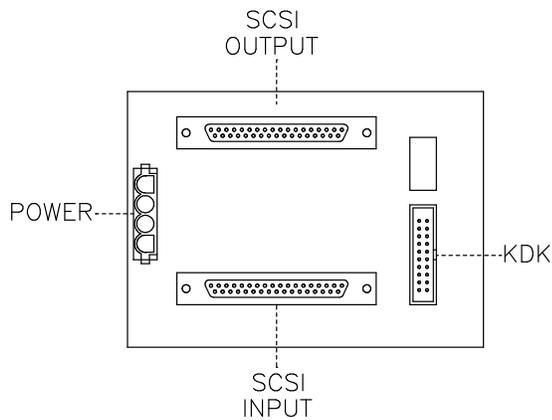


4. Install the required hard disks and disk carriers in the disk cage. For further details about this, please refer to the base unit documentation set.
5. Grip the disk cage by the edges and slide it in the slot until snaps click.

6. Tighten the retaining screws to lock the disk cage to the chassis.



7. Accessing the disk expansion unit from the right, connect the cables to the disk cage rear connectors shown in the figure. Check and perform the connection of the SCSI cables, following the rules described in **SCSI Cables Description and Connection**, on page 3-1.



8. Install the front panel and the right lateral panel, as described in **Front Panel**, on page 2-7, and **Lateral Panel**, on page 2-9.
9. Perform the **Restart Operations**, as described on page 2-10.

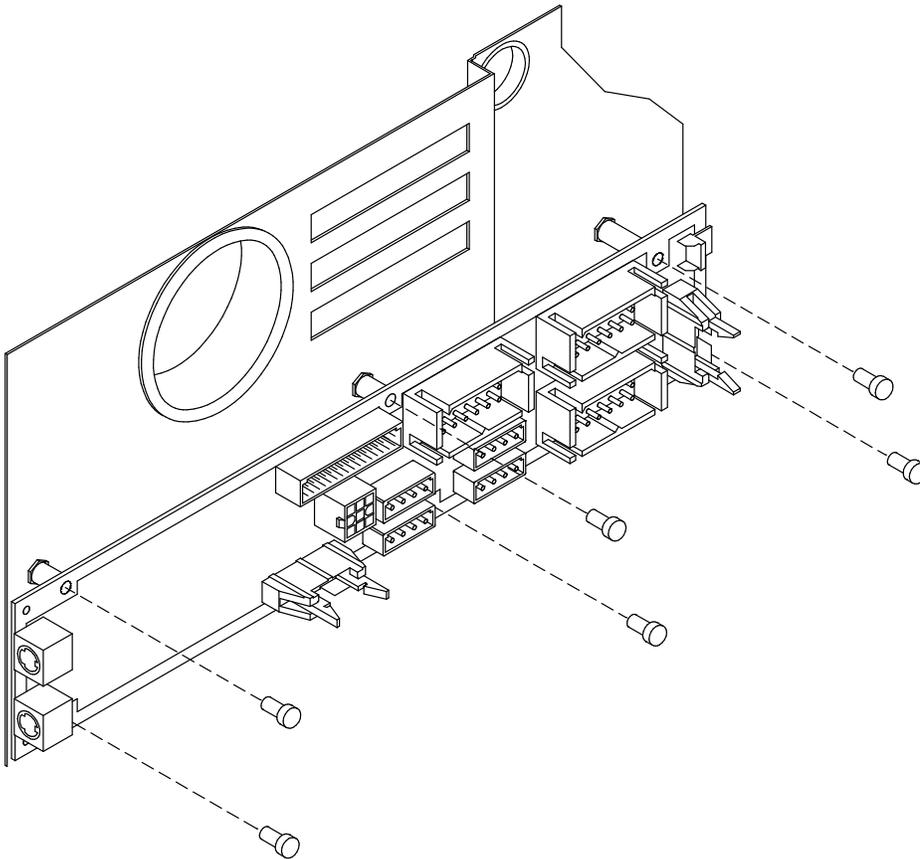
KDD Card

- **Removal**, below
- **Installation**, on page 2-20.

Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

Removal

1. Remove the left lateral panel of the disk expansion unit, as described in **Lateral Panel**, on page 2-8.
2. Unplug any connector attached to the KDD card. Keep trace of these connections.
3. Loosen the retaining screws to unlock the KDD card from the disk expansion unit middle wall.



4. Remove the KDD card from the disk expansion unit.

Installation

1. From the left side of the unit, locate the position for the KDD card in the upper part of the disk expansion unit middle wall.
2. Secure the KDD card to the disk expansion unit middle wall, tightening clockwise its retaining screws.
3. Plug in all the interconnection cables previously disconnected.
4. Re-install the lateral panel, as described in **Lateral Panel**, on page 2-9.
5. Perform the **Restart Operations**, as described on page 2-10.

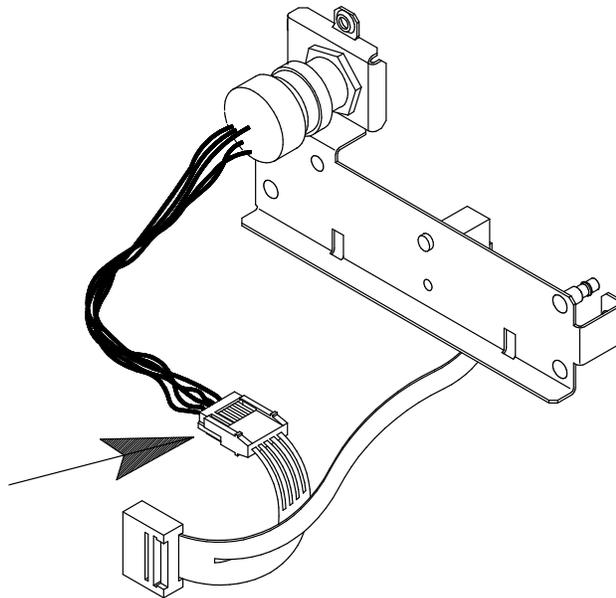
Key Mode Switch

- **Removal**, below
- **Installation**, on page 2-23.

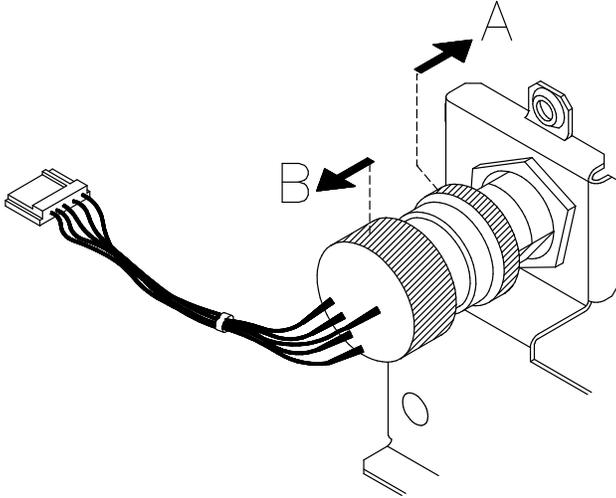
Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

Removal

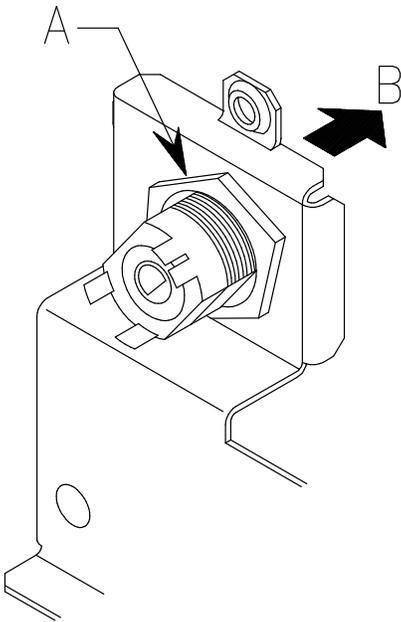
1. Remove the front panel from the disk expansion unit as described in **Front Panel**, on page 2-5, and then remove the left lateral panel, as described in **Lateral Panel**, on page 2-8.
2. Remove the operator panel from the disk expansion unit, following the instructions given in **Operator Panel, Removal**, on page 2-27.
3. Unplug the cable connector of the key mode switch, as shown in the figure.



4. Firmly grip the ring nut of the key mode switch and pull it, as indicated by the arrow (A). The back of the key mode switch will be released; pull it in the opposite direction and remove it, as shown at B.



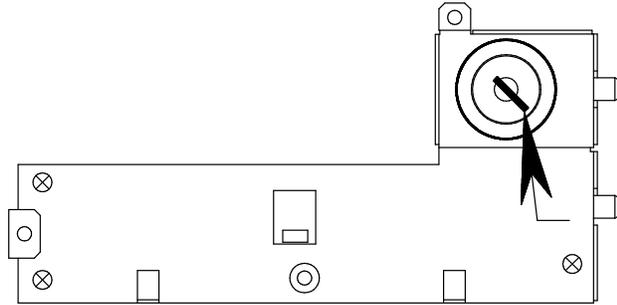
5. Loosen the indicated nut, which secures the key mode switch to the metallic frame, as indicated at A in the figure. Then pull the key mode switch out of the metallic frame, as shown at B.



Installation

1. Insert the key mode switch in the dedicated opening, on the metallic frame that also contains the operator panel.

The keyhole must be kept in the position indicated in the figure, to install correctly the key mode switch.



2. Secure the key mode switch to the relevant back part, by means of its ring nut.
3. Connect the cable connector coming from the operator panel to the key mode switch.
4. Re-install the operator panel. For details, please refer to **Operator Panel**, on page 2-27.
5. Re-install the lateral panel, as described in **Lateral Panel**, on page 2-9.
6. Perform the **Restart Operations**, as described on page 2-10.

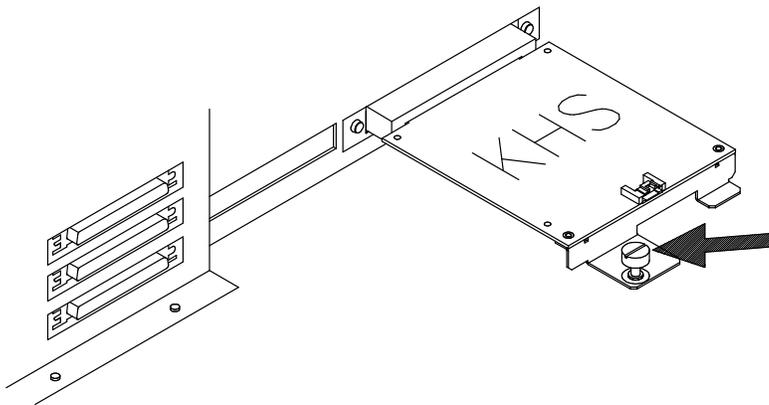
KHS Card

- **Removal**, below
- **Installation**, on page 2-25.

Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

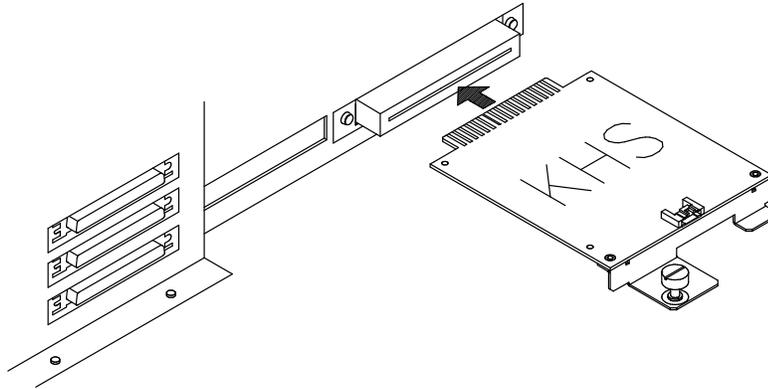
Removal

1. Remove the left lateral panel, as described in **Lateral Panel**, on page 2-8.
2. Unplug any connector attached to the KHS card.
3. Loosen the screw used to secure the KHS card to the metallic frame. Carefully grip the KHS card by its edges and remove it from the bulkhead.

