RS/6000 7026 H Series CPU Drawer

User's Guide

IBM

Contents

Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

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 nor 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.

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot 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 supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

International Electrotechnical Commission (IEC) Statement

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

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

This Class A digital apparatus meets the 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 a summary 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 Interference 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.

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者:

這是甲類的資訊產品，在居住的環境中使用
時，可能會造成射頻干擾，在這種情況下，
使用者會被要求採取某些適當的對策。

The following is a summary of the EMI Taiwan statement above.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit Dem deutschen EMVG vom 9.Nov.92 das EG–Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Hinweis

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

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.

Electrical Safety

Observe the following safety instructions any time you are connecting or disconnecting devices attached to the workstation.

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**
>
> **Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.**
>
> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
>
> **Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.**

CAUTION:
This product is equipped with a three–wire power cable and plug for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.

DANGER

> **To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.**

Laser Safety Information

The optical drive in this system unit is a laser product. The optical drive has a label that identifies its classification. The label, located on the drive, is shown below.

```
CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL À LASER DE CLASSE 1
IEC 825:1984   CENELEC EN 60 825:1991
```

The optical drive in this system unit is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 (1st edition 1984) and CENELEC EN 60 825:1991 for Class 1 laser products.

⚠

CAUTION:
A class 3 laser is contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive as it is not serviceable and is to be replaced as a unit.

Class 1 laser products are not considered to be hazardous. The optical drive contains internally a Class 3B gallium-arsenide laser that is nominally 0.14 milliwatts at 765 to 815 nanometers. The design incorporates a combination of enclosures, electronics, and redundant interlocks such that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing conditions.

About This Book

This book provides information on how to install and remove options, use the system, use diagnostics, use service aids, and verify system operation. This book also provides information to help you solve some of the simpler problems that might occur.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

Related Publications

The following publications are available:

The *RS/6000 7026 CPU Drawer Service Guide* contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.

The *Diagnostic Information for Multiple Bus Systems* contains diagnostic information, service request numbers (SRNs), and failing function codes (FFCs).

The *RS/6000 Adapters, Devices, and Cable Information for Multiple Bus Systems* contains information about adapters, devices, and cables for your system. This manual is intended to supplement the service information found in the *Diagnostic Information for Multiple Bus Systems*.

The *Site and Hardware Planning Information* contains information to help you plan your installation.

Trademarks

PowerPC is a trademark of the International Business Machines Corporation.

graPHIGS is a trademark of the International Business Machines Corporation.

OpenGL is a trademark of Silicon Graphics, Inc.

PEX is a trademark of Massachusetts Institute of Technology.

AIX is a registered trademark of the International Business Machines Corporation.

Velcro is a trademark of Velcro Industries.

Chapter 1. System Introduction

Thank you for selecting the RS/6000 7026 CPU Drawer system!

The RS/6000 7026 CPU Drawer is suitable for mounting in a standard 19 inch rack, occupying 7 EIA units of vertical space.
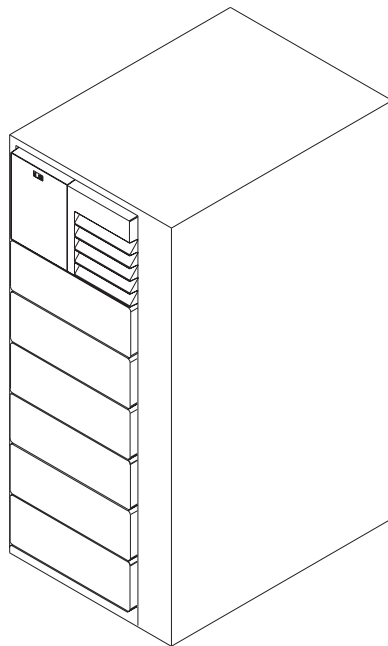
The RS/6000 7026 CPU Drawer system combines PowerPC 604 microprocessor performance and system expandability, ensuring that your system adapts to handle ever-changing operating requirements. The system is specifically designed to support the demands of network environments.

The RS/6000 7026 CPU Drawer system incorporates the new, advanced peripheral component interconnect (PCI) bus, which is faster than the industry standard architecture (ISA) bus. The system also offers ISA as a secondary bus architecture to accommodate businesses that already have invested in ISA and ISA-based devices.
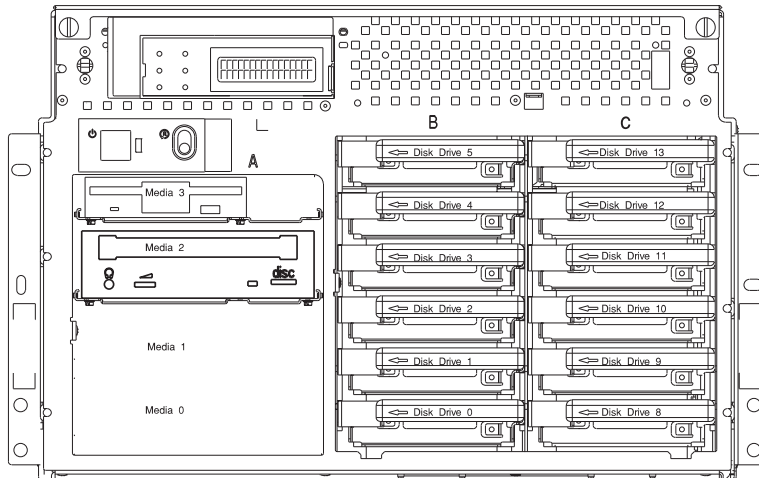
The base drawer has three banks in the front, each able to hold up to 6 one-inch 3.5-inch form factor drives, or three 1.6-inch drives. It comes with one 2.2GB 16 bit disk drive installed in bank B, which is the center bay in the front of the drawer. Bank A, the media bay, is to the left and bank C is to the right.

Additional 16 bit drives can be added to fill up bank B, then bank C, in sequence.

The media bay comes with a 1.44MB diskette drive and a CD-ROM drive in the base drawer.

When the drawer has the maximum configuration, it holds up to 12 one-inch 3.5-inch form factor 16 bit disk drives mounted on carriers and 3 media devices. If the drawer is fully populated only with 1.6-inch disk drives, it holds only 6 disk drives. The disk drives are mounted in carriers that are auto docking, auto addressing, and hot swappable.

The drawer has an operator panel card which monitors the operator panel status and other drawer functions.

This book helps you use the system, configure the system, and use the system pro-grams that are provided. This book also provides information to help you solve some of the simpler problems that might occur, and how to obtain assistance and service. Appendix A, "System Records" on page A-1 provides a section for you to record all the important information about your system.

When you are ready to learn about your system and make backup copies of important software, the order in which you do these tasks is up to you. Use the following checklist as a guide.

Record your identification numbers

Your system has important identification information that you might need if you have it serviced. Appendix A, "System Records" on page A-1 shows where to find these numbers, and provides space to record and retain this information.

Install the Operating System

If AIX is preinstalled in your system unit, or if you plan to install AIX yourself, refer to the *Quick Installation and Startup Guide* for instructions.

Some options that you might install come with a diskette that contains device drivers, configuration files, or test programs. To install these files (after your operating system is installed), follow the instructions that come with the diskettes.

Install application programs

To install application programs, follow the instructions supplied with each application program.

Chapter 2. Using the System Unit

Starting the System Unit

The following diagram shows the locations of the operator panel display (1) and the operator panel (2).
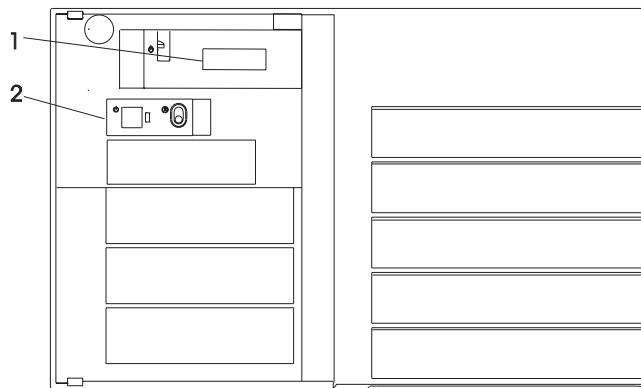
1. Set the power switches of the attached devices to On.

2. Press the Power Button.
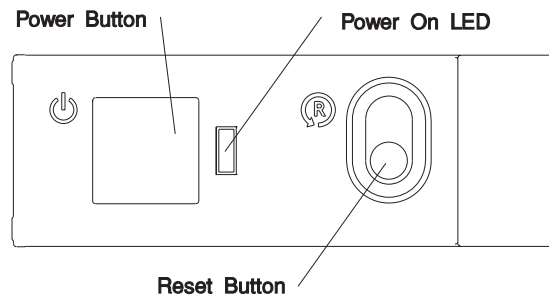
   When you press the Power Button, the Power On LED comes on and the system starts a POST (power-on self test).

   During POST, progress codes display in the operator panel display (1 in the diagram above).

3. If power does not come on when you press the Power Button, ensure that the power cord, located at the back of the system unit, is plugged into the rack power distribution unit. If this does not solve the problem, go to Chapter 8, "Hardware Problem Determination" on page 8-1.

Stopping the System Unit

Attention: When using the shutdown procedure for your system, enter the correct command before you stop the system unit. Failure to do so may result in the loss of data. If you need information on the shutdown procedure for your operating system, see your operating system documentation.

1. Before stopping the system unit, you must first perform a shutdown procedure of the operating system to prevent the loss of data.

2. After you shut down the operating system, set the power switches of the attached devices to Off.

Reading the Operator Panel Display

The operator panel display is used to:

Track the progress of the system unit self tests and configuration program.

Display codes when the operating system comes to an abnormal end.

Display system messages.
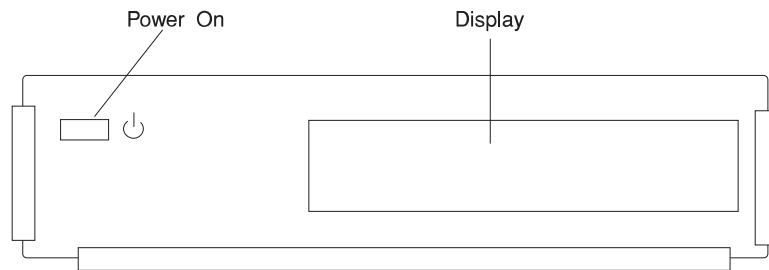
During power-on self-test (POST), 3 characters display indicating the progress of the testing. If an error is detected that requires attention, the system unit halts and an 8 digit number displays in the operator panel display to identify the error (see *7026 H Series CPU Drawer Installation and Service Guide* for a listing of the error codes).

Note: In some cases the 8 digit error code is followed by a 4 digit location code to aid in the isolation of the error (see "Location Codes" on page 5-19 for information about location codes).

Using the Keyboards

There are several keyboards available for the system unit. The keyboards have various keys that enter data and control the cursor location. The keyboards can be engraved for the languages of different countries.

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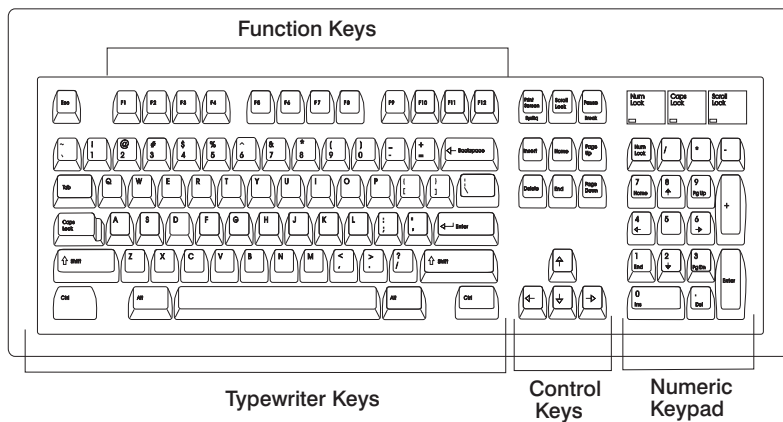
The keyboard is divided into four sections:

Function keys are multipurpose keys and their function is controlled by the operating system.

Typewriter keys are similar to a standard typewriter. Their function is controlled by the software.

Control keys move the cursor on the screen and do programmed control functions. The movement and functions depend upon the application used.

Numeric keypad is arranged like a calculator to help when typing numbers.