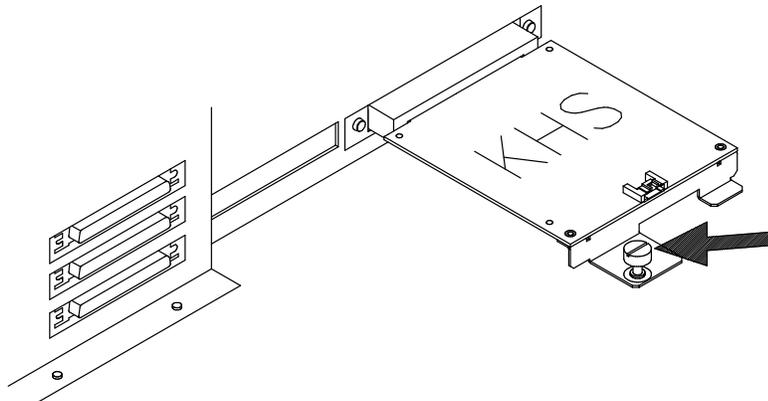


Installation

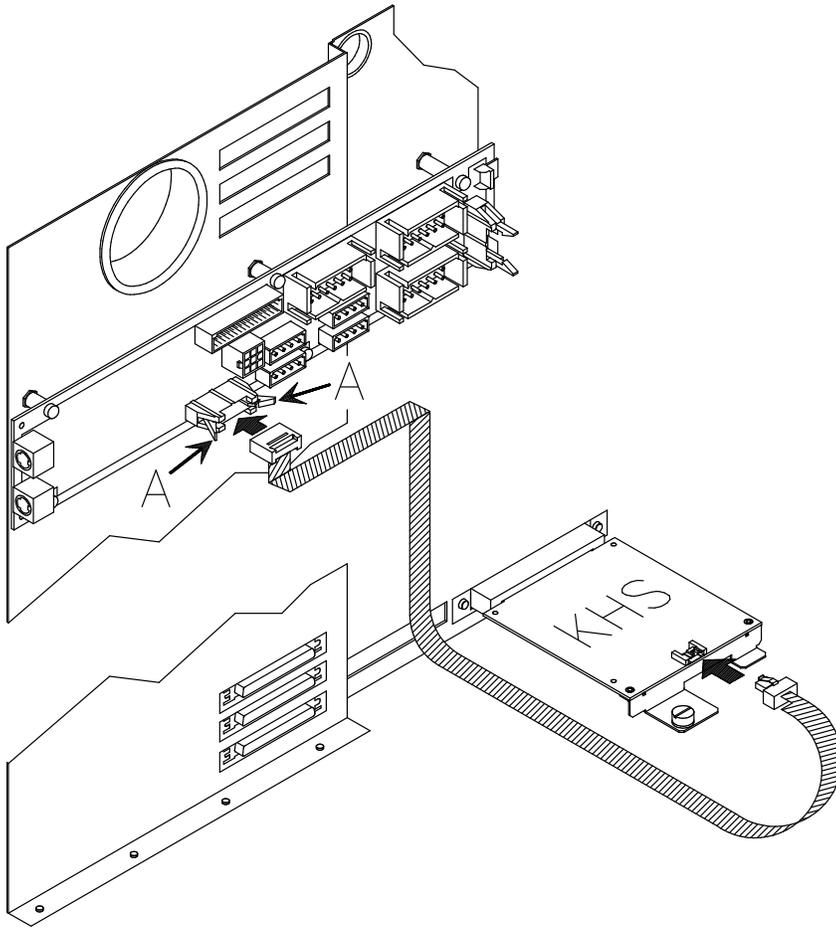
1. If not already done, remove the left lateral panel as described in [Lateral Panel](#), on page 2-8.
2. From the left side of the unit, identify the bulkhead connector dedicated to the KHS card. It is the rightmost connector in the lower part of the bulkhead.
3. Align the KHS card with the dedicated connector on the bulkhead and firmly push it until its connector is plugged in securely.



4. Secure the KHS card to the metallic frame by tightening the indicated screw.



5. Open the little levers of the KHS cable connector on the KDD card, as shown at A in the figure, and interconnect the KHS card to the KDD card by means of the appropriate cable.



6. Re-install the left lateral panel, as described in **Lateral Panel**, on page 2-8.
7. Perform the **Restart Operations**, as described on page 2-10.

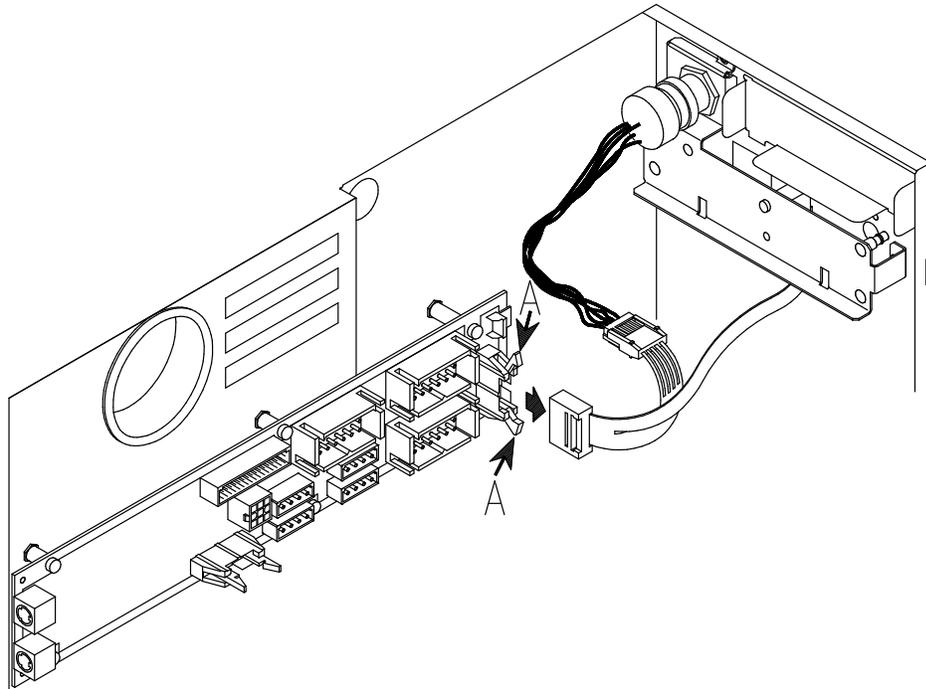
Operator Panel

- **Removal**, below
- **Installation**, on page 2-28.

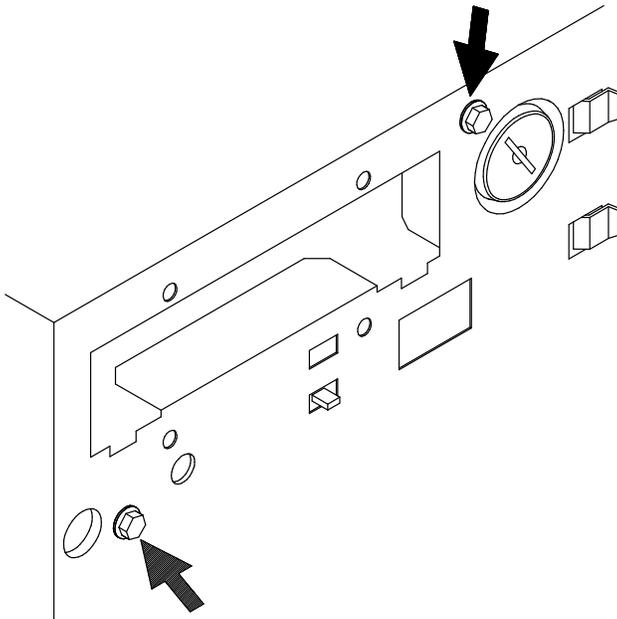
Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

Removal

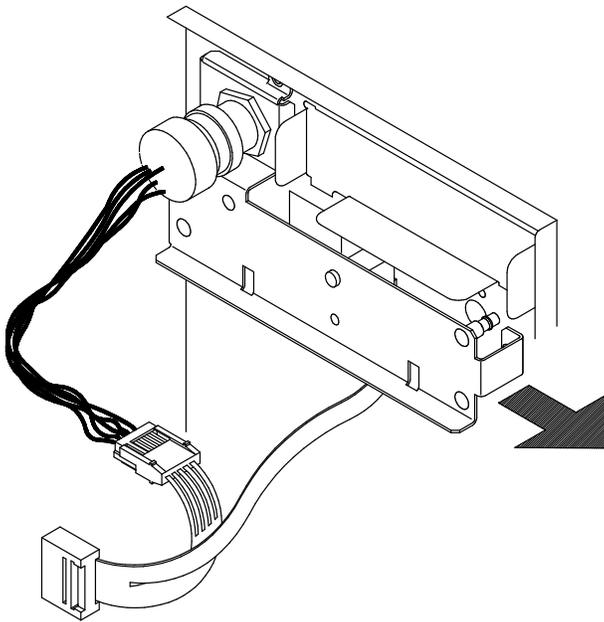
1. Remove the front panel from the disk expansion unit as described in **Front Panel**, on page 2-5, and then remove the left lateral panel, as described in **Lateral Panel**, on page 2-8.
2. From the left side of the disk expansion unit, open the retaining levers used to secure the operator panel cable connector to the KDD card. These are indicated by A in the figure. Then, unplug the protruding connector from the KDD card.



3. From the front side of the disk expansion unit, unscrew the operator panel retaining screws.



4. To release the operator panel, pull out the retainer which secures the operator panel to the disk expansion unit front, as indicated.



5. Gently slide the operator panel out of the disk expansion unit.

Installation

1. To install the operator panel, follow the steps described in the **Removal** procedure in the reverse order.
2. Perform the **Restart Operations**, as described on page 2-10.

Power Supply

- **Removal**, below
- **Installation**, on page 2-31.

Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

Note: The procedures to remove and install the power supply apply both to the standard power supply and to the redundant one.

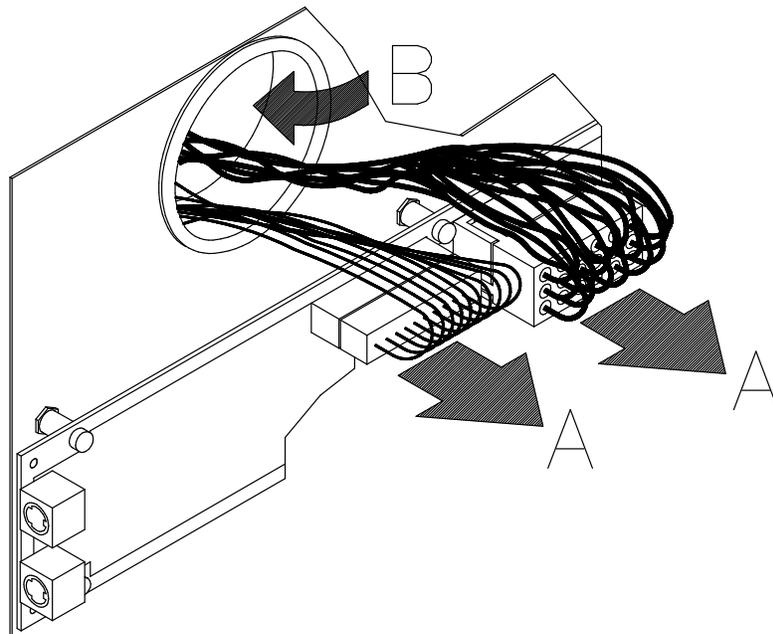
DANGER

Do not attempt to open the covers of the power supply. Power supplies are not serviceable and are to be replaced as a unit.

Removal

1. Unplug the disk expansion unit power cord from both the outlet and the unit rear side.
2. To gain access to the power supply, remove the two lateral panels, as described in **Lateral Panel**, on page 2-8.
3. From the left of the disk expansion unit, unplug the two power supply cable connectors located on the KDD card. These are indicated by A in the following figure.

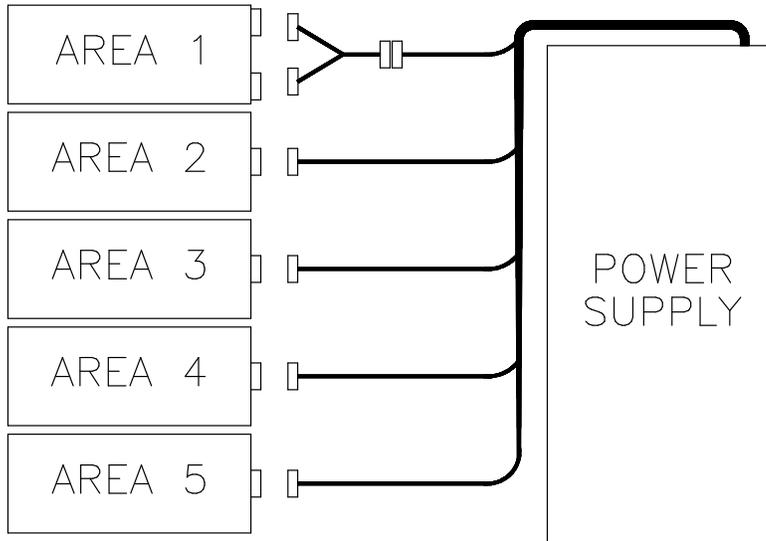
Slide the two unplugged cables through the opening of the metallic frame toward the power supply, as indicated by B in the figure.



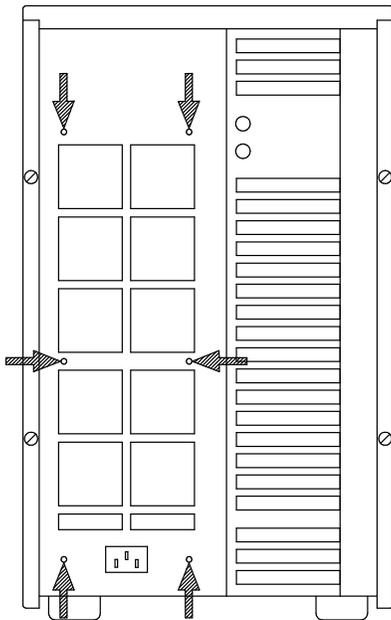
4. From the right of the disk expansion unit, unplug the device power cable connector of each disk cage and media device installed in it. Keep trace of these power connections.

The following figure shows the power distribution to the device areas. By default, it is assumed that Area 1 is occupied by any media devices, and other areas are occupied by hard disk devices.