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

The keyboard cable plugs into the keyboard connector at the rear of the system unit.
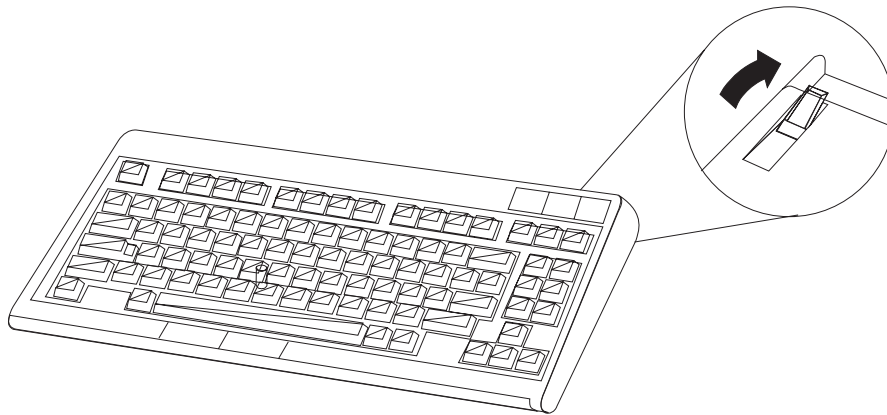
Using the Three–Button Mouse

The mouse is a hand–operated locating device. A three–button mouse is available for use with the system unit.

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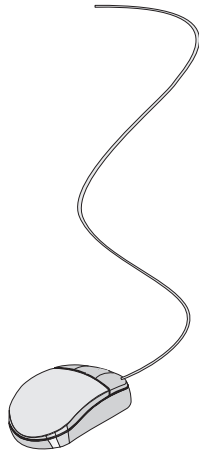
You can use the mouse to perform such functions as positioning a cursor, selecting items from a menu, or moving around in your document much easier and faster than if you used only the keyboard. The cursor moves exactly as you move the mouse on a flat surface, such as a desktop.

When you move the mouse around on a flat surface as shown in this illustration, the cursor moves on the display screen; the movement changes the position of the cursor.
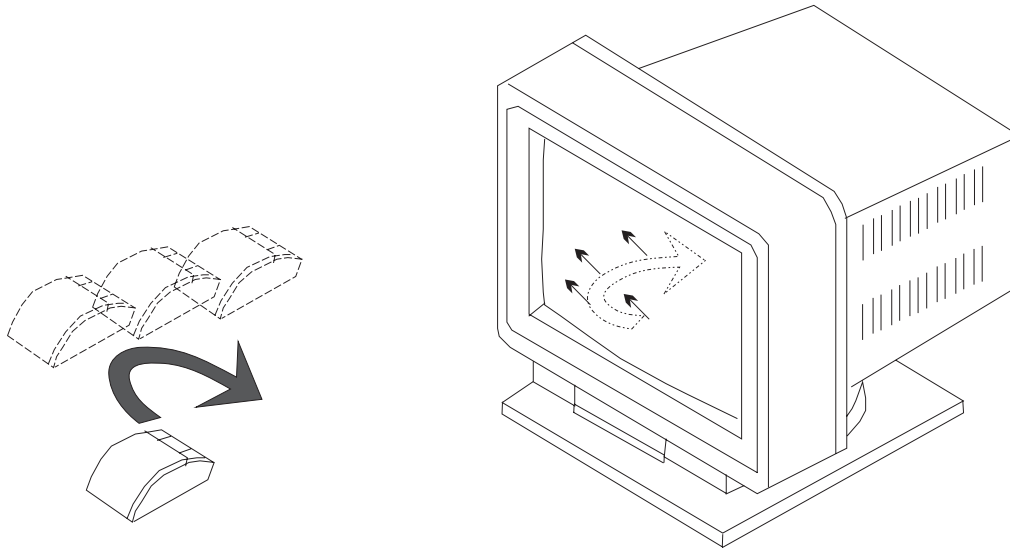
With the mouse buttons, you can perform functions such as selecting and deselecting options, extending your selection, or choosing a command. The precise function of your mouse depends on the software you are using.

The mouse has a cable that plugs into the mouse connector at the rear of the system unit.

Handling the Mouse Correctly

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

Do not:

Operate the mouse on cloth, unfinished wood, newspaper, or carpet.

Drop or hit the mouse.

Carry the mouse by holding onto the cable.

Expose the mouse to extreme temperatures or direct sunlight.

Place the mouse in liquid spills.

Care of the Mouse

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

Finished wood

Glass

Enamel

Plastic

Paper (except newspaper)

Metal

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

Inspect the work surface for spills or other contaminants.

Dust the work surface.

If you are using a paper pad, inspect it for wear and replace it if necessary.

Cleaning the Mouse

1. Remove the retaining ring by turning it counterclockwise, in the direction of the arrow as shown in the illustration.

Retaining Ring
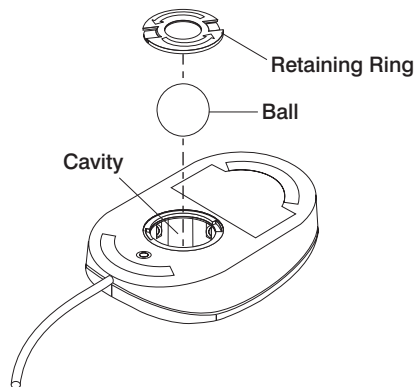
Ball

Cavity

2. Remove the ball.

3. Inspect the ball for contaminants. Wipe it clean with a dry, lint–free cloth.

4. If the ball is dirty, wash it in warm, soapy water. Rinse and wipe the ball with a lint–free cloth until dry.

5. Inspect the ball cavity in the mouse for foreign materials. If there are any foreign materials, remove them.

6. Replace the ball.

7. Replace the retaining ring on the mouse and align it with the open slots in the ball cavity.

8. Turn the retaining ring clockwise until the open slots are covered and you hear the ring snap into place.

Using the 3.5–Inch Diskette Drive

Diskette Compatibility

The system unit has a 1.44MB diskette drive installed.

The 1.44MB diskette drive can format, read, and write diskettes compatible with the following diskette drives:

    1.0MB diskettes with 720KB formatted data capacity.

    2.0MB diskettes with 1.44MB formatted data capacity (HD).

Format the diskette according to its specified capacity.

Write–Protecting 3.5–Inch Diskettes

Write–protecting diskettes is necessary so that important information is not accidentally lost.

When diskettes are write–protected, you can read information from the diskettes, but you cannot write information on to them.

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

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

    To prevent writing onto a diskette, slide the write–protect tab, to open the protect slot.
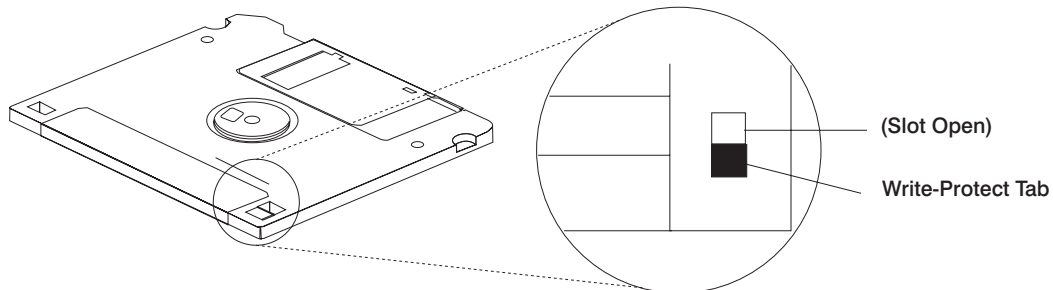
To allow writing onto a diskette, slide the write–protect tab to cover the protect slot.

(Slot Closed)

Write-Protect Tab
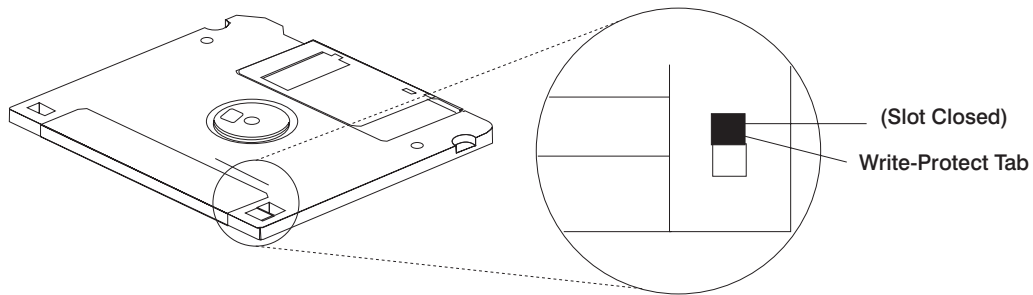
Loading and Unloading the 3.5–Inch Diskette

To load a diskette into the drive, insert the diskette in the diskette drive with the labeled metal shutter first. Push the diskette into the drive until you hear a click. The click indicates that the diskette is securely in position in the drive.

To unload the diskette, push the diskette–unload button. The diskette unloads partially from the drive. Pull the diskette out.

Using the CD-ROM Drive

CAUTION:
A Class 3 laser is contained in the device. Do not attempt to operate the device while it is disassembled. Do not attempt to open the covers of the device, as it is not serviceable and is to be replaced as a unit.

The CD-ROM is located in bay A of the system unit. Your CD-ROM drive looks like the one shown in the illustration, and the controls are located as indicated.
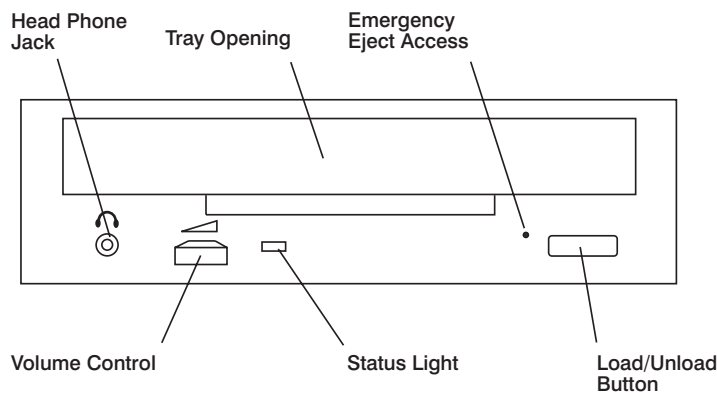
When the CD-ROM is set to On, the status light indicates one of several conditions. The following are status light states and the respective conditions of the CD-ROM drive:

Off during standby with the tray loaded or unloaded.

Blinks from insertion of the tray to completion of initialization.

Blinks slowly when either the lens or disc is dusty (lens should be cleaned by running the cleaning disc).

Blinks fast when in the audio mode.

Lights during data transfer operations.

Lights steady when:

– No disc is in the tray.

– The disc is in the tray upside down.

– Some condition exists that should be checked. If this occurs, contact your service representative.

Loading the CD-ROM Drive

Press the unload button to open the tray. Place the disc, with the printed side away from the tray, into the tray. Push gently on the load/unload button. The drive automatically pulls the tray into the drive and prepares the disc for reading.

Unloading the CD-ROM Drive

Push and hold the unload button until the drawer comes out and then remove the disc.

Cleaning the CD-ROM Drive

This CD-ROM drive has an internal head–cleaning mechanism, and therefore does not require an external cleaning device. The internal cleaning mechanism cleans the head every time the tray is operated.

Always handle discs carefully by the edges to avoid leaving fingerprints or scratching the disc. (This helps the disc to maintain good readability.) Discs can be wiped with a soft, lint–free cloth or lens tissue. Always wipe in a straight line from the inner hub to the outer rim.

Emergency Eject

Note: Execute the following procedure only in an emergency (caddy will not eject although pressing the unload button).

1. Insert a small diameter rod, such as a straightened paper clip, into the emergency eject hole. (Refer to the illustration below for the location of the emergency eject hole.)

2. Push the tool in until some resistance is felt.

3. Maintain a small amount of pressure on the rod while pulling on the tray with your finger nail.

4. Pull the tray open and remove the disc.
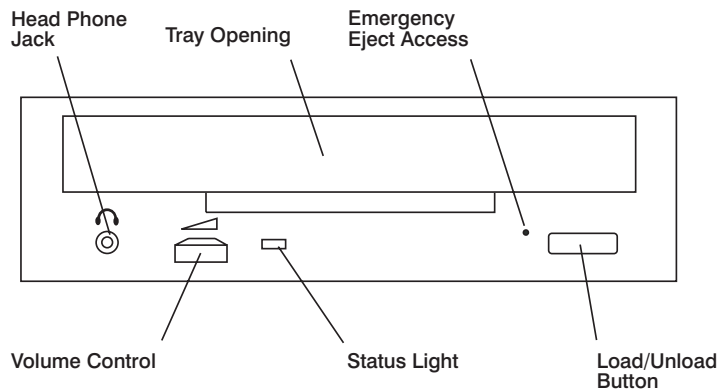
Note: Normally the tray makes a ratcheting sound when pulling it open using the above procedure.

Using the Hot Swap Disk Drives

Attention: A SCSI disk drive carrier cannot be installed into an SSA backplane. The
carrier connector for SCSI is designed to plug into the SCSI backplane, while the
SSA disk drive carrier is designed to be plugged into by the SSA backplane.