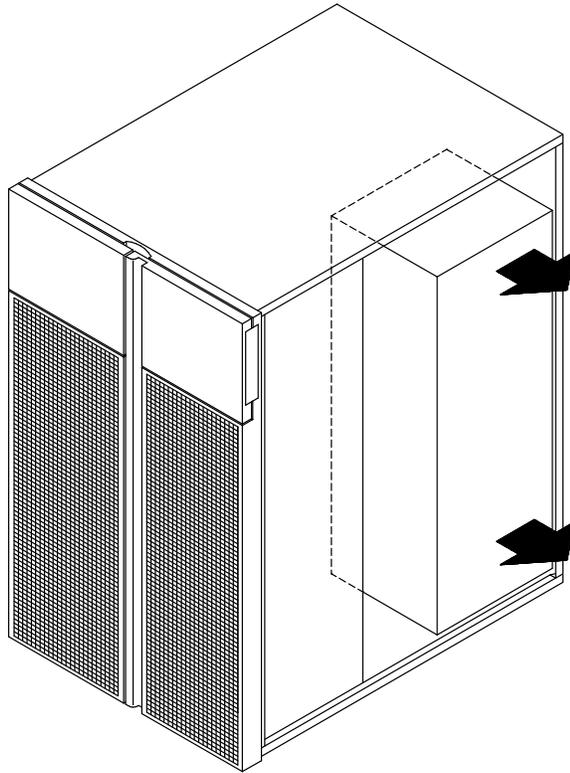
Please note that for the area housing one or more media devices, a split cable must be connected to the power cable connector corresponding to the area.



5. From the disk expansion unit rear, unscrew the retaining screws indicated by the arrows.



6. Firmly grip the power supply and remove it from the disk expansion unit.



Installation

It is presumed that the lateral panels are already removed from the system unit. If not, follow the removal procedure described in **Lateral Panel**, on page 2-8.

1. Accessing the disk expansion unit from the right, firmly grip the power supply and slide it inside the unit, making certain that the screw holes on the power supply fit the related holes at the disk expansion unit rear.

When the power supply is in place, secure it to the disk expansion unit by tightening its screws.
2. Locate the two power supply cable connectors.

Slide these two cables toward the KDD card by inserting them into the opening in the disk expansion unit chassis.
3. Plug the two power supply cables into the related connectors on the KDD card.
4. Connect the device power supply cables to each disk cage and media device installed in the disk expansion unit.
5. Plug the disk expansion unit power cord into both the outlet and the dedicated receptacle in the rear side of the unit.
6. Install the disk expansion unit lateral panels, as described in **Lateral Panel**, on page 2-8.
7. Perform the **Restart Operations**, as described on page 2-10.

SCSI Repeater

- **Removal**, below
- **Installation**, below.

Warning: Before handling any hardware component, read and perform the procedures described in **How to Handle Hardware Components**, on page 2-2, and **Preliminary Operations**, on page 2-3.

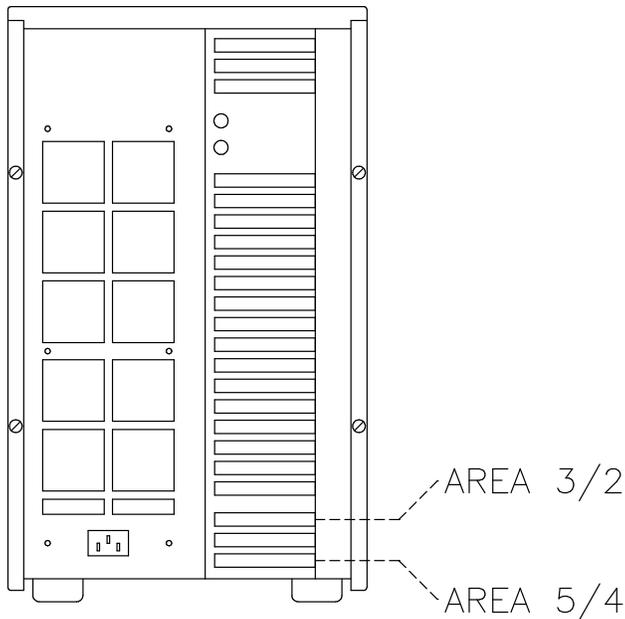
Removal

1. Unplug any cable connectors from the SCSI repeater.
2. Unscrew the SCSI repeater retaining screw, then slide the SCSI repeater out of its slot.

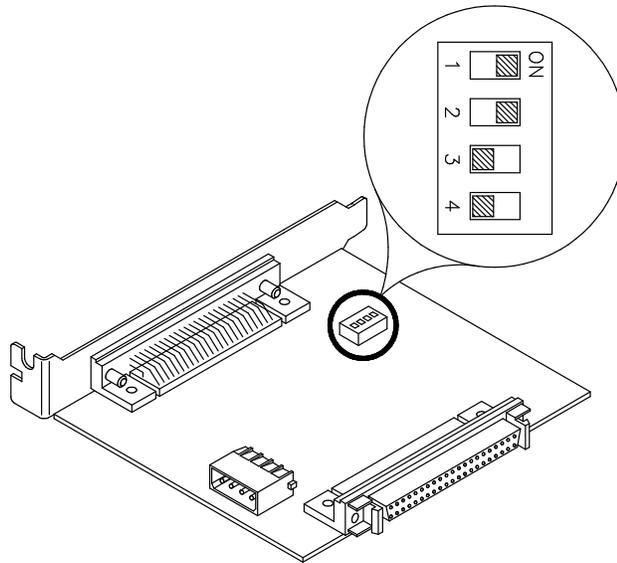
Installation

Note: Some figures in the following steps show the installation of the SCSI repeater for hard disk devices installed in Area 5 (and Area 4). The procedure related to the SCSI repeater for hard disk devices in Area 3 (and Area 2) is the same, except for the use of the connectors on the rear of the unit and on the bulkhead.

1. On the rear of the disk expansion unit, identify the connectors which are involved in the SCSI repeater installation.

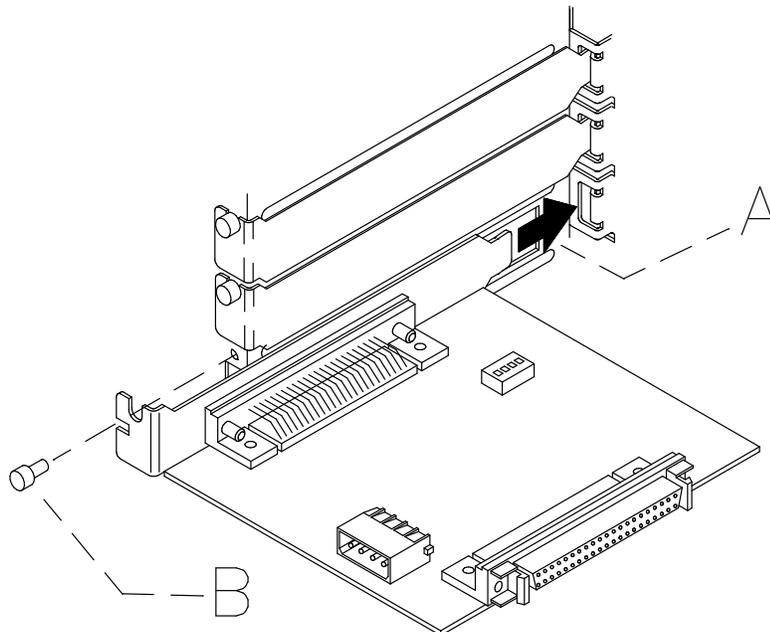


2. Before physically installing the SCSI repeater in the disk expansion unit, make sure that its switches are set as shown.

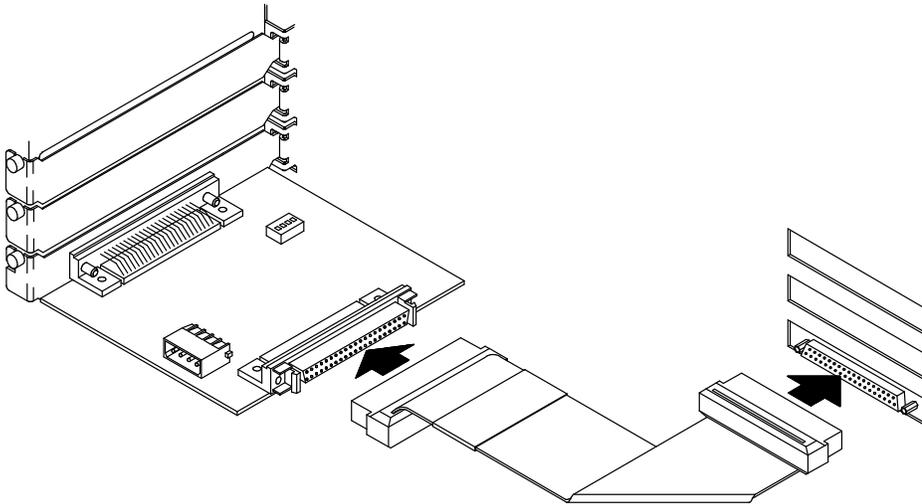


3. Install the SCSI repeater in the designated slot, as follows:

- a. Accessing the disk expansion unit from its internal side, insert the slot cover side of the SCSI repeater in the dedicated slot and slide it until it catches the unit chassis. See A in the figure.
- b. Secure the SCSI repeater by means of its retaining screw, as indicated by B.



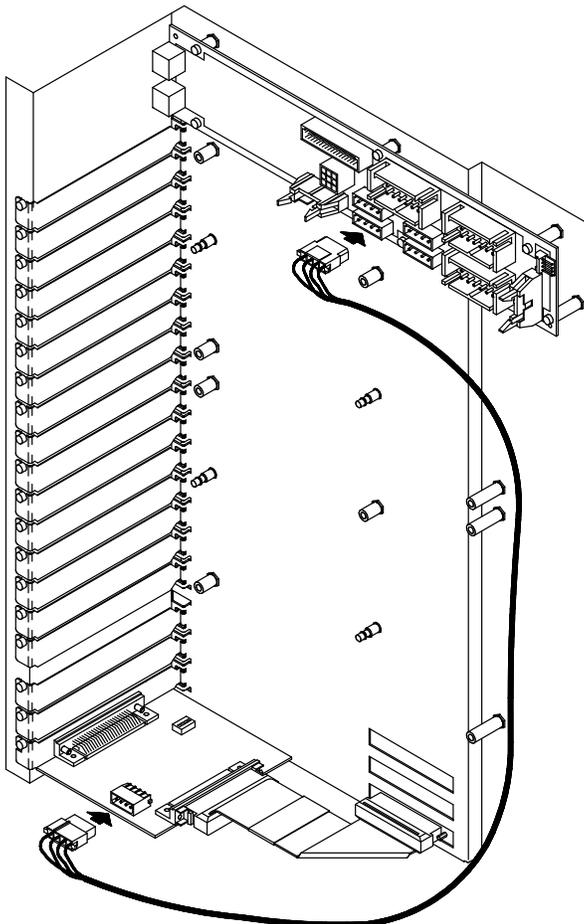
4. Connect the SCSI repeater to the dedicated connector on the unit bulkhead, by means of the appropriate cable.



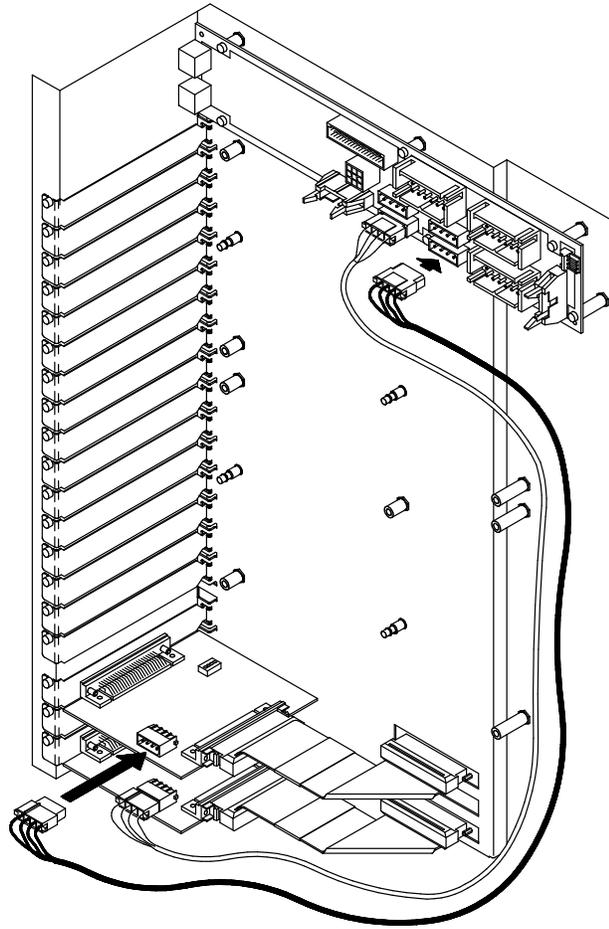
5. Connect the SCSI repeater power cable to the power connector on the SCSI repeater itself and to the dedicated one on the KDD card.

In particular, the SCSI repeater power cable must be connected differently according to the device areas the same repeater is connected to.

- a. For Areas 5 and 4, the SCSI repeater power cable must be connected as shown in the following figure.



- b. For Areas 3 and 2, the SCSI repeater power cable must be connected as shown in the following figure.



Chapter 3. SCSI Cables Description and Connection

- **Overview**, below
- **SCSI Cables Description**, on page 3-2
- **Bulkhead Location**, on page 3-4
- **SCSI Cables Connection**, on page 3-5
- **Example of SCSI Connections**, on page 3-12.

Overview

The connection rules of the SCSI cables for the disk expansion unit are described in the following paragraphs.

The connections of the various SCSI cables depend on the system configuration, i.e. which disk/media devices and how many of them are installed inside the disk expansion unit.

The disk expansion unit supports:

- Up to two media devices in Area 1
- Up to four disk cages in Areas 5, 4, 3 and 2:
 - KP2 and KP3 disk cages, with two 1.6-inch or three 1-inch ULTRA/SE disk devices, if these are the cages/devices used in the base unit
 - FD3 disk cages, with three 1-inch ULTRA-2/LVD disk devices, if these are the cages/devices used in the base unit.

RAID configurations as well as High Availability ones are supported.

Information and examples are given in this section.

SCSI Cables Description

The following table includes all SCSI cables that can be used for the disk expansion unit SCSI connections. For each SCSI cable, a brief description is given. The part number of any cable listed below is available in **Spare Parts**, on page A-1.

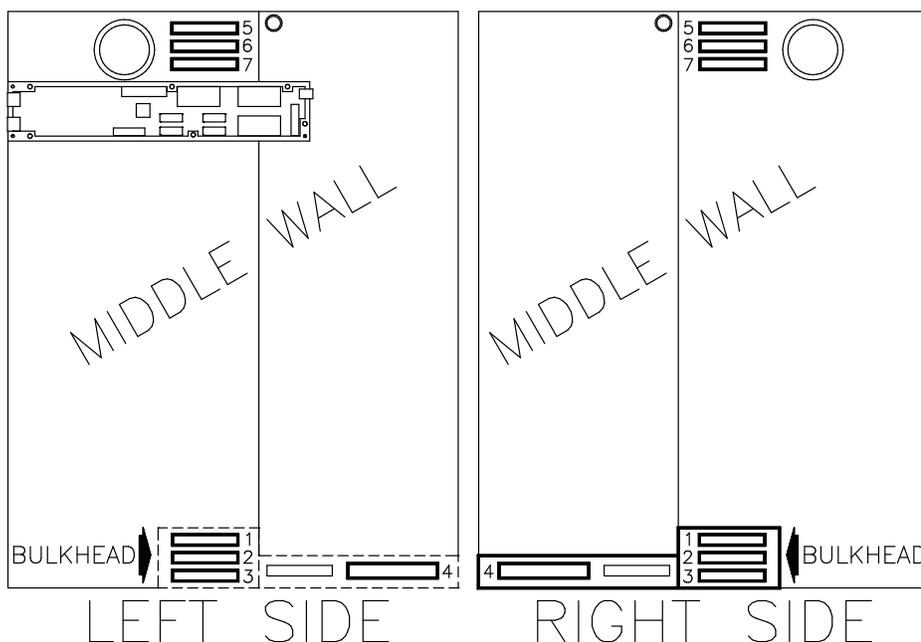
SCSI Cable	Cable Description
Area 3 Disk Cable (*)	It is used to connect the disk cage, if any, installed in Area 3.
Area 4 Disk Cable (*)	It is used to connect the disk cage, if any, installed in Area 4 in a High Availability configuration.
Area 5 Disk Cable (*)	It is used to connect the disk cage, if any, installed in Area 5.
SCSI Cable Area 2 High Availability	It is used to connect the disk cage installed in Area 2, if any, in a High Availability configuration.
Cage to Cage Jumper Cable	It is used to connect Area 3 disk cage to Area 2 disk cage and Area 5 disk cage to Area 4 disk cage.
Media Cable	It is used to connect the media devices installed in Area 1, if any, to the disk expansion unit bulkhead.
LVD/SE Terminating Plug	It is plugged into the dedicated connector on the rear of the last disk cage of a ULTRA-2/LVD disk bus, to terminate it.
SE Terminating Plug	It is plugged into the dedicated connector on the bulkhead, to terminate the media bus. It is plugged into the dedicated connector on the rear of the last disk cage of a ULTRA/SE disk bus, to terminate it.
KDK Complex (*)	It is composed of the KDK card and four flat cables connected to the KDK card and to the disk cages. It is plugged into the bulkhead's leftmost connector on the disk expansion unit right side. In addition, it houses the SCSI reset cable, which is connected to the KDD card.
Base Unit to Disk Expansion Unit SCSI Cable for Standard Connections	It is used for standard connections, to connect the dedicated controller on the base unit to the corresponding SCSI connector on the rear of the disk expansion unit.
Rear to Bulkhead SCSI Cable	It is used to internally connect each SCSI connector on the rear of the disk expansion unit, which is connected to the base unit through a dedicated controller, to the corresponding connector on the disk expansion unit bulkhead, to manage the media devices.
Rear to Bulkhead SCSI-LVD Cable	It is used to internally connect each SCSI connector on the rear of the disk expansion unit, which is connected to the base unit through a dedicated controller, to the corresponding connector on the disk expansion unit bulkhead, to manage the disk devices.
PassThru Terminator Cable	It is used to interconnect disk expansion and base units in High Availability configurations. This cable is equipped with an embedded active terminator named External SCSI Terminating Plug (or PassThru Terminator).
H.A. Wrap Plug	It is used to disable the controller internal terminator and is plugged either on the controller itself or on the internal SCSI cable for controller to bulkhead connection in High Availability configurations.

- (*) These cables are part of the bulkhead SCSI cables sub-assembly and are always pre-installed inside the disk expansion unit by the manufacturer. Their use does not depend on the system configuration.

Bulkhead Location

Each SCSI connection inside the disk expansion unit is performed through the bulkhead. The bulkhead is composed by seven SCSI input openings which are located at both the bottom and the top of the expansion unit middle wall, and are accessible from both the left and the right side of the unit. These host the SCSI cable connectors according to the unit configuration.

Disk Expansion Unit Bulkhead



The following table summarizes the possible use of these bulkhead SCSI input openings.

Bulkhead SCSI Input	Description
1	Left Side. It is connected, through the Rear to Bulkhead SCSI-LVD Cable , to a PCI controller used to control disk devices in Area 3 (and Area 2), if any. Right Side. It is connected to Area 3 Disk Cable .
2	Left Side. It is connected, through the Rear to Bulkhead SCSI Cable , to a PCI controller used to control disk devices in Area 4 in a High Availability configuration, if any. Right Side. It is connected to Area 4 Disk Cable .
3	Left Side. It is connected, through the Rear to Bulkhead SCSI-LVD Cable , to a PCI controller used to control disk devices in Area 5 (and Area 4). Right Side. It is connected to Area 5 Disk Cable .
4	Left Side. It is dedicated to the KHS card connection. Right Side. It is dedicated to the KDK complex connection.
5	Left Side. It is connected, through the Rear to Bulkhead SCSI Cable , to a SCSI controller for media devices in Area 1 (media bus input). Right Side. It is connected to the Media Cable .
6	Left Side. It hosts the media terminating plug (media bus output), when media are not shared between two base units. It is connected, through the Rear to Bulkhead SCSI Cable , to an additional SCSI controller for media devices in Area 1, when media are shared between two base units. Right Side. It is connected to the Media Cable .
7	Left Side. It is connected, through the Rear to Bulkhead SCSI Cable , to a PCI controller used to control disk devices in Area 2 in a High Availability configuration, if any. Right Side. It is connected to Area 2 Disk Cable .

SCSI Cables Connection

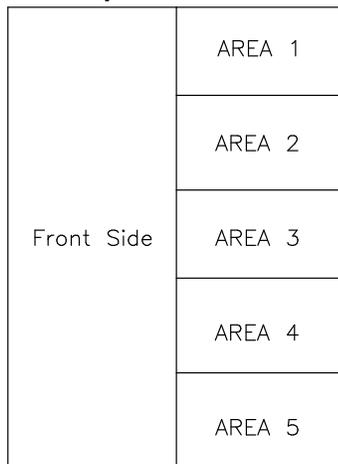
- **Introduction**, below
- **Media Cable**, on page 3-7
- **SCSI Cable (Area 2 H.A.)**, on page 3-8
- **Rear to Bulkhead SCSI Cable**, on page 3-9
- **Slot Cover**, on page 3-11.

Introduction

Disk devices can be installed in Areas 2, 3, 4 and 5. Each area can hold either up to two 1.6-inch disk devices or up to three 1-inch disk devices.

Media devices can be installed in Area 1 only. This area can hold up to two media devices.

Disk Expansion Unit Front Side

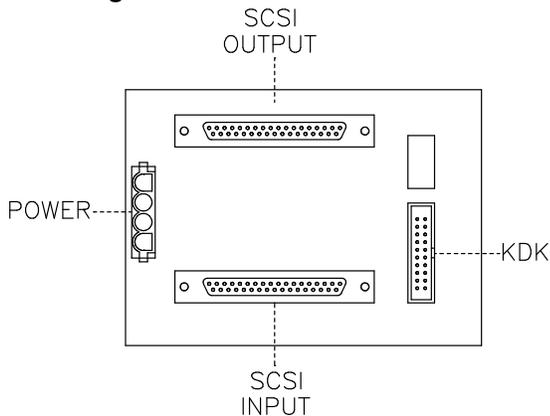


Note: Before any replacement of a disk or media device, it is strongly recommended to read carefully the description of the configuration rules given in the base unit documentation set and in the *Using the Disk Expansion Unit* guide.

Device areas of the disk expansion unit are always managed by SCSI controllers installed in the base unit.

For the disk devices, the SCSI cables must be connected to the input/output device connectors located on the rear of the disk cage housing the specified disks, as indicated below. In addition, the KDK complex cables must be connected to the rear of the disk cage(s) installed in the disk expansion unit, as shown in the figure.

Disk Cage Rear



For each media device, the SCSI cables must be connected to the dedicated input/output connectors placed on the rear of the device.

The procedures explaining how to install the various SCSI cables in the disk expansion units are detailed in the following paragraphs. In particular, the instructions needed to install the following cables are given:

- **Media Cable**, on page 3-7
- **SCSI Cable (Area 2 H.A.)**, on page 3-8
- **Rear to Bulkhead SCSI Cable**, on page 3-9.

In addition, are provided the procedures to remove and install the **Slot Cover** located on the rear side of the disk expansion unit, on page 3-11.

Schematic Procedure for SCSI Bus Activation

The following procedure summarizes the steps needed to add media or disk devices and SCSI busses to the system configuration. The objective of this procedure is just to list the needed operations, not to detail them.

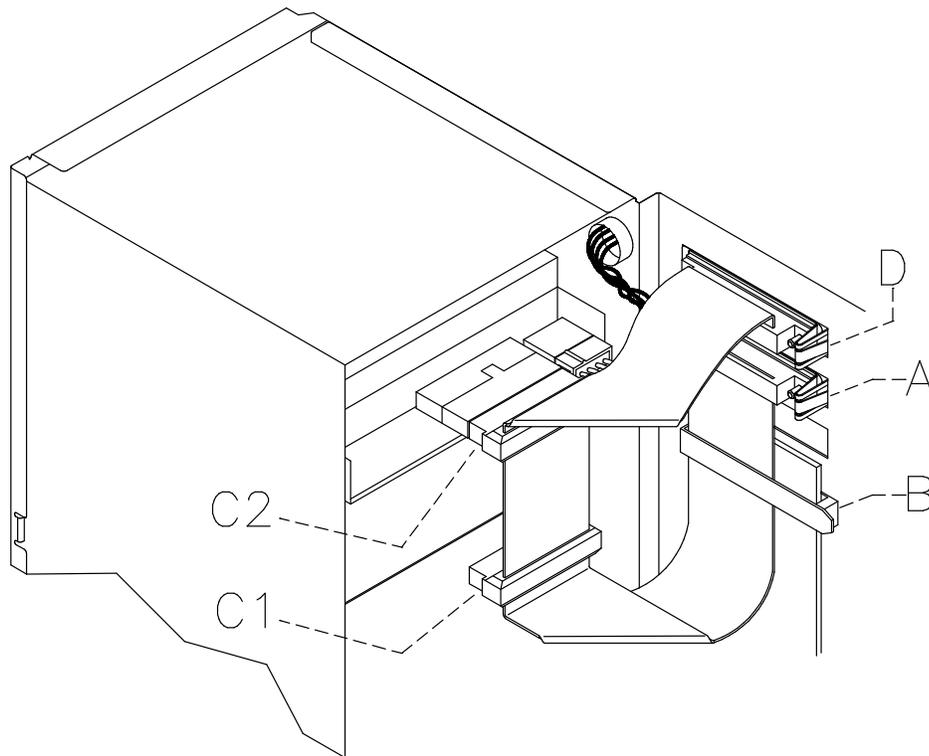
If you need to activate a new SCSI bus for the disk expansion unit:

1. Ensure the devices are properly installed in the designated area(s) of the disk expansion unit.
2. Install the appropriate PCI controller in the designated PCI slot on the base unit system planar.
3. Connect the PCI controller on the base unit to the rear of the disk expansion unit by means of the proper SCSI cable.
4. Connect the **Rear to Bulkhead SCSI Cable** to the connector on the rear of the disk expansion unit where you have just connected the **Base Unit to Disk Expansion Unit SCSI Cable**, and to the dedicated connector on the disk expansion unit bulkhead.
5. Connect the media device(s) or disk cage to the disk expansion unit bulkhead by means of the appropriate SCSI cable.
6. If you are installing two disk cages on the same bus, connect them by means of the **Cage to Cage Jumper Cable**.
7. Close the bus plugging the terminating plug either in the dedicated connector on the disk expansion unit middle wall, if it is a media bus, or in the dedicated connector on the rear of the last disk cage relevant to this bus, if it is a hard disk bus.