Notes:

> For information on installing a SCSI disk drive in bank B or C, go to page
> 4-8.
> For information on installing an SSA disk drive in bank B or C, go to page
> 4-13.
> For information on removing a SCSI disk drive from bank B or C, go to page
> 4-17.
> For information on removing an SSA Disk Drive from bank B or C, go to
> page 4-21.

Relationship of AIX Prompts and Physical Drive Location

A SCSI or SSA adapter and a SCSI or SSA drive address can be displayed on a
user display. The AIX command **lsdev -C** returns the attached devices on the
system display. For more information, see the documentation for the operating
system that controls the system unit. The following diagram shows the physical
locations of the drives.
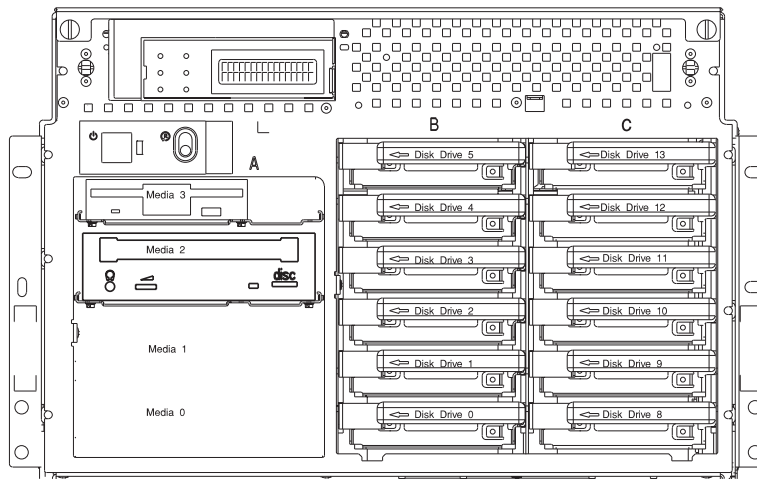
Handling Guidelines

The hot-swap disk drive is a sensitive device. Handle the hot-swap carrier and disk drive with care.

Do not drop the disk drive or subject the drive to excessive shock.

Do not expose the disk drive to temperatures lower than -40° F (-40° C) or higher than 158 ° F (70° C).

If drive temperature changes, allow approximately one hour of temperature acclimatization for every 18° F (10° C) of temperature change.

Never allow moisture to condense on the drive.

Static electricity can damage your equipment. Take these precautions to avoid static electricity damage:

– Always handle your disk drive carefully.

– Handle the drive by the edges and never touch any exposed circuitry.

– Prevent others from touching the drive.

Store the hot-swap disk drive in a protective container such as an instrument case or in a protected area.

Failure to observe these precautions may lead to product failure, damage, and invalidation of all warranties.

Labels

Several labels are included in your system ship group which may be attached to the handle of the hot-swap drive. The labels may be marked in any way that the user can easily identify the drive for removal or installation.

Disk Drive Status Light States

SCSI Disk Drives: The following table explains the meaning of the green and amber status lights and spin down button.
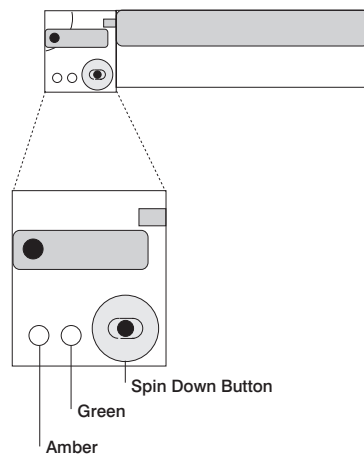
SCSI Disk Drive Status Lights		
Light or Button	**Status**	**Definition**
Amber	On	Drive spinning
	Off	Drive not spinning
Green	On	Power On
	Off	Power Off
	Blinking	Power Off/Drive identify
Spin down	Depressed	Spin down drive and remove power

SSA Disk Drives: The following table explains the meaning of the Power, Ready and Check status LEDs.
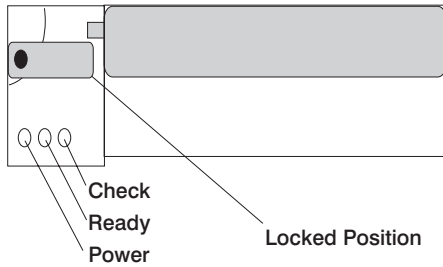
SSA Disk Drive Status LEDs		
LED	**Status**	**Definition**
Power	On	Power On
	Off	Power Off
Ready	On	Both SSA connections good and drive is ready
	Blinking	Only one SSA connection good
	Flickering	Drive is executing a command
Check	On	Disk drive failure
		Self-test running
		Drive in service mode
	Blinking	Disk drive selected

General Information for 5.0GB 8-mm Tape Drive

Recommendations

Use only Data Grade 8-mm tape cartridges. These cartridges are identified by either a Data, D, or D8 marking on the data cartridge. Use of video grade cartridges can damage the 8-mm tape drive and can void the warranty of your 8-mm tape drive, and data written on these tapes may be lost over a short period of time.

Remove the tape cartridge from the tape drive when it is not in use, and store the cartridge in the cartridge case.

Do not open the door on the data tape cartridge. This door covers and protects the magnetic tape material from dirt, dust, and damage.

Avoid touching the tape since this can cause loss of data.

Keep the tape drive door closed except when loading or unloading a tape cartridge.

Back up and then discard any tape cartridge that repeatedly produces error messages. The error information is in the system error log.

Clean the tape path regularly according to the cleaning procedure of the 8-mm tape drive. Use only recommended cleaning cartridges; other cleaning cartridges can permanently damage your 8-mm tape drive.

Attention: Do not use video grade cartridges in the 8-mm tape drive. Video grade tapes may be unreliable and may cause permanent damage to the 8-mm tape drive.

Types of 8-mm Tape Cartridges

Test Tape Cartridge: This is a specially labeled tape cartridge that is in the media kit with the 8-mm tape drive. Use this cartridge only when checking the operation of the drive or running diagnostics; do not use it to save programs or data.

Data Tape Cartridge: This is a non-labeled blank tape cartridge that is in the media kit. Use this cartridge for saving your programs or data. The same data tape cartridge can be used in either a 2.3GB 8-mm tape drive or a 5.0GB 8-mm tape drive.

Cleaning Tape Cartridge: Use this cartridge for cleaning the 8-mm tape path. For more information, see "Cleaning the Tape Path on the 5.0GB 8-mm Tape Drive" on page 2-26.

Tape Cartridge Compatibility

The 8-mm tape drive is compatible with existing 8-mm tape subsystems that comply to the American National Standard (ANSI) X3B5/89-136, Helical-scan Digital Computer Tape Cartridge, 8-mm for Information Exchange. Data compression effectively increases the cartridge capacity and data transfer rate for the 5.0GB tape cartridges.

Note: 160 meter cartridges are not processed and are automatically ejected by the drive.

Format Modes (C=compression mode)				
8-mm Tape Drive	**2.3GB**	**2.3GB (C)**	**5.0GB**	**5.0GB (C)**
2.3GB	Read/Write			
5.0GB	Read/Write	Read only	Read/Write	Read/Write

Setting the Write-Protect Tab on 8-mm Tape Cartridges

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

The window on the tape cartridge controls write-protection.

Write Enabled

Write-Protect Tab Set

Window Closed

Window Open
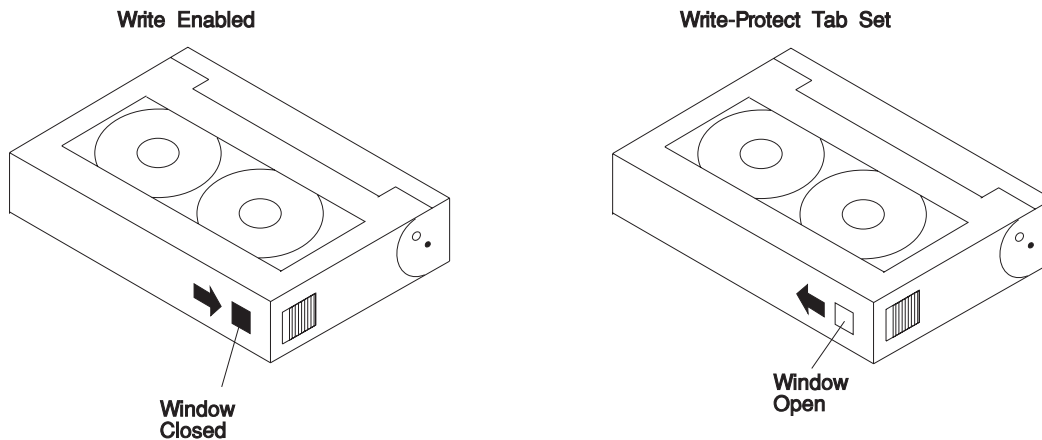
Environment Considerations for 8-mm Data Cartridges

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

Attention: The manufacturer has specified a set of temperature and humidity ranges in which the 8-mm data cartridge can operate with ease. Only regular cleaning procedures are required when operating the cartridge within this range. The risk of possible data loss is increased if 8-mm tape cartridges are operated, stored, or shipped outside the temperature or humidity ranges shown in the following table.

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

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

	Operating Ranges	Storage	Shipping
Temperature	16°C to 32°C (60°F to 90°F)	5°C to 32°C (40°F to 90°F)	-40°C to 52°C (-40°F to 125°F)
Relative Humidity (non-condensing)	20 to 80%	20 to 80%	5 to 80%
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)	26°C (79°F)

Operating in Harsh Environments

The 8-mm tape drive is ideally suited to streaming operations, as opposed to tape movement operations involving multiple stop/starts and random searches. When the tape is used for frequent stop and start operations, streaming movement is beneficial and should be used whenever possible. This can be accomplished by ensuring that any save or restore operation is the only active operation performed by a device connected to this SCSI I/O controller.

Any tape that has been used outside the ranges specified in the table on 2-21 for an extended period of time (50 passes in 40 hours of nonstop operation) should not be used as an archival tape. Exposure to the environment will deteriorate the magnetic and physical strength of the tape. Do not store important data on a tape that has been used outside the specified ranges; transfer the data to a new tape for reliable archiving.

8-mm Data Cartridge Erasure

Most bulk eraser devices do not have the capability to erase 8-mm data cartridges. To properly erase an 8-mm data cartridge with a bulk eraser device, the erasure rating must be at least 1500 oersted.

The 2.3GB and the 5.0GB 8-mm tape drives erase residual data before writing new data on the data tape.

Tape Cartridge Data Efficiency

The 8-mm tape cartridge efficiency is defined as the amount of data that can be stored on the cartridge. The following variables affect the amount of data that can be stored on a tape cartridge:

Size of the data file

Number of file marks per file

File mark size used

Compatibility mode (2.3GB or 5.0GB)

Media rewrites.

Using the 5.0GB 8-mm Tape Drive

The optional 5.0GB 8-mm tape drive is a half-height device.

Status Lights

The 5.0GB 8-mm tape drive has two green status lights and one amber status light. The on and off combinations of the status lights indicate the conditions of the 8-mm tape drive.

Each of the International Organization for Standards (ISO) symbols located next to a status light indicates a specific condition of the tape drive as follows:
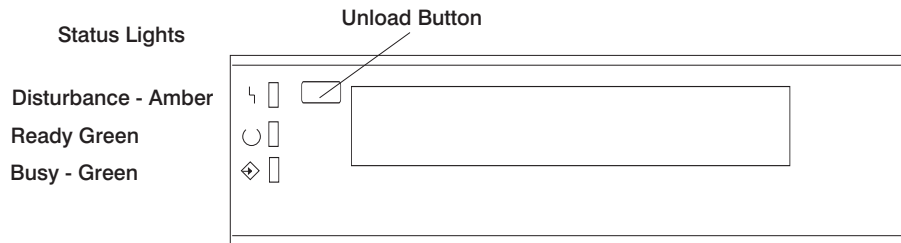
Status Lights   Unload Button

Disturbance - Amber
Ready Green
Busy - Green

Status Light States

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

Status Lights on the 5.0GB 8-mm Tape Drive			
Status	**Ready (green)**	**Busy (green)**	**Disturbance (amber)**
The power-on self-test (POST) is running or the system has issued a Reset to the drive.	On	On	On
One of the following has occurred: The power is off. The POST has completed successfully, but no tape cartridge has been inserted.	Off	Off	Off or On
A tape cartridge has been inserted and the 8-mm tape drive is ready to receive commands from the system.	On	Off	Off or On
A tape cartridge has been inserted and the 8-mm tape drive is performing a tape load or unload operation.	Off	Flashing	Off or On
The tape is in motion and the 8-mm tape drive is busy running a device operation.	On	Flashing	Off or On
The 8-mm tape drive has detected an internal fault that requires corrective action. If this occurs, see the following note.	Off	Off	Flashing
The tape path requires cleaning. Refer to "Cleaning the Tape Path on the 5.0GB 8-mm Tape Drive" on page 2-26.	Off or On	Off or Flashing	On

Note: If a fault or an error condition occurs, first try to recover by pressing the unload button. If this does not correct the fault, switch off the power to the 8-mm tape drive and then switch on the power to the drive. If the condition continues, call your service representative.