Media Cable

Perform the following procedure to connect the **Media Cable** to the media device(s) installed in Area 1.

1. Access the disk expansion unit from the right.
2. Connect the **Media Cable** to the dedicated output connector on the unit middle wall, as indicated by A in the figure.
3. Unanchor the plastic retainer marked with B in the figure, insert the **Media Cable** and then secure it to the bulkhead vertical structure closing the same plastic retainer.
4. Connect the **Media Cable** to the lower media device, if this is present in Area 1 (see C1 in the figure).
5. Connect the **Media Cable** to the upper media device, plugging the cable connector shown at C2 in the corresponding connector on the media device.
6. Connect the other end of the **Media Cable** to the dedicated input connector on the unit middle wall, as indicated by D in the figure.



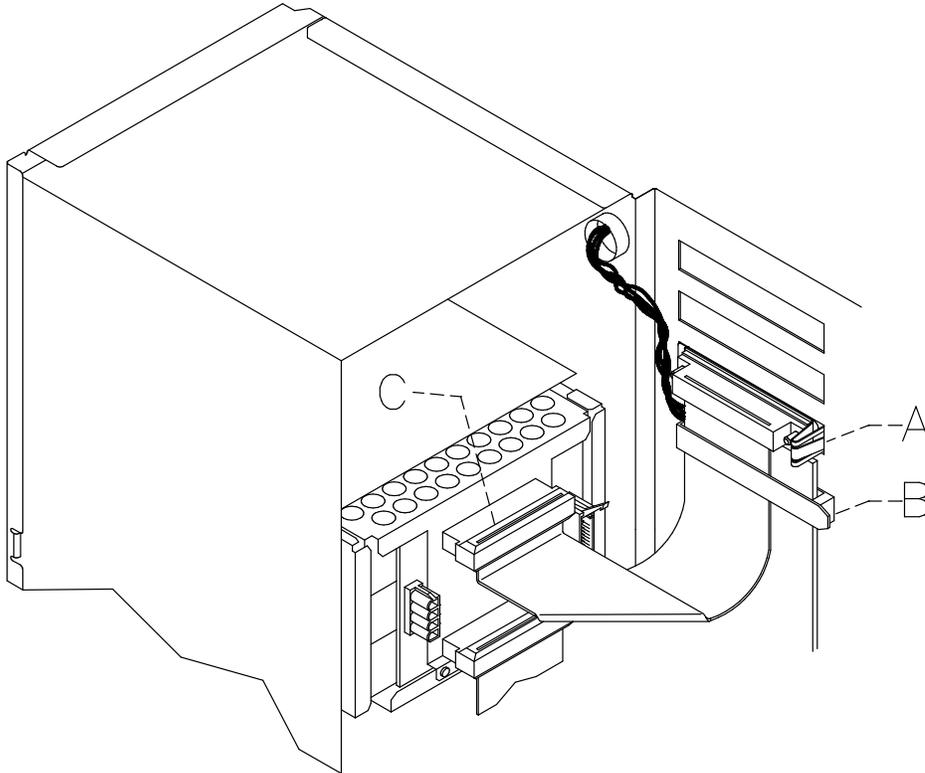
7. Now access the disk expansion unit from the left and perform the connections according to the unit configuration. Please refer to **Bulkhead Location**, on page 3-4.

SCSI Cable (Area 2 H.A.)

Connection of the Disk Cage in Area 2

Perform the following procedure to connect this **SCSI Cable** to the disk cage installed in Area 2.

1. Access the disk expansion unit from the right.
2. Connect the **SCSI Cable** to the dedicated connector on the unit middle wall, as indicated by A in the figure.
3. Unanchor the plastic retainer marked with B in the figure, insert the **SCSI Cable** and then secure it to the bulkhead vertical structure closing the same plastic retainer.
4. Connect the **SCSI Cable** to the Area 2 disk cage output connector (if the connector hosts a terminating plug, remove it), as indicated by C in the figure.



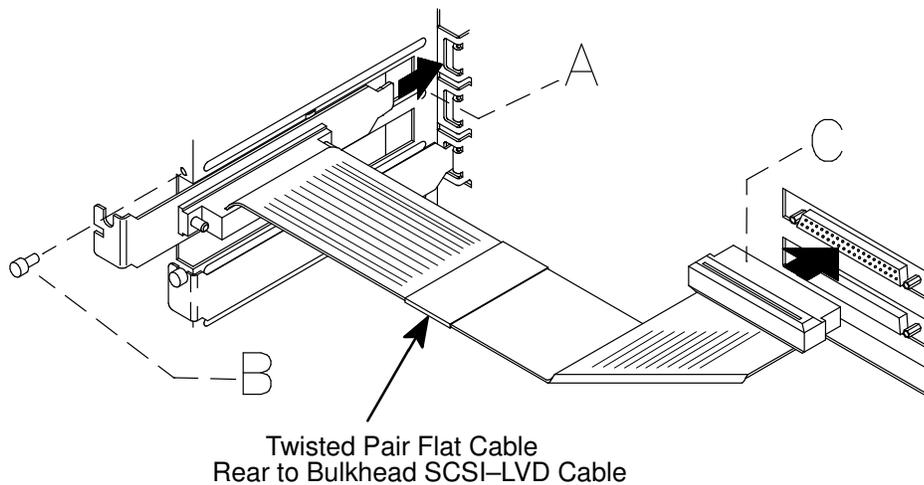
5. Now access the disk expansion unit from the left.
6. Connect the **Rear to Bulkhead SCSI Cable** to the rear of the unit and to the dedicated connector on the unit middle wall. For further information, please refer to **Rear to Bulkhead SCSI Cable**, on page 3-9.

Rear to Bulkhead SCSI Cable

Perform one of the following procedures to connect the **Rear to Bulkhead SCSI Cable** to the rear of the disk expansion unit and to the bulkhead in the dedicated connectors, according to the unit configuration.

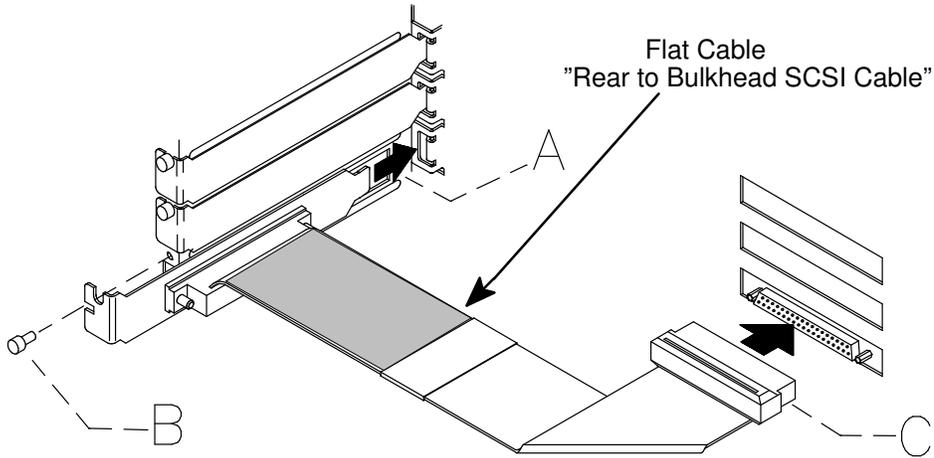
For Hard Disk Devices

1. Access the disk expansion unit from the left.
2. If not already done, remove the slot cover that protects the slot on the rear of the disk expansion unit where you are going to install the **Rear to Bulkhead SCSI-LVD cable**. For exhaustive information, please refer to **Slot Cover, Removal**, on page 3-11.
3. Install the **Rear to Bulkhead SCSI-LVD Cable** as follows:
 - a. Accessing the unit from its internal side, insert the slot cover end of the cable in the dedicated slot and slide it until it catches the unit chassis. This is shown at A in the figure.
 - b. Secure the cable to the unit chassis by means of its retaining screw, as indicated by B.
 - c. Connect the opposite end of the cable to the dedicated connector on the disk expansion unit middle wall, as shown at C.

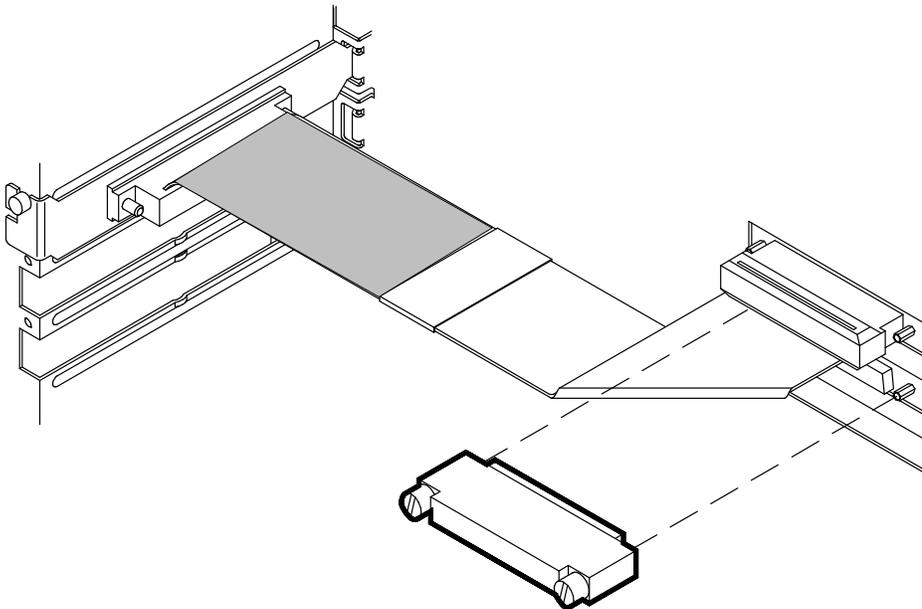


For Media Devices

1. Access the disk expansion unit from the left.
2. If not already done, remove the slot cover that protects the slot on the rear of the disk expansion unit where you are going to install the **Rear to Bulkhead SCSI Cable**. For information, please refer to **Slot Cover, Removal**, on page 3-11.
3. Install the **Rear to Bulkhead SCSI Cable** as follows:
 - a. Accessing the unit from its internal side, insert the slot cover end of the cable in the dedicated slot and slide it until it catches the unit chassis. This is shown at A in the figure.
 - b. Secure the cable to the unit chassis by means of its retaining screw, as indicated by B.
 - c. Connect the opposite end of the cable to the dedicated connector on the disk expansion unit middle wall, as shown at C.



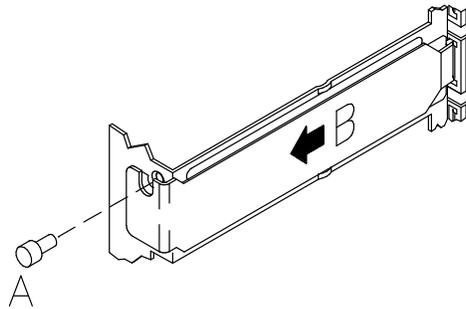
4. Plug the terminating plug into the SCSI output connector on the unit middle wall, as shown in the figure, unless you are going to share the media devices between two base units. In this case you need to install an additional **Rear to Bulkhead SCSI Cable**, instead of the terminating plug.



Slot Cover

Removal

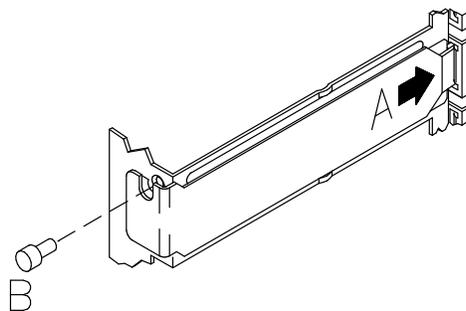
1. Loosen the retaining screw that secures the slot cover to the designated slot. This is shown at A in the figure.
2. Slide the slot cover out of the slot, following the direction indicated at B.



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

Installation

1. Accessing the disk expansion unit from the internal side, insert the slot cover in the free slot and slide it until it catches the unit chassis. See A in the figure.
2. Secure the slot cover to the unit chassis by means of its retaining screws, as indicated at B.



Warning: For safety and cooling reasons, it is strongly recommended to install a slot cover in any free opening on the disk expansion unit rear side.

Examples of SCSI Connections

This section provides some examples of SCSI connections, also including connections in RAID and High Availability configurations. These do not include all possible disk/media device configurations, but they should represent an easy template to help you in performing the SCSI connections both inside the disk expansion unit and between the base unit and the disk expansion one.

Notes:

1. The drawings of the following examples show a specific base unit model but the connections they show are valid for any base unit, unless otherwise specified.
2. The positions of the SCSI controllers shown in the following examples are not to be considered as mandatory positions. The SCSI controllers for the management of a disk expansion unit can be installed in any available slot. Please, refer to the base unit documentation set for any specific constrain related to the configuration of the controller area.
3. For the examples related to both standard and RAID configurations, which show the connection between one base unit and one (or two) disk expansion unit(s), make sure the RS-485 units interconnection has been properly performed.