Loading the 8-mm Tape Cartridge

Before loading the tape cartridge, make sure the power is on and the write-protect tab on the tape cartridge is properly set. Refer to "Setting the Write-Protect Tab on 8-mm Tape Cartridges" on page 2-20. The tape drive loads the tape from the cartridge and prepares it for reading and writing.

To load the 8-mm tape cartridge, do the following:

1. Grasp the edges of the 8-mm tape cartridge with the write-protect tab toward you and the window side of the cartridge facing up.

2. Slide the tape cartridge into the opening on the front of the 8-mm tape drive until the loading mechanism pulls the cartridge into the drive and the drive door closes. The ready status light (green) goes on if the load operation was successful.
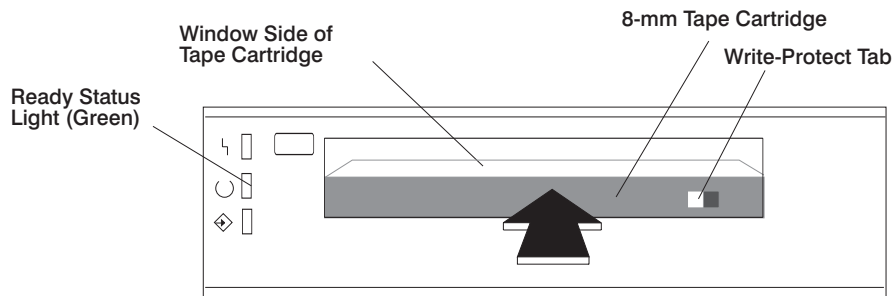
The 8-mm tape drive is ready for data operations when the tape cartridge is inserted. After the cartridge is inserted into the tape drive, the tape takes about 25 seconds to load; this does not interfere with beginning the data operations.

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

Unloading the 8-mm Tape Cartridge

Before performing the unload operation, make sure the power to the 8-mm tape drive is on.

To unload and eject the tape cartridge, press the unload button. The 8-mm tape drive rewinds the tape and then ejects the tape cartridge from the tape drive.

After pressing the unload button, the following occurs:

1. The ready status light goes off.

2. The busy status light flashes during the unload operation.

3. The busy status light will goes off when the cartridge is ejected from the tape drive.
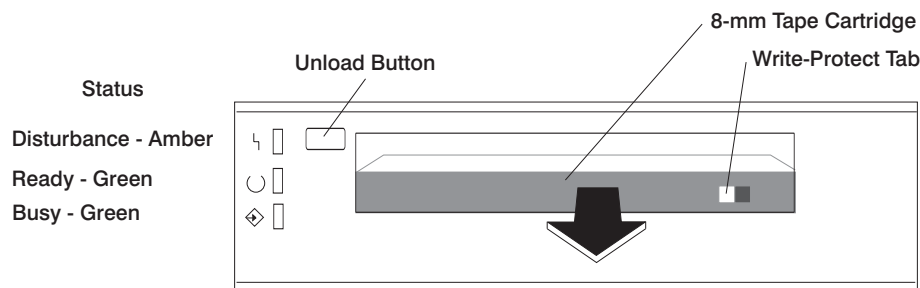
The time required for a tape to rewind and unload is between 18 seconds and 3 minutes, depending on the position of the tape when the unload button is pushed.

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

Cleaning the Tape Path on the 5.0GB 8-mm Tape Drive

Attention: Do not use video cleaning cartridges in the 8-mm tape drive. Video cleaning cartridges can damage the 8-mm tape drive.

The 8-mm tape path should be cleaned either approximately every 30 hours of tape motion or once a month, whichever occurs first. The 5.0GB 8-mm tape drive counts the number of hours of tape motion and indicates when the tape path requires cleaning when the lighted disturbance status light (amber) is on.

More frequent cleaning may be required if the drive is operated in a dusty environment or in humid conditions. If the dust is allowed to accumulate, the drive has to

perform more reads and writes. This can cause data loss, and may be prevented by regularly scheduled cleaning of the drive.

The cleaning cartridge cleans the 8-mm tape drive. If you attempt to use an 8-mm cleaning cartridge more times than allowed, the tape drive automatically detects the error and ejects the cleaning cartridge. The disturbance status light (amber) remains on if it was on prior to the cleaning operation being attempted.

Some video cleaning cartridges are extremely abrasive. An 8-mm tape drive may be permanently damaged after only a few cleaning operations using an abrasive-type cleaning cartridge.

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

To load the 8-mm cleaning cartridge, do the following:

1. Grasp the edges of the 8-mm cleaning cartridge with the window side of the cartridge facing up.

2. Slide the cleaning cartridge into the opening on the front of the 8-mm tape drive until the loading mechanism pulls the cartridge into the drive.
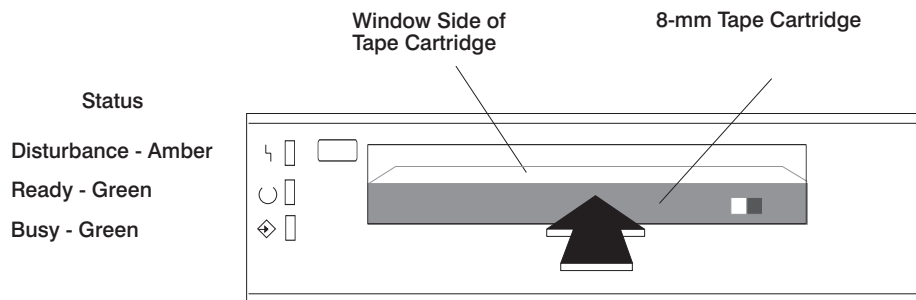
After the 8-mm cleaning cartridge has been fully inserted into the 8-mm tape drive, the following cleaning operations are performed automatically:

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

2. The drive is cleaned by moving the cleaning tape forward for approximately two minutes.

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

4. A successful cleaning operation is indicated when the disturbance status light (amber) goes off.

General Information for 4.0GB 4-mm Tape Drive

The 4.0GB 4-mm tape drive is a streaming tape drive that is used to:

  Save and restore system data files.

  Archive important records.

  Distribute operating system software upgrades.

The 4-mm tape drive can be attached to any system using a single-ended interface meeting the Small Computer System Interface II (SCSI-II) Standard ANSI X3.131-199X Rev. 10h.

The 4-mm tape drive has the following features:

  Capacity of 4.0 GB per cartridge. 8 GB is typical with data compression and with DDS2 data cartridges.

  The actual capacity per cartridge varies depending on the application and the type of data cartridge being used.

  Data transfer rate is 400 KBps. 800 KBps is typical with data compression.

  Note: Data compression activated is the default setting from the factory. Data compression is usually controlled by the application software.

  Read and write of DDS]]]] tape cartridges in 2.0 GB per cartridge format.

  A status light that indicates when it is time to clean the tape path.

  Internal diagnostics that are activated when the 4 mm Diagnostic Cartridge is inserted and loaded into the drive.

  Media recognition system: only data grade media can be written with this tape drive.

The 4-mm tape drive uses a 4-mm data cartridge for saving and restoring your system data. The 4-mm tape drive writes and reads only 4-mm Digital Data Storage (DDS]]]] or DDS2) cartridges.

Recommendations

Attention: Tape cartridges that do not carry the proper DDS symbol cannot be written to and their use may cause the 4-mm tape drive to report an error.

Use only 4-mm Digital Data Storage (DDS]]]] or DDS2) cartridges.

Attention: Use of other than recommended cleaning cartridges can damage your tape drive and will void the drive warranty.

Clean the tape path by using the recommended cleaning cartridge. Follow the instructions on the cartridge.

Back up and then discard any tape cartridge that repeatedly produces error messages. The error information is in the system error log.

Do not open the door on the data cartridge that covers the tape. This door protects the magnetic tape material from dirt, dust, and damage.

Do not operate in a dusty environment.

Do not touch the tape material. Any substance transferred to the tape by touching it could cause loss of data.

Types of 4-mm Tape Cartridges

The 4-mm tape drive is shipped with three 4-mm cartridges to help start your tape operations immediately.

4-mm Data Cartridge: Use this non-labeled cartridge for saving or restoring your programs or data. Additional data cartridges can be ordered.

4-mm Diagnostic Cartridge: Use this specially labeled cartridge to perform diagnostics on the drive. Do not use it to save or restore programs or data.

Cleaning Cartridge: Use this cartridge for cleaning the 4-mm tape path. For more information, see "Cleaning the Tape Path on the 4.0GB 4-mm Tape Drive" on page 2-37.

Tape Cartridge Compatibility

The 4-mm Tape Drive is compatible with existing 4mm tape subsystems that are designed to operate with Digital Data Storage approved media, which meet the following standards:

For DDS]]]]

- American National Standard (ANSI) standard, X3.203-191, Helical-scan Digital Computer Tape Cartridge, 3.81mm.

- European Computer Manufacturers Association (EMCA) standard, EMCA-150, 3.81mm Wide Magnetic Tape Cartridge and DDS]]]] format.

For DDS2

- European Computer Manufacturers Association (EMCA) standard, EMCA/TC17/93/20, 3.81mm Wide Magnetic Tape Cartridge for Information Interchange Helical Scan Recording, DDS2 format.

You cannot change the density setting of the drive, because the device reconfigures itself automatically, depending on the media type installed, as follows:

Media Type	Device Configuration
Non-DDS	Read-only
DDS]]]]	Read/write in 2.0GB mode only.
DDS2	Read in either density; write in 4.0GB mode only.

Setting the Write-Protect Tab on 4-mm Tape Cartridges

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

Write Enabled

Write-Protect Tab Set

Window
Closed

Window
Open
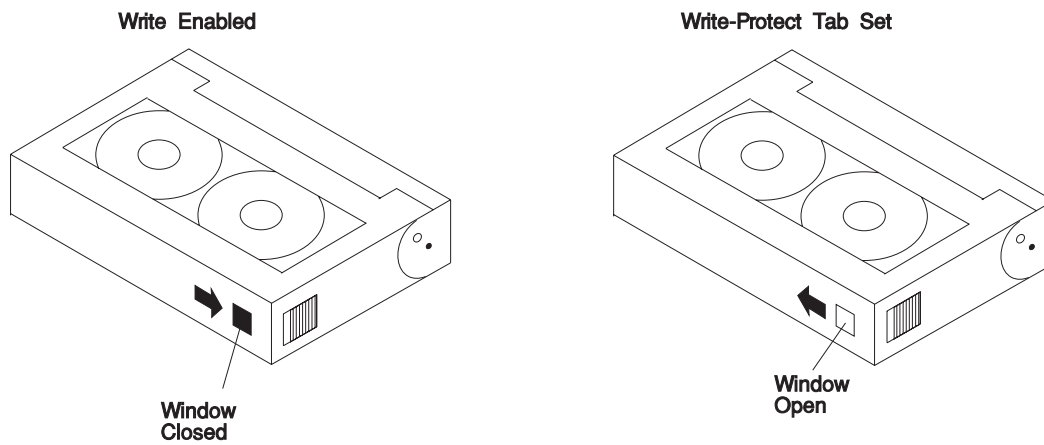
Environmental Considerations for 4-mm Data Cartridges

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

Attention: The manufacturer has specified a set of temperature and humidity ranges in which the 4-mm data cartridge can operate with ease. Only regular cleaning procedures, as described in "Cleaning the Tape Path on the 4.0GB 4-mm Tape Drive" on page 2-37 are required when operating the cartridge within this range. The risk of possible data loss is increased if 4-mm tape cartridges are operated, stored, or shipped outside the temperature or humidity ranges shown in the following table.

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

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

	Operating Ranges	**Storage**	**Shipping**
Temperature	16°C to 32°C (60°F to 90°F)	5°C to 32°C (40°F to 90°F)	-40°C to 52°C (-40°F to 125°F)
Relative Humidity (non-condensing)	20 to 80%	20 to 80%	5 to 80%
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)	26°C (79°F)

Operating in Harsh Environments

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

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

4-mm Data Cartridge Erasure

Most bulk eraser devices do not have the capability to erase 4-mm data cartridges. To properly erase an 4-mm data cartridge with a bulk eraser device, the erasure rating must be at least 2000 oersted.

The 4-mm tape drive erases residual data before writing new data on the data tape.

Tape Cartridge Data Capacity

The 4-mm tape cartridge capacity is defined as the amount of data that can be stored on the cartridge. The following variables affect the amount of data that can be stored on a tape cartridge:

Size of the data file

Number of file marks per file

Compatibility mode (2GB or 4GB)

Media rewrites.

Using the 4.0GB 4-mm Tape Drive

The optional 4.0GB 4-mm tape drive is a half-high device.