The RS-485 interconnection is not required for High Availability configurations.

For detailed information about the RS-485 units interconnection, please refer to the *Disk Expansion Unit Quick Set Up* leaflet.

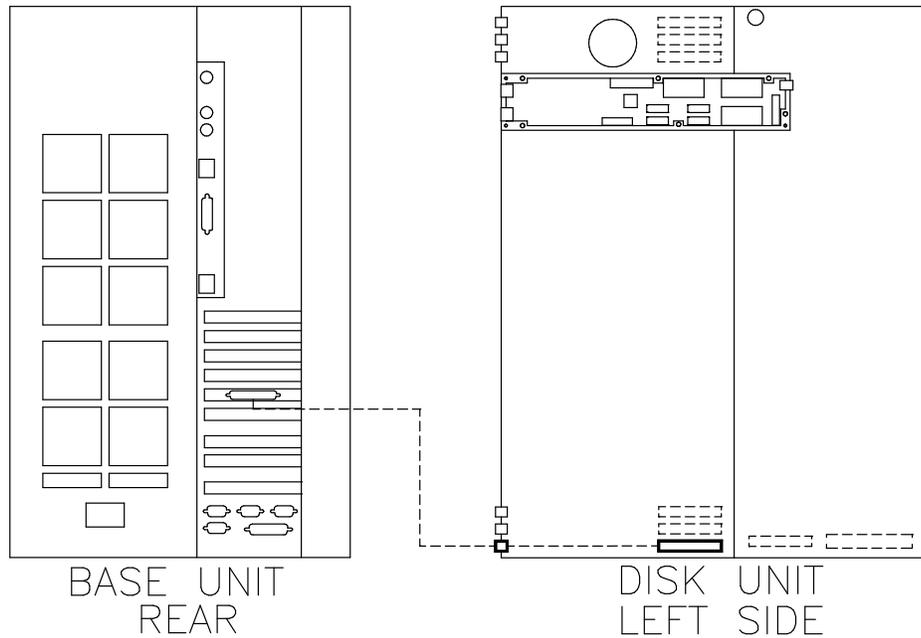
The following examples are given:

- Connections in standard configuration:
 - **Connection of Disk Devices in Area 5 (and Area 4)**, on page 3-13
 - **Connection of Disk Devices in Area 3 (and Area 2)**, on page 3-14
 - **Connection of Media Devices in Area 1**, on page 3-15
 - **Connection of Disk Devices in Areas 5, 4, 3 and 2, and Media Devices in Area 1**, on page 3-16
 - **Connection of Two Disk Expansion Units**, on page 3-17.
- Connections in RAID configuration:
 - **Connection of Disk Devices in Areas 5, 4, 3 and 2 in a RAID configuration**, on page 3-18.
- Connections in High Availability configuration:
 - **One Disk Expansion Unit Shared between Two Base Units**, on page 3-21.

Connections in Standard Configuration

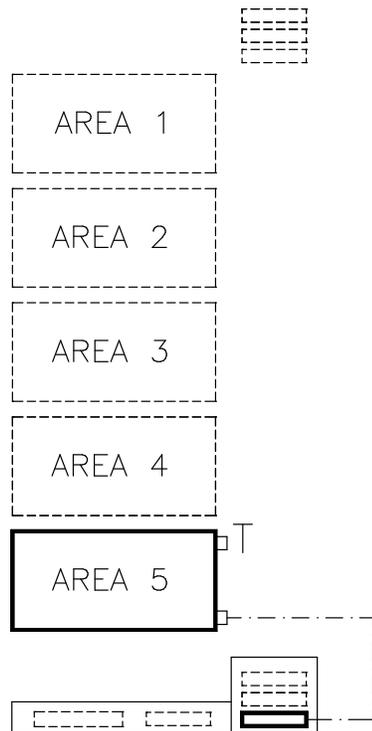
Connection of Disk Devices in Area 5 (and Area 4)

Perform the connection between the base unit and the disk expansion unit as shown.

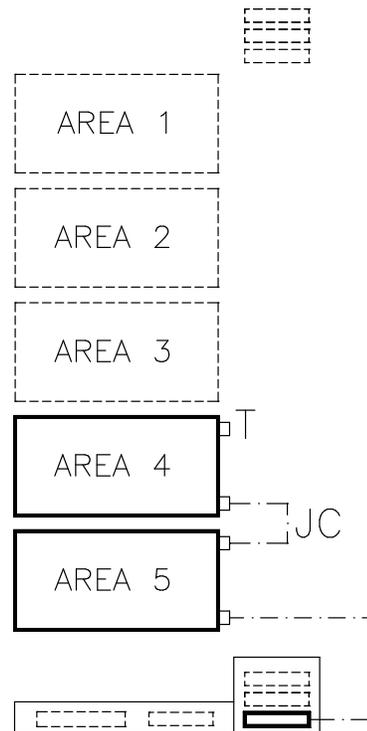


Then, connect the required disk devices as indicated in the following figure.

Minimum Configuration



Maximum Configuration

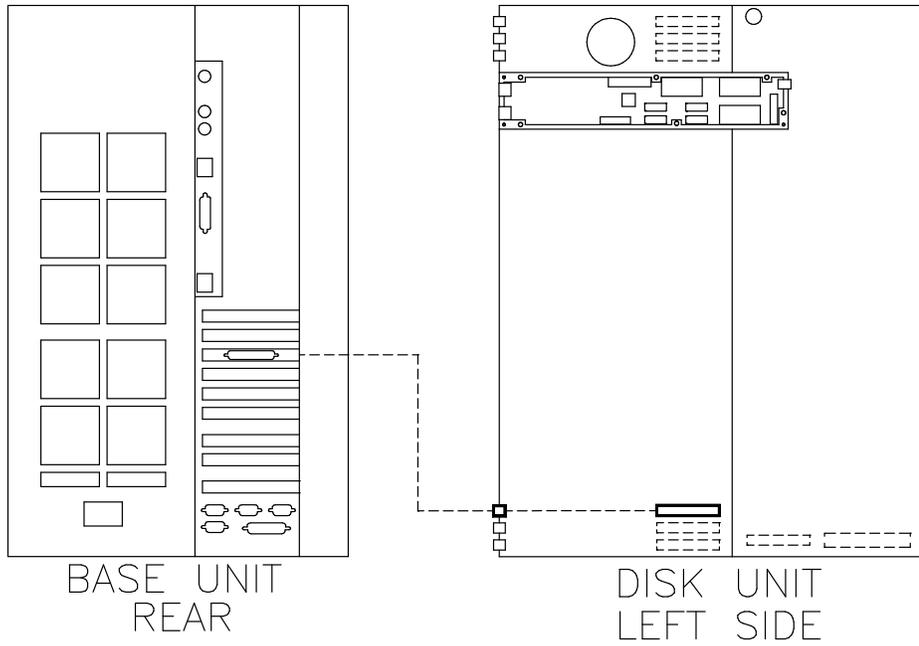


Legend:

- T** Terminating Plug
- JC** Jumper Cable

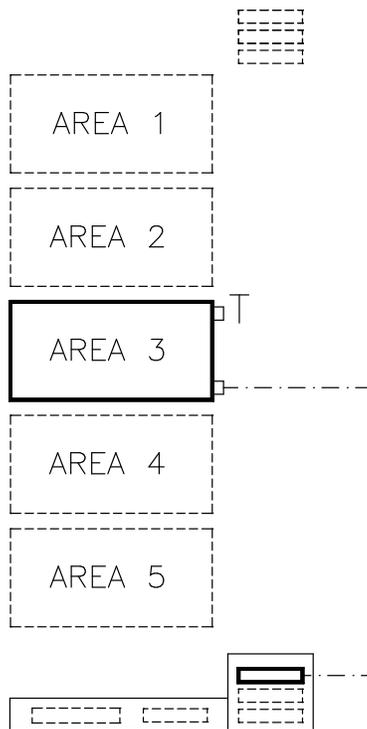
Connection of Disk Devices in Area 3 (and Area 2)

Perform the connection between the base unit and the disk expansion unit as shown.

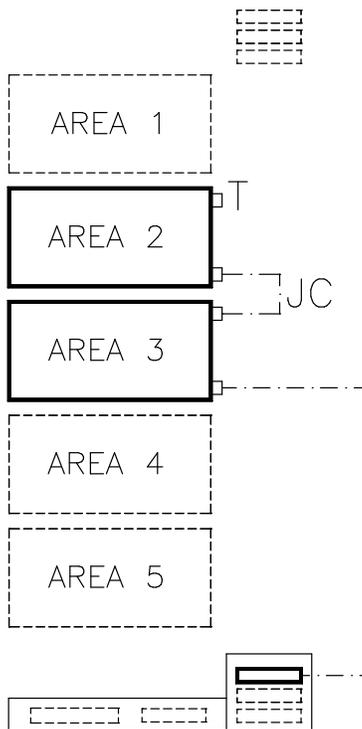


Then, connect the required disk devices as indicated in the following figure.

Minimum Configuration



Maximum Configuration

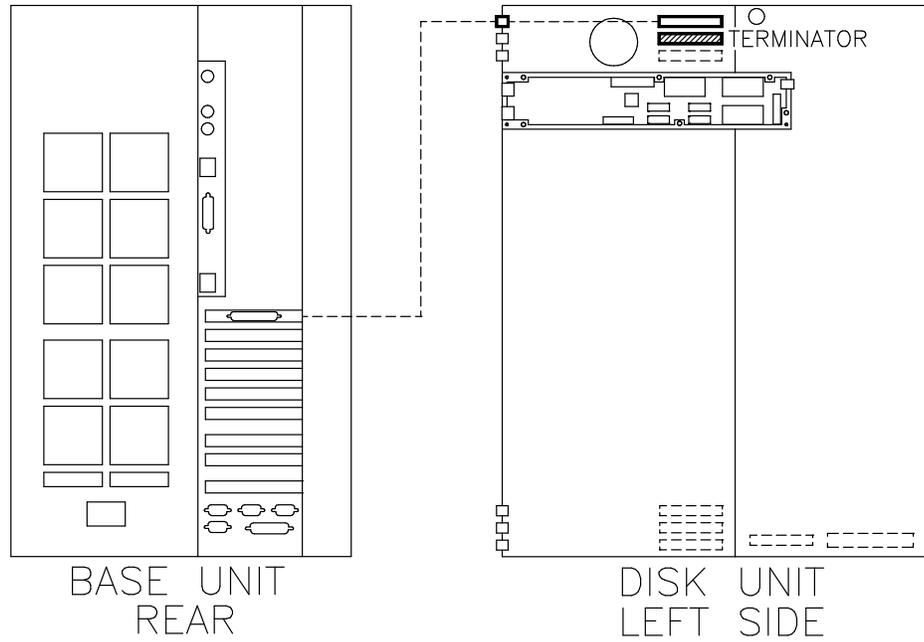


Legend:

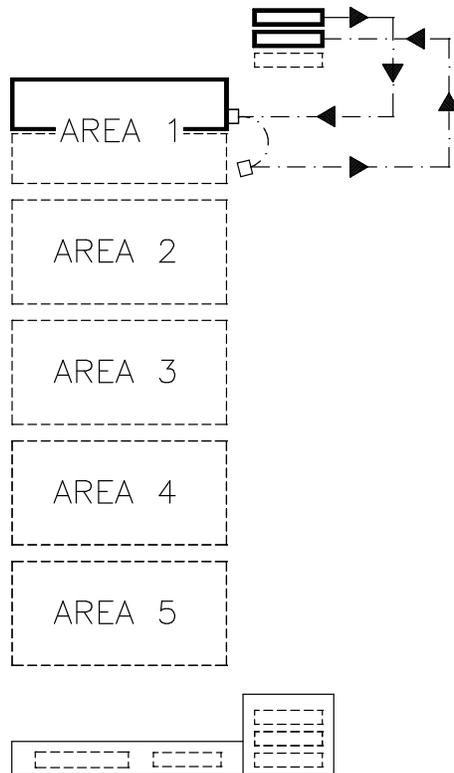
- T** Terminating Plug
- JC** Jumper Cable

Connection of Media Devices in Area 1

Perform the connection between the base unit and the disk expansion unit as shown.

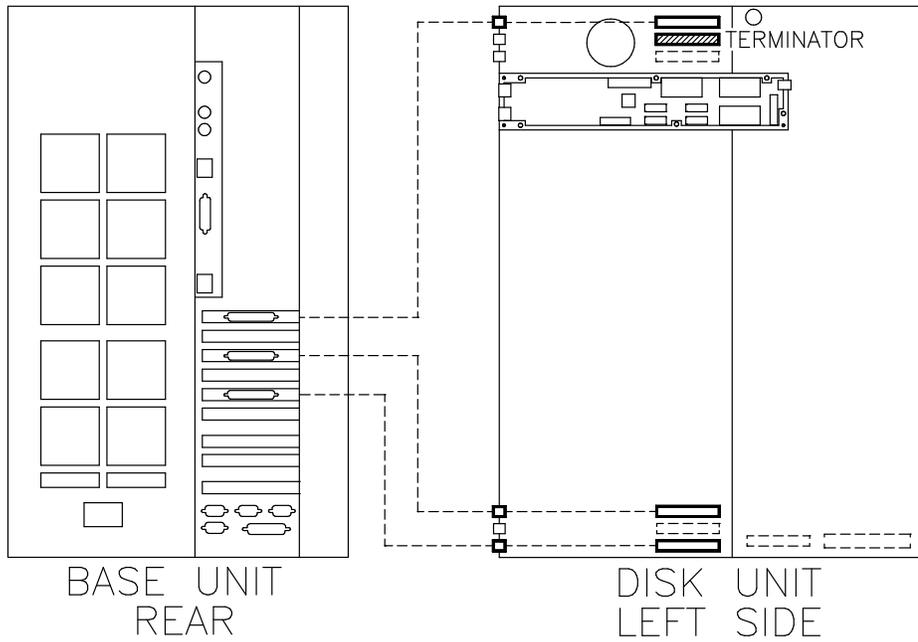


Then, connect the required media device(s) as indicated in the following figure.