Status Lights

The 4.0GB 4-mm tape drive has two green status lights and one amber status light. The on and off combinations of the status lights indicate the conditions of the 4-mm tape drive.

Each of the International Organization for Standards (ISO) symbols located over a status light indicates a specific condition of the tape drive as follows:

4-mm Tape (Front View)

Tape Drive Door

Ready (Green)

Read/Write (Green)

Disturbance (Amber)

Status Lights

Unload Button
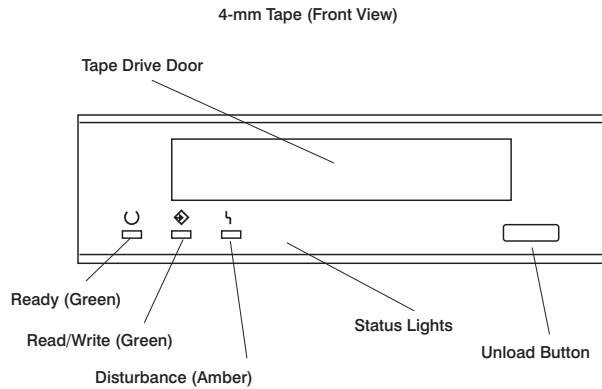
Status Light States

The following tables explain the meaning of the green and amber status lights.

	Ready (green)	Read-Write (green)	Disturbance (amber)
Off	No cartridge installed or error condition	No cartridge or no activity	No error condition
Steady	Cartridge installed or loading/unloading		Cleaning required or worn media
Flashing	Power-on self- test in progress	Cartridge activity	Error condition

Status Lights on the 4.0GB 4-mm Tape Drive			
Status	Ready (green)	Read-Write (green)	Disturbance (amber)
LED test.	On 2 seconds at power on	On 2 seconds at power on	On 2 seconds at power on
The power-on self-test (POST) is running or the Diagnostic Cartridge is running.	Flashing	Off	Off
One of the following has occurred: The power is off. The POST has completed successfully, but no tape cartridge has been loaded.	Off	Off	Off or On
A tape cartridge has been inserted and the 4-mm Tape Drive is Ready to receive commands from the system.	On	Off	Off or ON
The tape is in motion and the 4-mm Tape Drive is running a device operation or cleaning.	On	Flashing	Off or On
The 4-mm Tape Drive has detected an internal error that requires corrective action such as tape cartridge failure, high humidity, or no SCSI terminator. Refer to the service guide or contact your service representative. (See note below)	Off	Off	Flashing
The tape path requires cleaning or a poor quality tape cartridge is being used. See "Cleaning the Tape Path on the 4.0GB 4-mm Tape Drive" on page 2-37.	Off or On	Off or Flashing	On

Note: If an error condition occurs, first try to recover by pressing the unload button. If this does not correct the error, switch off the power to the 4-mm tape drive and then switch on the power to the drive. If the condition continues, call your service representative.

Loading the 4-mm Tape Cartridge

Before loading the tape cartridge, make sure the power is on and the write-protect switch on the tape cartridge is properly set. Refer to "Setting the Write-Protect Tab on 4-mm Tape Cartridges" on page 2-31. The tape drive loads the tape from the cartridge and prepares it for reading and writing.

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

1. Grasp the edges of the 4-mm tape cartridge with the write-protect tab towards you and the window side of the cartridge facing up.

2. Slide the tape cartridge into the opening on the front of the 4-mm tape drive until the loading mechanism pulls the cartridge into the drive and the drive door closes. The ready status light (green) goes on if the load operation was successful.
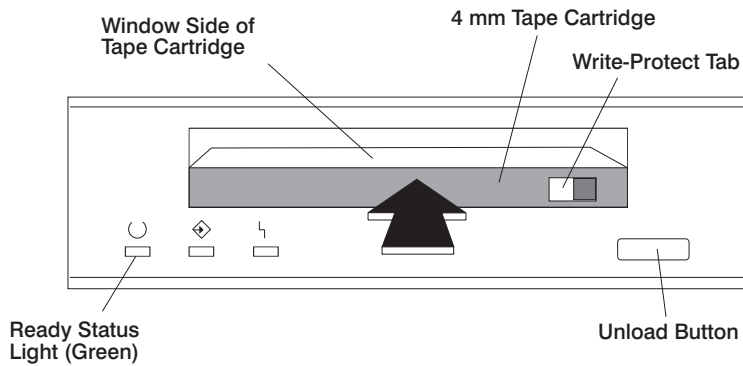
The 4-mm tape drive is ready for data operations when the tape cartridge is inserted. After the cartridge is inserted into the tape drive, the tape takes about 15 seconds to load.

Unloading the 4-mm Tape Cartridge

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

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

After pressing the unload button, the following occurs:

1. The Read-Write status light flashes during the unload operation.

2. The Ready status light and the Read-Write status light turns off when the cartridge is ejected from the tape drive.

Write-Protect Tab

4 mm Tape Cartridge

Ready Status
Light (Green)

Ready-Write Status
Light (Green)
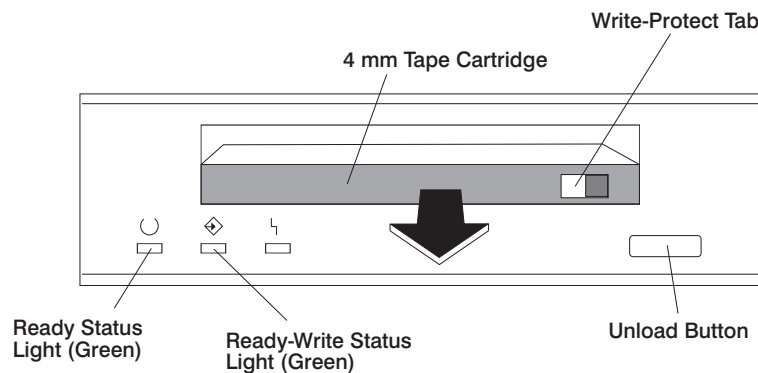
Unload Button

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

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

Cleaning the Tape Path on the 4.0GB 4-mm Tape Drive

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

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

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

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

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

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

2. Slide the cleaning cartridge into the opening on the front of the 4-mm tape drive until the loading mechanism pulls the cartridge into the drive.
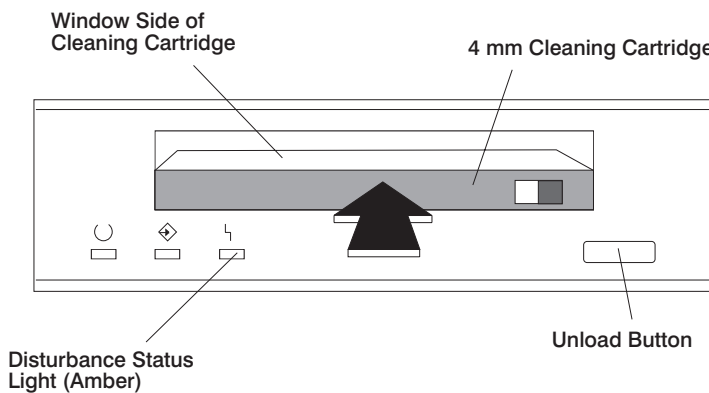
After the 4-mm cleaning cartridge has been fully inserted into the 4-mm tape drive, the following cleaning operations are performed automatically:

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

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

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

4. A successful cleaning operation is indicated when the disturbance status light (amber) goes off (if it was activated before the cleaning operation).

If the cleaning cartridge has been used more than 50 times the disturbance status light (Amber) will flash.

Using the 24/48GB DDS-2 4-mm Tape Autoloader

The 4-mm Tape Autoloader can only be located in the bottom bay of Media Bank A.

Attention: Never remove, install, or transport the 4-mm Tape Autoloader with tape cartridges loaded in the drive. They can become dislodged and jam the mechanism.

Controls and Indicators
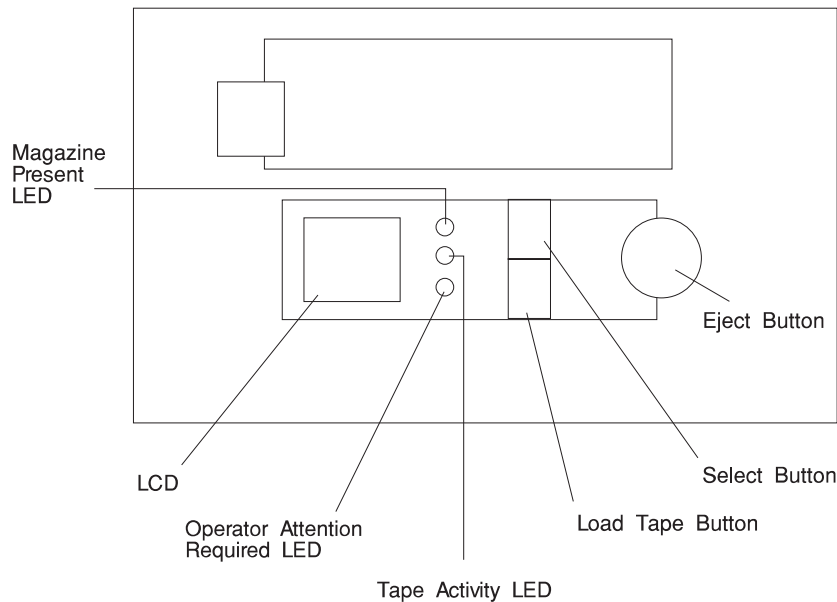
Select Button: The Select button allows you to select a cartridge from the magazine in the unit. The number of the cartridge selected is displayed on the left side of the LCD. If you press the Select button repeatedly, the display cycles through the cartridges available in the magazine.

Eject Button: The Eject button starts the unload process. The drive unloads any currently loaded cartridge, and the changer mechanism returns it to the magazine. The magazine is then ejected.

Load Tape Button: The Load Tape button loads the selected cartridge from the magazine into the drive. The drive then goes into sequential mode. See "Modes" on page 2-45.

Note: When in Random Mode, the select and load buttons are disabled. Their function is controlled by host software.

Magazine Present (LED)

Steady Green: A magazine is in the Autoloader.

Flashing Green: A magazine is being loaded, checked, or ejected.

Tape Activity (LED): This light indicates what is happening to the cartridge in the drive:

Steady Green: A cartridge is present in the drive

Rapidly Flashing (twice per second) Green: Data is being read or written

Slowly Flashing (once per second) Green: A cartridge is being loaded or unloaded.

Operator Attention Required (LED): This light indicates that the operator needs to take some action:

Steady Amber: A serious hardware error has occurred. If a power reset does not eliminate the problem, the Tape Autoloader requires service.

Flashing Amber: A user-recoverable error has occurred:

- The front-panel door is open.

- A cartridge is in the drive, but no magazine is present.

- The tape heads need cleaning.

- The tape is nearing the end of its useful life.

- A firmware upgrade is occurring.

When the Operator Attention Required LED is on or flashing, an error message might be displayed in the Status LCD.

Status Liquid Crystal Display
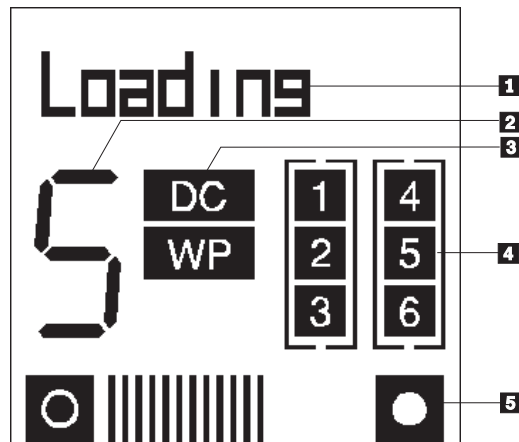
The Status LCD displays a range of autoloader status information in each of its five display regions:

  1 A 10-character display provides operating status information and potential error conditions.

  2 A 7-segment display shows the number of the cartridge currently loaded in the drive, or the cartridge selected when the Select button is pressed repeatedly.

  3 "DC" indicates that data compression is being used for writing; "WP" indicates a Write-Protected cartridge.

  4 Six numbered boxes individually light to show which magazine slots contain a cartridge.

  5 An "odometer" line shows how much tape has been used in the active partition of the current cartridge. The more lines that are shown, the more tape that has been used.

Loading a Magazine

Attention: Cartridge and magazine labels must be firmly affixed to the recessed
label areas; otherwise, the mechanism will jam.

Labels must not be peeling off.

Labels must not go over the edge of the label area.

Labels must not be folded over the edge of cartridges.

Labels must not be stuck on top of another label.

Attention: Only cartridges labeled with the DDS or DDS2 logo should be used in the
Autoloader.

It is recommended that you store cartridges in their magazines, so that cartridges
belonging to a multi-volume backup are kept together and in the correct order.

1. Align the arrow on the cartridge with the arrow on the magazine and insert the
   cartridge in the magazine. Insert as many cartridges as you need. You can
   insert up to 6 cartridges, and they can be placed in any of the magazine slots.
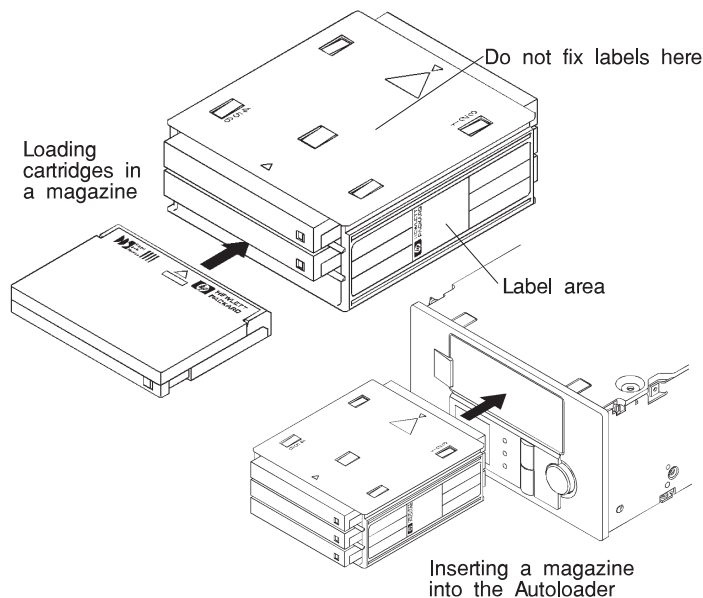
2. Insert the cartridge magazine into the slot in the front of the Autoloader with the large arrow on the magazine pointing towards the Autoloader. Apply steady pressure until the mechanism takes the magazine and pulls it into the Autoloader.
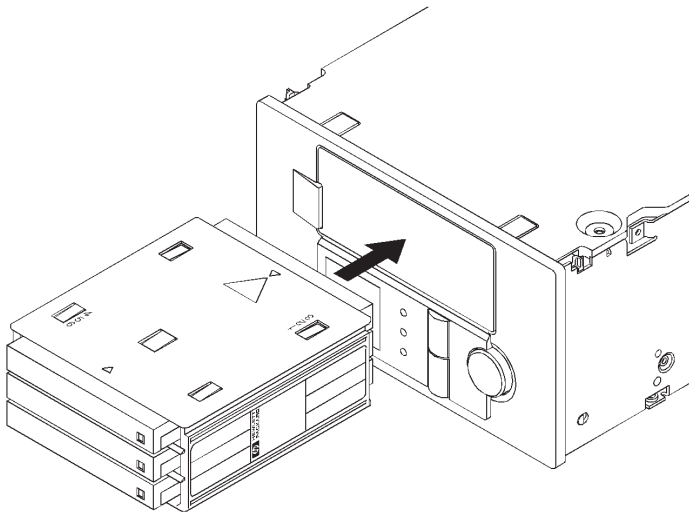
Ejecting a Magazine

To eject the magazine, press the Eject button. When you do this:

1. The tape rewinds to the beginning of the partition (BOP).

2. If the tape is write-enabled, the updated copy of the Tape log is written back to tape.

3. The tape rewinds to BOM and is unthreaded.

4. The changer replaces the cartridge in the magazine.

5. The magazine is ejected.

Forcing an Ejection

Attention: Force an ejection only as a last resort to recover a cartridge. Never use it as a quick way of ejecting the cartridge. You can lose data if you force an eject. The tape also might end up invalidly formatted, because EOD might not have been written.

If you press the Eject button when the drive is busy, the drive first completes the current task. Then it responds to the ejection request. This ensures that the task is terminated in a controlled manner and that no data is lost.

There might be occasions when you need to unload a cartridge urgently, even at the risk of losing data. To do this, you must force an ejection:

1. Press and hold the Eject button for at least 5 seconds. The LCD displays "Force Eject."

2. The Autoloader waits 35 seconds to give the normal ejection process a chance to occur.

3. When this period elapses, any tape in the drive is immediately unthreaded, and the cartridge is ejected, regardless of what operation the drive was performing. The cartridge then is returned to its slot in the magazine, and the drive is reset as though power had been cycled. Because forced ejection might interrupt an operation, it is possible that the drive will not write EOD before the cartridge is ejected. This will cause a loss of data and an invalid formatting of the cartridge. The data on such a cartridge should be readable up to the point where the format violation occurred.

4. If no cartridge is loaded in the drive, the Autoloader waits 35 seconds, ejects the magazine, and then resets as though power had been cycled.

Modes

The Autoloader can operate in two modes, sequential or random.

Sequential: In sequential mode, the Autoloader does not depend on host implementation of changer commands. You select which cartridge you want to start with by using the Select and Load buttons on the front panel. When a cartridge is ejected from the drive following a host UNLOAD command, the cartridge is placed back in it's slot and the the Autoloader automatically loads the next available cartridge from the magazine into the drive.

Random: In random mode, the host views the Autoloader as two devices:

   A changer mechanism to which SCSI Medium Changer commands can be sent.

   A tape drive to which SCSI Sequential Access commands can be sent.

The controlling host computer therefore has full random access to any cartridge. Most backup/restore applications automatically load, unload the Autoloader using the random access mode. Refer to your backup/restore software instructions for additional details.

Loading and Unloading Cartridges

When a magazine containing cartridges has been inserted into the autoloader, some applications can begin, because they use the Move Medium commands which can select and load cartridges. However, many applications, and the AIX commands **mksysb**, **tar**, **backup**, **cpio**, operate only with a tape drive which has media loaded (is Ready). Also, the drive must be loaded with an appropriate cartridge to boot from the drive, or to run diagnostics on the drive. You can load the drive manually using the controls on the front of the Autoloader.

To load a cartridge into the tape drive contained in the Autoloader, you use the Select button on the front of the Autoloader to select one of the cartridges from the magazine. Then, pressing the Load Tape button causes the selected cartridge to be moved from the magazine to the drive, where the drive starts a Load cycle automatically. Pressing the Load Tape button when the Select digit is "0" causes the loading of the first available cartridge in the magazine.

The tape drive may encounter difficulties in loading the cartridge. If it does, AIX and most using applications are unaware of the difficulty because applications and AIX typically communicate with "Ready" devices. You should observe the loading process to ensure it completes successfully. If the Load Tape process fails, the Autoloader retries the cycle several times. Failure to load after retrying is signaled to

the operator through the LCD panel and Operator Attention Required LED on the control panel.

Load failures are indicated by a flashing (Yellow) Operator Attention Required LED and messages on the LCD. If an error message (for example, Error 112) is displayed alternating with the instruction PressEject, the operator should press the Eject button which causes the magazine to be ejected with the unloadable cartridge. Try another cartridge. If a second cartridge also fails to load, the drive may be defective. However, if a substitute cartridge loads successfully, the original cartridge may be defective. You can try to load it into another 4-mm tape drive, or examine it for obvious problems (such as tape disconnected from one of the reels).

When a cartridge has been loaded, the LCD displays the READY message, and the application, diagnostic, or command can be initiated or continued. On initial manual loading, the Autoloader is in a sequential mode. In this mode, an Unload command issued to the drive causes the cartridge to be placed back in its assigned slot in the magazine and the next available cartridge to be loaded. This process ends when the cartridge in the highest numbered occupied slot of the magazine has been processed.

Most AIX commands such as **mksysb**, **tar** and **backup** do not issue Unload commands at the end of the command or at the end of the tape. When not controlled by the command or application, the operator should cause the unload by pressing the Eject button (making sure that the application or command is finished with the cartridge). The magazine ejects when operating in this single cartridge mode. Re-insert the magazine, and select the next or appropriate cartridge to continue or to initiate a new command or application. Don't reuse the cartridge just unloaded if it contains important data (such as your backup data).

Autoloader Status Messages

See the *24/48GB DDS-2 4-mm Tape Autoloader Installation and User's Guide* for information about status messages.

Error Messages

See the *24/48GB DDS-2 4-mm Tape Autoloader Installation and User's Guide* for information about error messages.

Head Cleaning

The tape heads should be cleaned regularly, as indicated in the following table. Tape heads also should be cleaned if the "Clean Me" message is displayed on the LCD and the Operator Attention Required LED is flashing amber.

Number of DDS cartridges used each day	Cleaning Interval
1	Weekly
2 to 3	Twice a week
4 or more	Daily

Clean the heads using a cleaning cartridge as follows.

Sequential Mode

1. Place the cleaning cartridge into one of the magazine slots (for example, slot 1) and insert the magazine into the Autoloader.

2. Use the Select button to select the slot in which you placed the cleaning cartridge.

3. Press the Load Tape button to load the cleaning cartridge into the drive. The Autoloader then automatically performs a cleaning cycle.

4. Press the eject button to unload the magazine and remove the cleaning cartridge.

5. Record the date on the label of the cleaning cartridge. After 25 uses, discard the cartridge.

Random Mode

1. Some backup software will perform the cleaning operation automatically. Using this process, the cleaning cartridge could be in any one of the six magazine slots. The Autoloader recognizes that the cartridge is a cleaning cartridge once it is loaded into the drive.

2. The drive then automatically carries out a cleaning cycle.

3. The drive automatically ejects the cartridge when the cleaning cycle is complete. The changer returns the cartridge to its magazine slot without any additional user involvement. Refer to your backup/restore software instructions for additional details.

Chapter 3. System Management Services

The System Management Services make it possible for you to view information about your computer and to perform such tasks as setting passwords and changing device configurations.

If you have chosen a graphical display as your system console, you can use the graphical System Management Services described below. If you are using an ASCII display as your system console, see "Text-Based System Management Services" on page 3-24.

Graphical System Management Services

To start the Open Firmware command line or graphical System Management Services, turn on or restart the computer.

The firmware version installed in your system unit is displayed at the bottom right-hand corner of the initial logo screen. Please note the version number; processor upgrades may require a specified version of firmware to be installed in your system unit. (Update System Firmware is an option under the Utilities menu in the System Management Services.)

After the logo displays, initialization icons appear across the bottom of the screen.

To enter the Open Firmware command line, you must press the **F8** key *after the keyboard icon appears* during startup.

If you press the **F8** key, the Open Firmware command line (an "OK" prompt) appears after the initialization and power-on self test (POST) are complete.

The Open Firmware command line is used to set up adapters that are not configurable with the System Management Services. Your adapter documentation directs you to use this option if it is needed.

To enter the graphical System Management Services instead of the Open Firmware command line, you must press the **F1** key *after the keyboard icon appears* during startup. and prior to the audible tone.

Note: If you do not press the **F1** key prior to the tone, the Sysystem Management Services screen will not appear. If this happens, turn off the system and re-start this process.

After the System Management Services starts, the following screen appears.

The System Management Services screen contains the following choices.
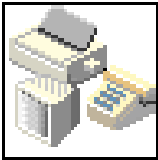
Config: Enables you to view your system configuration.

Boot: Allows you to set the sequence in which devices are searched for operating system startup code.
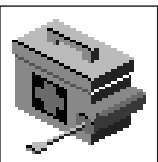
Utilities: Enables you to set and remove passwords, control the playing of system tones, enable the unattended start mode, set and view the addresses of your system's SCSI controllers, select the active console, and view or clear the error log.
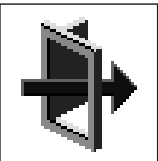
Exit: Returns you to the previous screen.

To select an icon, move the cursor with the arrow keys to choose which icon is high-lighted, then press the **Enter** key. You can also select an icon by clicking on it with your left mouse button. To leave the current screen, either press the **Esc** key or select the **Exit** icon.

Config
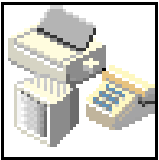
Selecting this icon makes it possible for you to view information about the setup of your system unit. A list similar to the following appears when you select the **Config** icon.

```
<Device  Name>

PowerPC,  604
L2-Cache,  0512K
Memory
        slot  A=8  MB
        slot  B=8  MB
LPT
        addr=3BC
IDE
        addr=1F0
COM
        addr=3F8
COM
        addr=2F8
Audio
Keyboard
Mouse
Diskette
        addr=3F0
Integrated  Ethernet
        addr=9999FF111B
Video
        enhanced  graphics
```


Exit

Selecting the down arrow displays the next configuration screen, which lists your computer's firmware version, the date of its development, and the firmware part number.