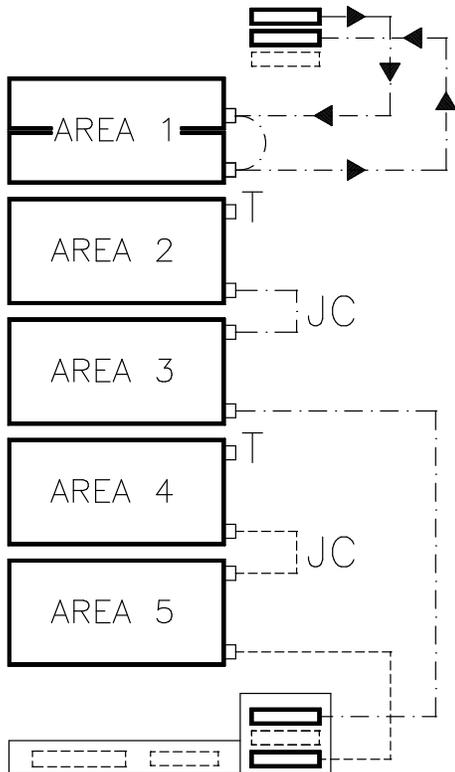


Connection of Disk Devices in Areas 5, 4, 3 and 2, and Media Devices in Area 1

Perform the connection between the base unit and the disk expansion unit as shown.



Then, connect the required disk and media devices as indicated in the following figure.



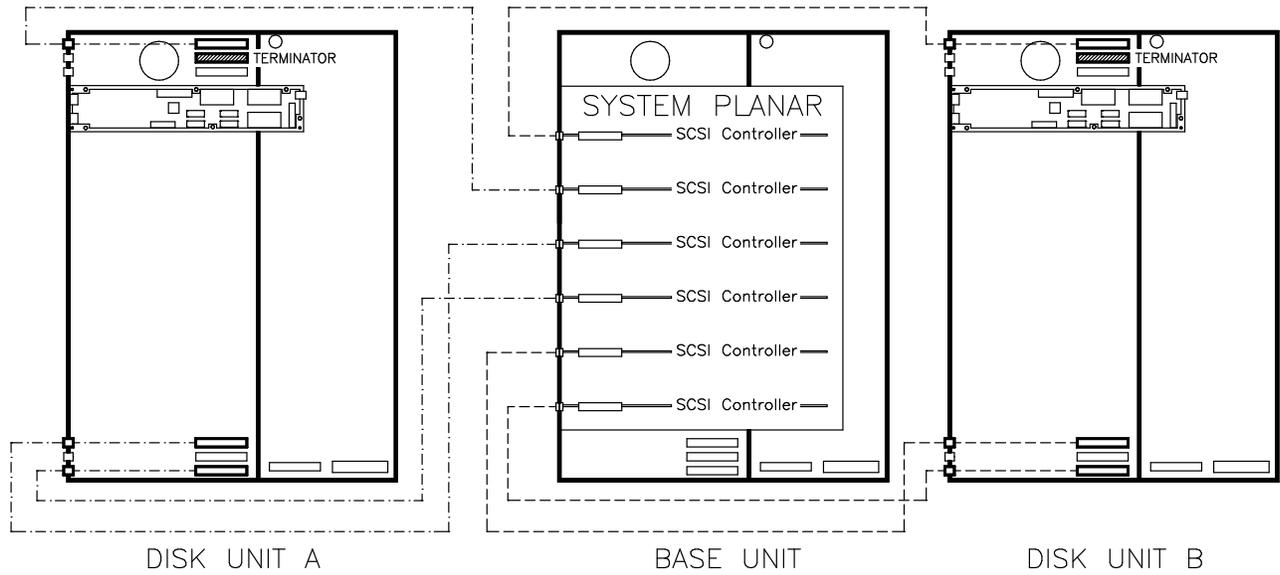
Legend:

- T Terminating Plug
- JC Jumper Cable

Connection of Two Disk Expansion Units

Perform the connection between the base unit and two disk expansion units as shown. Notice that it is mandatory to place the base unit between the two disk expansion units.

For the connections inside each disk expansion unit, please refer to the previous examples.



Connections in RAID Configuration

Connection of Disk Devices in Areas 5, 4, 3 and 2 in a RAID Configuration

Perform the following steps to accomplish this connection.

1. Make sure that a RAID controller able to manage two SCSI busses is properly installed in the base unit.

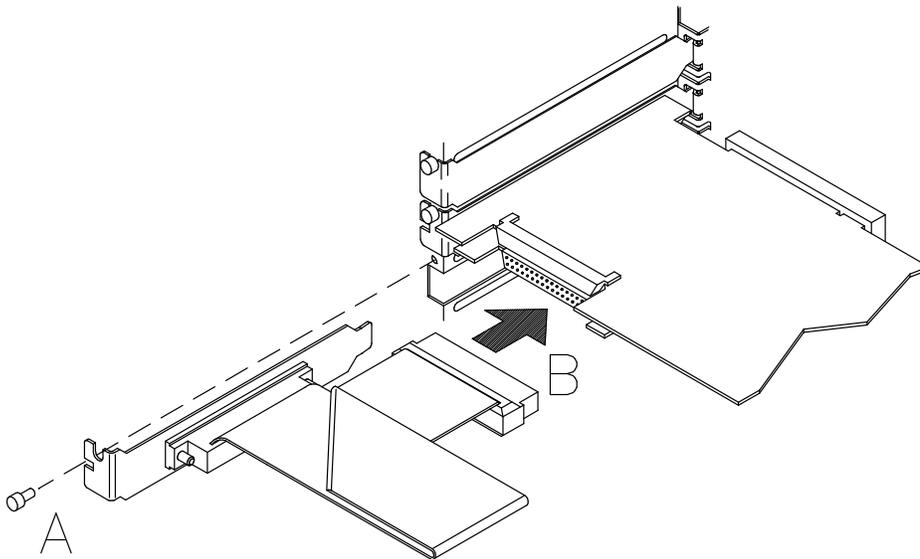
The RAID controller needed for this configuration must be composed of two cards, one mother and one daughter card.

No additional operation is required for the RAID controller mother card inside the base unit.

The text below in Step 1 is only applicable to the SCSI RAID PCI Adapter Type B4-4.

On the contrary, the daughter card must be connected to the rear side of the base unit by means of the **Rear to Bulkhead SCSI Cable**. This cable must be folded and connected as follows:

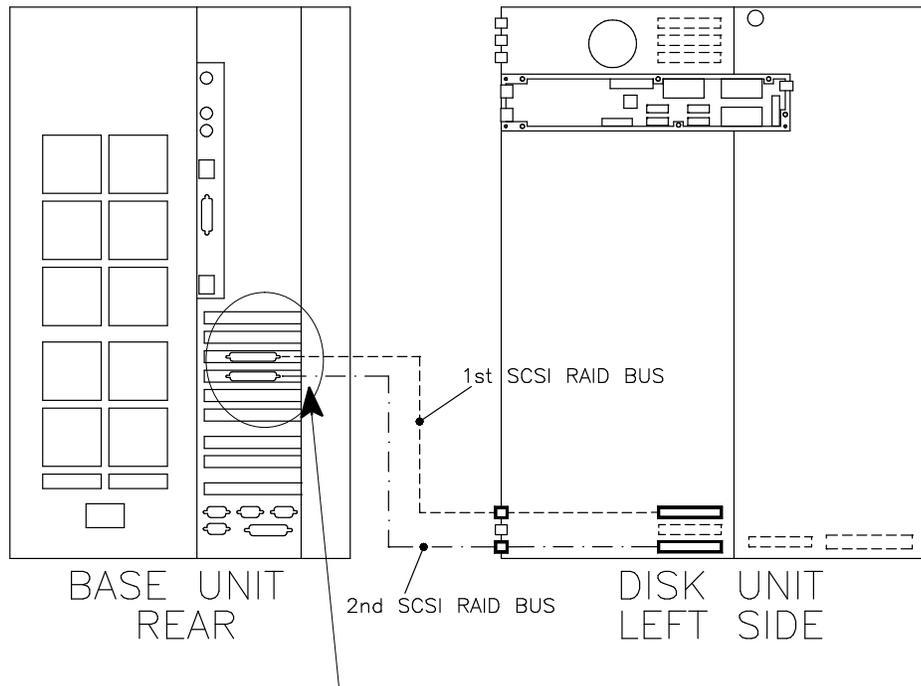
- a. Accessing the unit from its internal side, insert the slot cover end of the cable in the dedicated slot and slide it until it catches the base unit chassis, then secure it by means of its retaining screw. See A in the figure.
- b. Connect the opposite end of the cable to the dedicated connector on the RAID controller daughter card, as shown at B.



You do not need to add a cable from the daughter board to the rear of the Ultra2-LVD SCSI RAID Adapter Type B4-C.

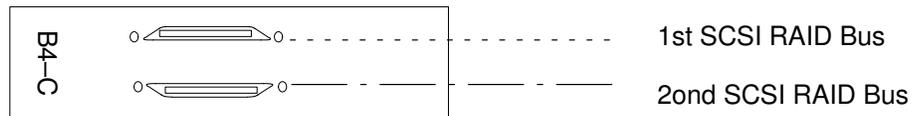
2. On the disk expansion unit left side, ensure that the KHS card is connected to the rightmost connector on the bulkhead. If you need exhaustive information about the installation of the KHS card, please refer to **KHS Card, Installation**, on page 2-25.

3. Now, perform the connections between the base unit and the disk expansion unit as shown.

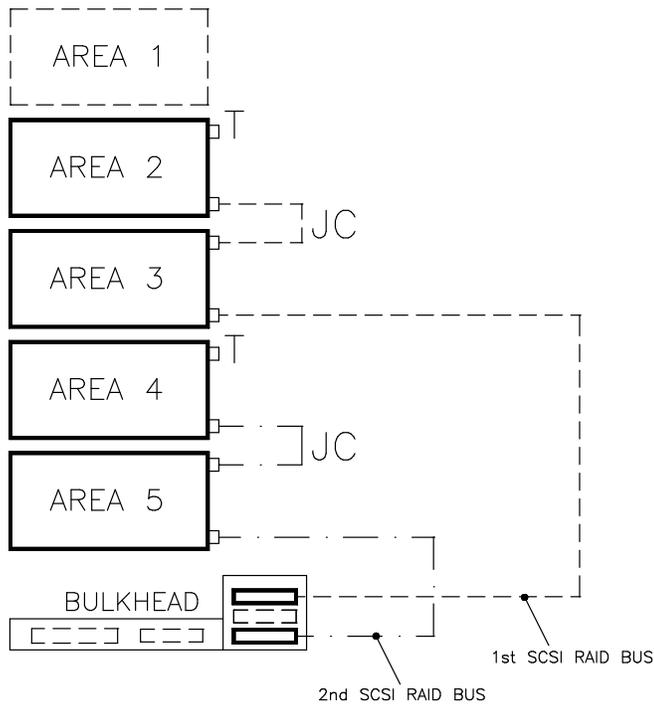


For an SCSI RAID PCI Adapter B4-4

For an Ultra2 SCSI RAID Adapter Type B4-C, both connectors are on the same adapter as shown below.



4. Connect the required disk devices as indicated in the following figure.



Legend:

T Terminating Plug

JC Jumper Cable

Connections in 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 any additional information.
2. High Availability configurations are not supported by RAID controllers.
3. Even though the principles of the High Availability connections shown in this example are always valid, some base unit internal connection details might be not fully applicable to your base unit model. If you need detailed information about the base unit SCSI connections, please refer to its specific maintenance and service documentation.