The following screen appears if you DO NOT have a service processor in your system.
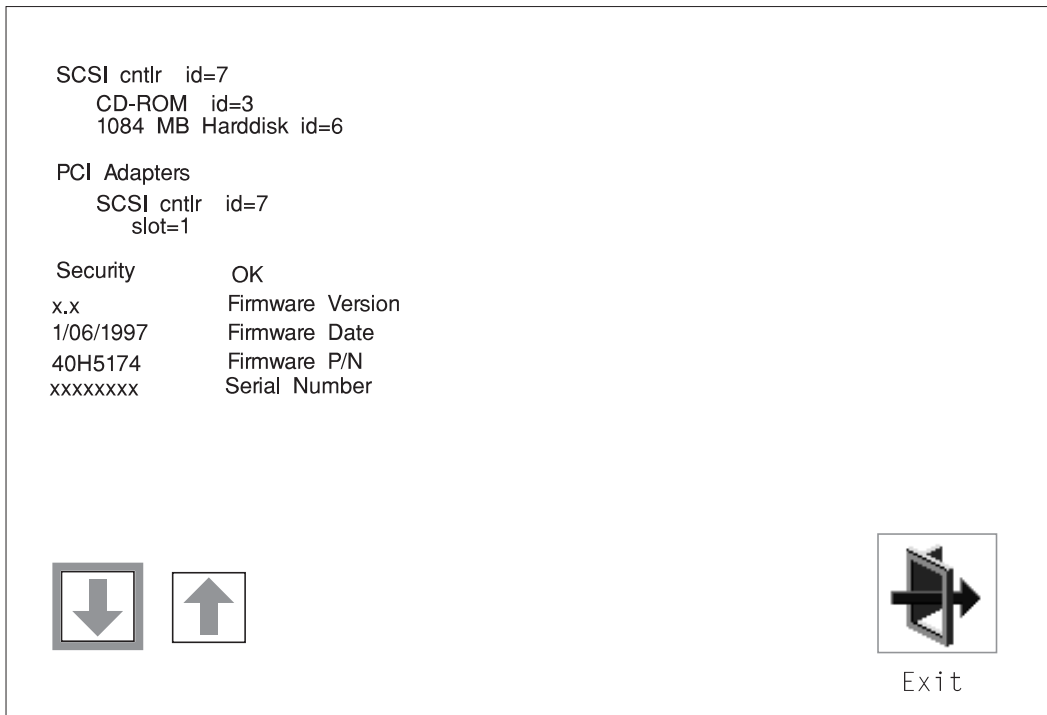
```
SCSI cntlr  id=7
    CD-ROM   id=3
    1084  MB  Harddisk id=6

PCI  Adapters
    SCSI cntlr   id=7
        slot=1

Security          OK

x.x              Firmware  Version
1/06/1997        Firmware  Date
40H5174          Firmware  P/N
xxxxxxxx         Serial  Number
```


Exit

The following screen appears if you have a service processor in your system.

```
SCSI  cntlr    id=7
      CD-ROM    id=3
      1084  MB  Harddisk  id=6

PCI  Adapters
      SCSI  cntlr    id=7
            slot=1

Security          OK
<System  Information>
x.x                Firmware  Version
1/06/1997          Firmware  Date
40H5174            Firmware  P/N
xxxxxxxx           Serial  Number

<IO  Information>
xxxxxxxx           Serial  Number
xxxxxxxx           Part  Number
xxxxxxxx           EC  Number
xxxxxxxx           FRU  Number

<Service  Processor  Information>
xxxxxxxx           Serial  Number
xxxxxxxx           Part  Number
xxxxxxxx           EC  Number
xxxxxxxx           FRU  Number
```

Exit

Boot

This selection enables you to view and change the custom boot list (the sequence in which devices are searched for operating system startup code).

```
        New             List of Boot Devices
         -      [1]      Diskette
         1      [2]      SCSI CD-ROM id=3 (slot=1)
         3      [3]      SCSI 2168 MB Harddisk id=6 (slot=1)
         2      [4]      Ethernet (Integrated)




         Save      Default                              Exit
```

Attention: If you change your startup sequence, you must be extremely careful when performing *write* operations (for example, copying, saving, or formatting). You can accidentally overwrite data or programs if you select the wrong drive.

The default boot sequence is:

    The primary diskette drive

    CD-ROM drive

    Hard disk drive

    Network device.

To change the custom boot list, enter a new order in the **New** column, then select **Save**. The List of Boot Devices is updated to reflect the order you have chosen.

You can choose 1 to 4 devices for the custom boot list. To change the boot sequence back to the default values, select **Default**. (The default sequence is automatically saved.)

Utilities
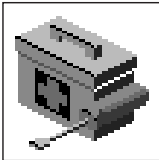
Selecting this icon enables you to perform various tasks and view additional information about your computer.

The following describes the choices available on this screen.
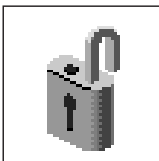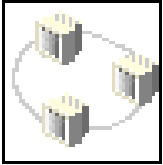
Password: Enables you to set password protection for turning on the computer and for using system administration tools.
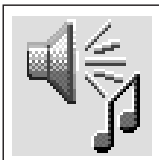
Audio: Enables you to turn on or off the system tones heard when the system is turned on.
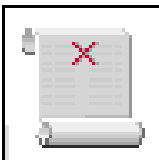
Error Log: Enables you to view and clear error log information for your computer.

RIPL (Remote Initial Program Load): Allows you to select a remote system from which to load programs via a network adapter when your system unit is first turned on. This option also allows you to configure network adapters which require setup.
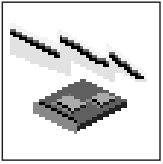
Update: Allows you to update the firmware programs on your computer.
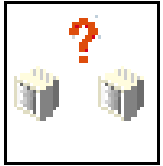
Console: If you have more than one keyboard and display attached to your system unit, or if you have an ASCII terminal attached to your system unit in addition to a keyboard and display, this tool allows you to define which one is active.

Password
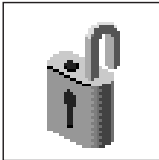
When you select this icon, the following screen is displayed.
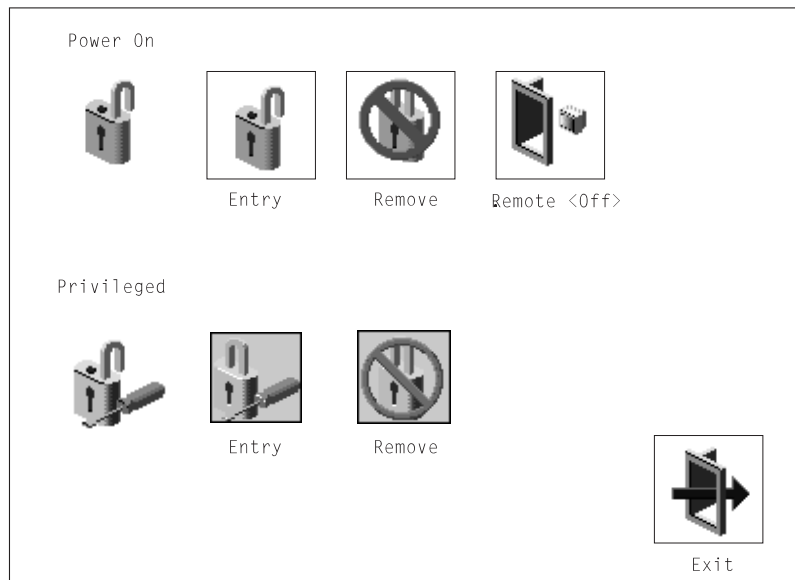
Power-On Password: Setting a power-on password helps protect information stored in your computer. If a power-on password is set for your computer, the Power On icon is shown in the locked position; if a power-on password is not set, then the Power On icon is shown in the unlocked position (as in the screen above).

When you select the Entry icon, a screen with 8 empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. As you type a character, a key appears in the box.

Press **Enter** when you are finished; you are required to type the password again for verification.

```
Verify Password

 ☐  ☐  ☐  ☐  ☐  ☐  ☐  ☐
```
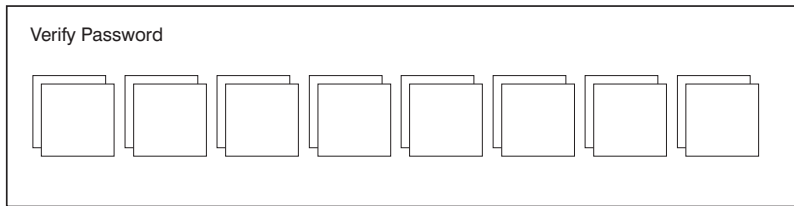
If you make a mistake, press the **Esc** key and start again.

After you have entered and verified the password, the power-on password icon flashes and changes to the locked position to indicate that the power-on password is set.

If you previously had set a power-on password and want to remove it, select the Remove icon.

Note: If you *forget* the power-on password, you must remove the battery for at least 30 seconds to disable this password. See Appendix B, "Replacing the Battery" on page B-1 for details.

A password can be set only after the system is turned off and on again.
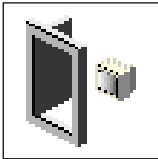
Remote Mode: The remote mode, when enabled, allows the system to start from the defined boot device. This mode is ideal for network servers and other computers that operate unattended. You *must* set a power-on password before you can enable the remote mode. When the remote mode is set, the icon changes to **Remote <On>**.

If you remove the power-on password, the remote mode is automatically reset, and the icon returns to **Remote <Off>**.
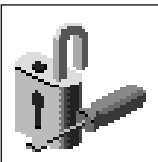
Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

When you select the Entry icon, a screen with 8 empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. As you type a character, a key appears in the box.

Press **Enter** when you are finished; you are required to type the password again for verification.

If you make a mistake, press the **Esc** key and start again.

After you have entered and verified the password, the privileged-access password icon flashes and changes to the locked position to indicate that your computer now requires the password you just entered before running system programs.

Note: If you *forget* the privileged-access password, you must remove the battery for at least 30 seconds to disable this password. See Appendix B, "Replacing the Battery" on page B-1 for details.

Audio

This icon enables you to turn on or off the system tones heard at power-on time. To change the audio status, use the arrow keys to highlight the audio icon, then press the Enter key.

Error Log
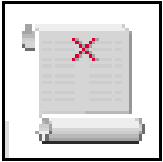
Selecting this icon displays the log of the first and the last errors your computer has encountered during operations.

```
                        System Error Log


        Date       Time      Error Code     Location
    1. 00/04/13   00:51:32   25C38005       P1-M1.10
    2. No entry
```


Clear

Exit

Selecting the Clear icon erases the entries in this log.

RIPL
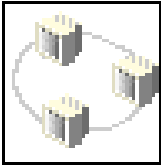
Selecting the Remote Initial Program Load (RIPL) icon above gives you access to
the following selections.

Set Address   Ping   Config

Exit
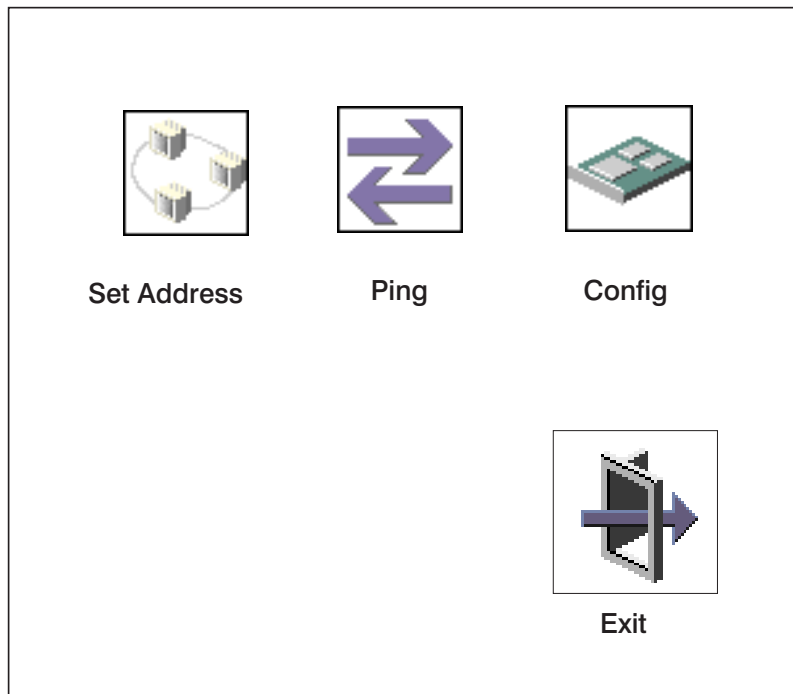
The Set Address icon allows you to define addresses from which your computer can receive RIPL code.

```
                          Remote  IPL  Setup


              Client  Addr        000.000.000.000     *
              Server  Addr        000.000.000.000     *
              Gateway  Addr       000.000.000.000
              Subnet  Mask        000.000.000.000




                  [Save icon]              [Exit icon]

                   Save                      Exit
```

Notes:

1. Those addresses indicated with an (*) are required.

2. Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 123.132.004.020. If you are using the NIM application, do not specify leading zeroes in the IP parameters section. Leading zeroes can cause subsequent attempts to initiate a network boot to fail.

If any of the addresses is incomplete or contains a number other than 0 to 255, an error message is displayed when you select the Save icon. To clear this error, change the improper address and select Save again.
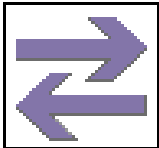
The Ping icon allows you to confirm that a specified address is valid by sending a test transmission to that address.

After choosing the Ping option, you may be asked to indicate which communications adapter (Token Ring or Ethernet) should be used to send the test transmission.
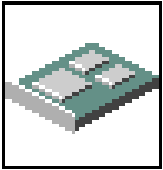
The Config icon allows you to configure network adapters which require setup. Selecting the Config icon presents a list of the adapters requiring configuration. Use the arrow keys to highlight an adapter, press the spacebar to select the adapter, then highlight the OK icon and press the Enter key.


```
   ☑   10/100 Ethernet slot=1

   ☐   10/100 Ethernet slot=2




        OK                        Exit
```
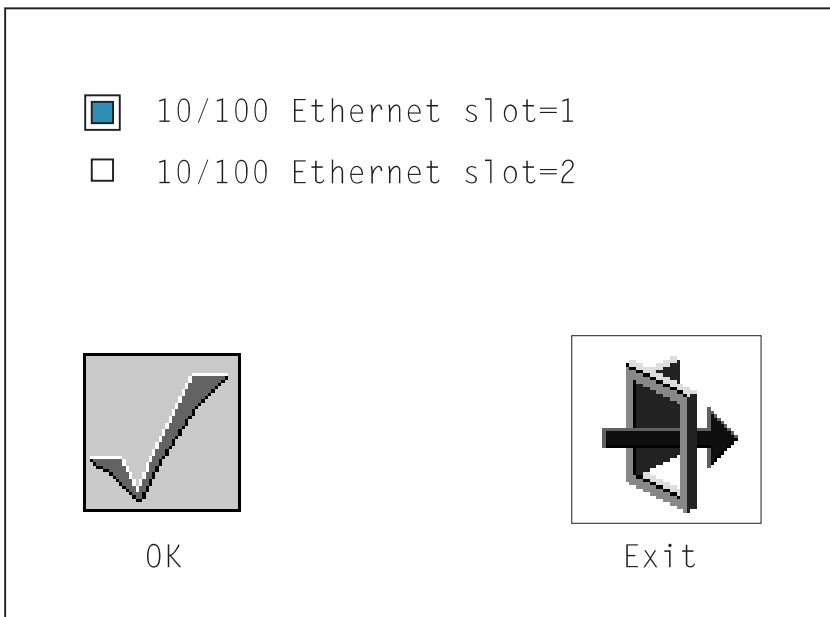
The next screen allows you to select the type of adapter you have just chosen (or allow the system to select the type automatically). You can also select the communications mode of the chosen adapter (or allow the system to select the communications mode automatically). As on the previous screen, use the arrow keys to highlight, press the space bar to select, then highlight the OK icon and press enter.

After choosing the adapter to configure, you can select the communications mode of the chosen adapter (or allow the system to select the communications mode automatically). As on the previous screen, use the arrow keys or mouse to highlight, then press the spacebar to select. When you have selected the communications mode, highlight the OK icon and press the Enter key.

SCSI ID
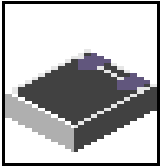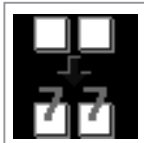
This selection allows you to view and change the addresses (IDs) of the SCSI controllers attached to your system unit. To change an ID, highlight the entry by moving the arrow keys, then enter another number. After you have entered the new address, use the arrow keys to highlight the Save icon and press the Enter key.

At any time in this process, you can select the Default icon to change the SCSI IDs to the default values.

Change SCSI ID

Type	Slot	ID	Max ID
Fast	5	7	7
Fast/Wide	7	7	15

Save   Default   Exit

Update

System Without Service Processor

System With Service Processor
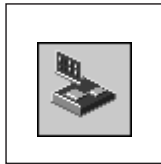
This selection allows you to update the firmware in your system unit from an image on a 3.5 inch diskette.

In order to create a firmware diskette with the latest level of firmware available, see

`http://www.rs6    .ibm.com/support/micro`

After choosing the Update option in the System Management Services, and confirming this choice, you must insert the diskette containing the firmware image.

ATTENTION: While the new firmware image is being copied into your system unit, **you must not turn off the system unit**. Turning off the system unit during the update process may render your system unit inoperable.

After the flash update is complete, the system unit restarts.

If the flash update does not complete successfully or the system unit does not restart after the flash update, contact your authorized reseller or marketing representative.

Firmware Recovery

If a troubleshooting procedure has indicated that the firmware information in your system unit has been corrupted, then you must perform a firmware recovery.

To perform a firmware recovery, do the following:

1. Locate your firmware update diskette.

2. Using another system unit, rename the ***.img** file on the firmware update diskette to **precover.img**.

3. Make sure your system unit is turned off.

4. Insert the firmware recovery diskette into your system unit.

5. Turn on your system unit.

6. When the keyboard indicator appears, press the **1** key if the system console is an ASCII terminal, or the **F1** key if the system console is a directly-attached keyboard.

7. When the System Management Services appear, choose Utilities and perform a Firmware Update as described under "Update" on page 3-22.

Text-Based System Management Services

The text-based Open Firmware command line and System Management Services are available if an ASCII terminal is attached to your system unit. The text-based Open Firmware command line allows you to configure some adapters, and the System Management Services makes it possible for you to view information about your system unit and to perform such tasks as setting passwords and changing device configurations.

To enter the Open Firmware command line, you must press the **8** key *after the keyboard text symbol appears* during startup.

If you have pressed the **8** key, the Open Firmware command line (an "OK" prompt) appears after the initialization and power-on self tests (POST) are complete.

The Open Firmware command line can be used to set up adapters that are not configurable with the System Management Services. Your adapter documentation directs you to use this option if it is needed.

To start the text-based System Management Services instead of the Open Firmware command line, press 1 on the ASCII terminal keyboard when the keyboard text symbol appears during startup.

After the text-based System Management Services starts, the following screen appears:

The firmware version installed in your system unit is displayed at the top of each screen in the text-based System Management Services. Please note the version number; processor upgrades may require a specified version of firmware to be installed in your system unit. (Update System Firmware is an option under the Utilities menu in the System Management Services.)

```
 System Management Services


 1.  Display Configuration
 2.  Select Boot Devices
 3.  Utilities
 4.  Select Language


                                         .------.
                                         |X=Exit|
                                          ------'

 ====>
```

Selecting the numbered options provide capabilities described on the following pages.

After you have finished using the text-based System Management Services, entering **x** (for exit) boots your computer.

Display Configuration

This option provides information about the setup of your computer. A screen similar
to the following displays:

```
    Device

    PowerPC 6 4
    L2-Cache,  512K
    Memory
       slotA=8MB
       slotB=8MB
    LPT
       addr=3BC
    COM
       addr=3F8
    COM
       addr=2F8
    Audio
    Keyboard
    Mouse
    Diskette
       addr=3F
    Integrated Ethernet
       addr=8    5AF67BD
    SCSI cntlr id=7

    PCI Adapters

    .-----------.  .-----------.                        .-------.
    |P=prev-page|  |N=next-page|                        |x=Exit|
     -----------'   -----------'                         ------'

```

Note that this configuration information does not include ISA adapters installed in the
system unit.

Select Boot Devices

This selection enables you to view and change the custom boot list, which is the
sequence of devices read at startup time.

```
Select Boot Devices

 1. Display Current Settings
 2. Restore Default Settings
 3. Configure 1st Boot Device
 4. Configure 2nd Boot Device
 5. Configure 3rd Boot Device
 6. Configure 4th Boot Device


                                   .------.
                                   |X=Exit|
                                    ------'

 ====>
```

Selecting the Display Current Settings option lists the current order of devices in the
boot list. The following screen shows an example of this display.

```
Current Boot Sequence

 1. Diskette
 2. Ethernet (Integrated)
 3. SCSI CD-ROM          id=3   (slot=1)
 4. SCSI 5  MB Hard Disk  id=6   (slot=1)



                                   .------.
                                   |X=Exit|
                                    ------'

 ===>
```

Selecting any of the Configure Boot Device options displays the following screen:

```
   Configure Nth Boot Device

   Device Number        Current Position        Device Name

        1                    1                Diskette
        2                    2                Ethernet
        3                    3                SCSI CD-ROM
        4                    4                SCSI 5  MB Hard Disk
        5                    -




    .-----------. .-----------.                     .------.
    |P=prev-page| |N=next-page|                     |X=Exit|
     -----------'  -----------'                      ------'


===>
```

Utilities

The Utilities screen enables you to select from the following system management tools.

The following screen appears if you DO NOT have a service processor installed in your system:

```
 Utilities

  1. Set Password and Unattended Start Mode
  2. Audio <ON>
  3. Display Error Log
  4. Remote Initial Program Load Setup
  5. Change SCSI id
  6. Update System Firmware
  7. Select Console




                                          .------.
                                          |X=Exit|
                                           ------'
 ===>
```

The following screen appears if you have a service processor installed in your system:

```
 Utilities

  1. Set Password and Unattended Start Mode
  2. Audio <ON>
  3. Display Error Log
  4. Remote Initial Program Load Setup
  5. Change SCSI id
  6. Update System Firmware
  7. Update Service Processor
  8. Select Console


                                          .------.
                                          |X=Exit|
                                           ------'
 ===>
```

Set Password and Unattended Start Mode: Entering this selection permits access to the following options:

```
Password Utilities

 1. Set Power On Password
 2. Remove Power On Password
 3. Unattended Start Mode <OFF>
 4. Set Privileged-Access Password
 5. Remove Privileged-Access Password




                                      .------.
                                      |X=Exit|
                                       ------'
===>
```

Set Power On Password: Setting a power-on password helps protect information stored in your computer. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. The password you type is not displayed on the screen. Press **Enter** when you are finished; you are required to type the password again for verification.

If you previously had set a power-on password and wanted to remove it, select **Remove Power-On Password**.

Note: If you *forget* your password, you must shut down the computer and remove the battery for at least 30 seconds to disable the password. See Appendix B, "Replacing the Battery" on page B-1 for details.

A password can be set only after the system is turned off and on again.

Set Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

If you previously had set a privileged-access password and want to remove it, select **Remove Privileged-Access Password**.

Note: If you *forget* your password, you must shut down the computer and remove the battery for at least 30 seconds to disable the password. See Appendix B, "Replacing the Battery" on page B-1 for details.

Audio: Selecting this utility turns on or off the system tones heard at power-on time.

Remote Initial Program Load Setup: This option allows you to enable and set up the remote startup capability of your computer. First, you are asked to specify the network parameters.

```
Network Parameters

 1. IP Parameters
 2. Adapter Parameters
 3. Ping

                                     .------.
                                    |X=Exit|
                                     ------'

===>
```

Note: Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 123.132.004.020.

Selecting the IP Parameters option displays the following screen.

```
 IP Parameters

  1. Client IP Address      .   .   .
  2. Server IP Address      .   .   .
  3. Gateway IP Address     .   .   .
  4. Subnet Mask            .   .   .




                                     .------.
                                     |X=Exit|
                                      ------'


 ===>
```

Selecting the Adapter Parameters option allows you to view an adapter's hardware
address as well as configure network adapters that require setup.

```
 Adapter Parameters


    Device              HW Address

  1. 3Com,3C9 5          8    5AFC67BD
  2. Token-Ring          8    32E54A12




                                     .------.
                                     |X=Exit|
                                      ------'

```

Selecting option 1 (3Com,3C905) displays the following 100Mb Ethernet configuration menus:

```
3Com Etherlink Fast XL


1. Media Type          Auto"
2. Full Duplex         Auto"




                                      .------.
                                      |X=Exit|
                                       ------'
```

Selecting the Media Type option allows you the change the media employed by the Ethernet adapter:

```
           .----------------.
           | MEDIA TYPE     |
           | 1. 1  BaseT    |
           | 2. 1   Base TX |
           | 3. Auto        |
            ----------------'
```

Selecting the Full Duplex option allows you to change how the Ethernet adapter
communicates with the network:

```
                    .----------------.
                    | Full Duplex    |
                    | 1. Yes         |
                    | 2. No          |
                    | 3. Auto        |
                     ----------------'
```

Ping, the last option available from the Network Parameters menu, allows you to test
a connection to a remote system unit. After selecting the Ping option, you must
choose which adapter communicates with the remote system.

```
 Interface

  1. Ethernet (Integrated)
  2. Token Ring (Slot=3)




 ===>
```

After choosing which adapter to use to ping the remote system, you must provide the addresses needed to communicate with the remote system.

```
Ping

 1. Client IP Address    129.132.4.2
 2. Server IP Address    129.132.4.1
 3. Gateway IP Address   129.132.4.3
 4. Subnet Mask          255.255.255.




      .---------.                                    .------.
      |E=