One Disk Expansion Unit Shared Between Two Base Units

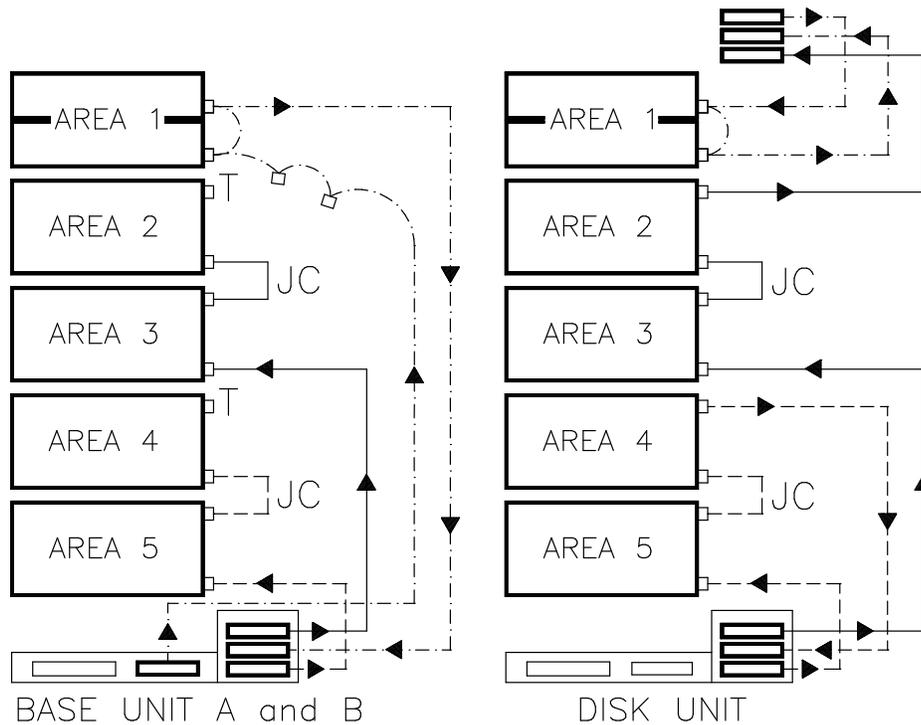
This example shows the connection of a disk expansion unit with two base units in a High Availability configuration.

Note: Smaller High Availability configurations are allowed.

In this configuration, the hard disk devices installed in Areas 3 and 2 of each base unit are mirrored with the hard disk devices installed in the disk expansion unit. In addition, the media devices installed in Area 1 of the disk expansion unit are shared between the two base units connected to it.

Perform the following steps to accomplish the connections relevant to this configuration.

1. Access both base units and the disk expansion unit from the right side.
2. Make the bulkhead to device area connections, as indicated in the following figure.



Legend:

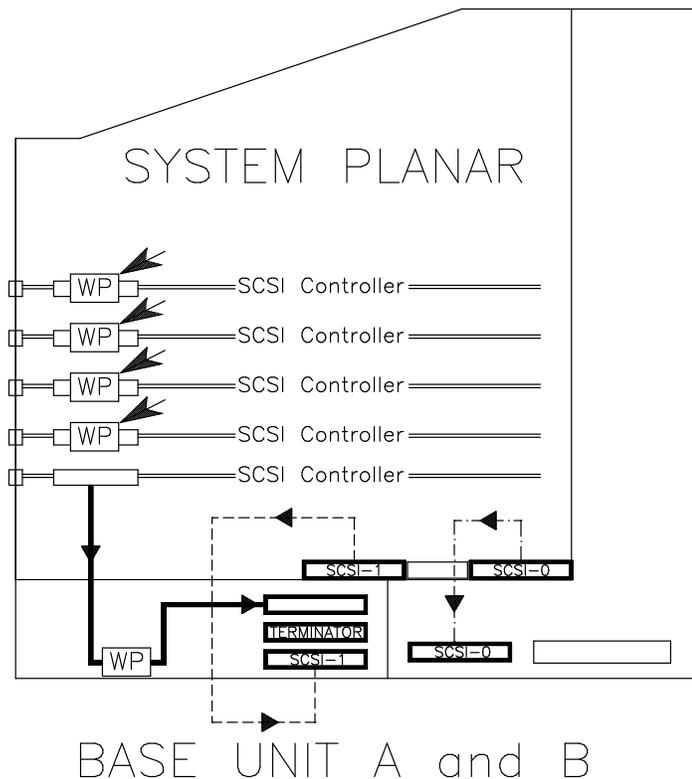
- T** Terminating Plug
- JC** Jumper Cable

3. Access each base unit from the left side.
4. Ensure that five dedicated PCI controllers are properly installed on each base unit.
 - One controller is needed to activate the SCSI bus for local hard disk devices installed in Areas 3 and 2. As this SCSI bus is also activated by another controller on the other base unit, an **H.A. Wrap Plug** must be installed on the internal **SCSI Cable for PCI Controller to Bulkhead Connection**
 - One controller is used for hard disk devices installed in Areas 3 and 2 in the other base unit. On this controller, the **H.A. Wrap Plug** must be installed on its internal connector to disable the on-board terminator
 - The other three controllers are required for the external connections to the disk expansion unit. On each of these controllers, the **H.A. Wrap Plug** must be installed on the controller internal connector to disable the on-board terminator. See the figure which follows. Details about the external connections are given later in this procedure.

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, according to your base unit model. 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, by means of the **SCSI Cable for PCI Controller to Bulkhead Connection**.

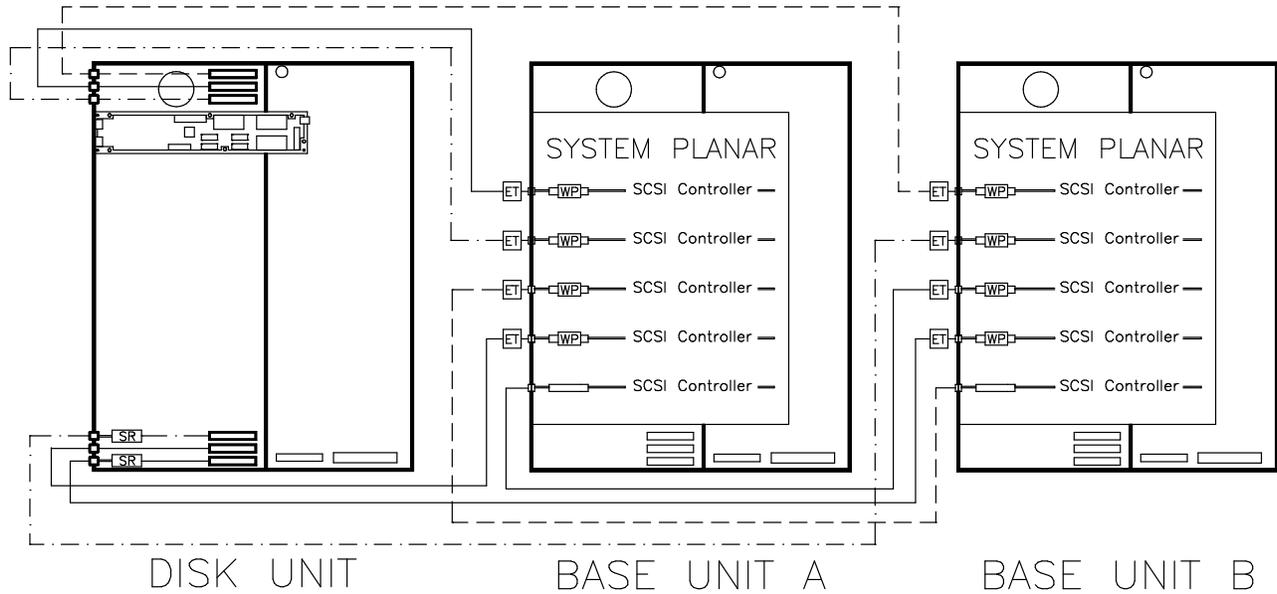
Note: Please refer to the base unit maintenance documentation for information on its SCSI cables.



6. Access the disk expansion unit from the left side and install two SCSI repeaters. The repeaters are necessary to overcome the SCSI bus length limit. See **SCSI Repeater**, on page 2-32, for details.
7. Perform the external connections from both the base units to the disk expansion unit, as shown in the figure below.

Please note that, as previously explained, the **H.A. Wrap Plug** must be plugged in the internal connector of the PCI controllers, as required.

Each external SCSI connection is made by means of the **PassThru Terminator Cable**, which is equipped with the **External SCSI Terminating Plug**.



Legend:

WP H.A. Wrap Plug

ET External SCSI Terminating Plug. It is an active terminator attached to the PassThru Terminator cable.

SR SCSI Repeater.

Appendix A. Spare Parts

Component - Part Number Cross-Reference

Component	Part Number
Base unit to disk expansion unit SCSI cable for standard connection	90676006
Base unit to disk expansion unit SCSI LVD cable	91302001
Bulkhead SCSI cables (Area 3, Area 4 (HA only) and Area 5 disk cables + KDK complex + bulkhead)	78 172 890
Cage assembly for 2 disks (mechanical part only)	78 172 259
Cage assembly for 3 disks (mechanical part only)	78 172 258 (KP3) 78 174 491 (FD3)
Cage to cage jumper cable (0,14M)	90171002
FD3 card	78 175 235
H.A. wrap plug	90982001
KDD card	78 172 155
Key cable	78 164 146
KHS card	78 171 615
KHS card to KDD card cable	78 172 798
KP2 card	78 172 467
KP3 card	78 172 470
Media cable for 2 media (Area 1)	78 172 807
Media power cable	78 166 951
PassThru terminator cable (100 cm)	91076001
Power cord (Europe)	90399122
Power cord (UK)	90399222
Power cord (US)	90399322
Power supply (no redundant)	78 167 030
Power supply (redundant)	78 167 031
Rear to bulkhead SCSI cable	78 172 789
Rear to bulkhead SCSI-LVD cable	78 175 617
Repeater assembly	78 172 898
Repeater bulkhead cable (MIND 68M/MIND 68M, 25 cm)	90171005
Repeater card SYM20101	348-0033740
RS-485 cable base to expansion (190 cm), ESCALA E Series only	91109002
RS-485 cable base to expansion	90177001
RS-485 cable expansion to expansion (190 cm)	
RS-485 terminator	90016001
Signal key cable	78 172 791
SCSI cable (Area 1 or Area 2 H.A.)	78 172 805
SCSI reset cable (KDK-KDD)	78 172 816
Terminating plug: LVD/SE	90054301
Terminating plug: SE	90054003

Note: Media and disk devices supported by the disk expansion unit are those listed in the base documentation set.

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 disk expansion unit rear side.

ASCII: American Standard Code for Information Interchange.

AUI: Attachment Unit Interface.

B

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.

CPU: Central Processing Unit.

D

DC: Direct Current generated by the power supply.

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 up to three disk carriers. See also FD3, KP2, KP3.

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

DUART: Dual Universal Asynchronous Receiver Transmitter.

E

ECMA: European Computer Manufacturers Association.

EIA: Electronic Industries Association.

EMI: ElectroMagnetic Interference.

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 data transfers 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.

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

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.

FPL: See system planar.

FSB: 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.

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.

I

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

IEC: International Electrotechnical Commission.

I/O: Input /Output.

ISA: Industry Standard Architecture (Bus).

J

JBOD: Just a Bunch Of Disks.

K

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

KDD: A card installed in the disk expansion unit 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 system RAID configuration. It interfaces the RAID controller card.

KP2: The back plane of a disk cage that connects up to two 1.6-inch ULTRA/SE disk devices. See also disk cage, disk carrier.

KP3: The back plane of a disk cage that connects up to three 1-inch ULTRA/SE disk devices. See also disk cage, disk carrier.

KPL: See system planar.

KPS/KPSR: See power supply.

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

L

LAN: Local Area Network.

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

LVD: Low Voltage Differential.

M

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

MFG: Manufacturing.

MP: MultiProcessor.

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

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

N

NVRAM: Non Volatile Random Access Memory.

O

OF: See Open Firmware.

OP: See operator panel.

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

operator panel (KOP): The disk expansion unit panel where the key mode switch and the power on LED are located.

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

P

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

PowerPC: A standard RISC microprocessor family.

power supply (KPS): The disk expansion unit is equipped with one power supply module. The power supply provides power and power regulation to all the unit components. Optionally, the redundancy feature can be provided. See also redundant power supply.

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

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

ROM: Read Only Memory.

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

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

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

RSF: Remote Services Facilities.

S

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

SCSI-ID: See ID.

SCSI repeater: A card used to overcome the SCSI bus length limit, in High Availability configuration.

SE: Single Ended.

SID: System IDentifier.

slot cover: A metallic plate that covers free slots on the disk expansion unit rear side.

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

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

SYSID: SYStem IDentification.

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

system planar (FPL/KPL): The planar on the base unit which interconnects all the system resources.

SVGA: Super Video Graphics Array.

T

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

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.

V

V: Volt.

VCC: Voltage Continuous Current.

VCCI: Voluntary Control Council for Interference.

VGA: Video Graphics Array.

VPD: Vital Product Data.

W

No entries.

X

No entries.

Y

No entries.

Z

No entries.

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SOCIETE / COMPANY : _____

ADRESSE / ADDRESS : _____

PHONE / TELEPHONE : _____ FAX : _____

E-MAIL : _____

For Bull Subsidiaries / Pour les Filiales Bull :

Identification: _____

For Bull Affiliated Customers / Pour les Clients Affiliés Bull :

Customer Code / Code Client : _____

For Bull Internal Customers / Pour les Clients Internes Bull :

Budgetary Section / Section Budgétaire : _____

For Others / Pour les Autres :

Please ask your Bull representative. / Merci de demander à votre contact Bull.

**BULL ELECTRONICS ANGERS
CEDOC
34 Rue du Nid de Pie – BP 428
49004 ANGERS CEDEX 01
FRANCE**

ORDER REFERENCE
86 A1 13PX 03

PLACE BAR CODE IN LOWER
LEFT CORNER



Utiliser les marques de découpe pour obtenir les étiquettes.
Use the cut marks to get the labels.

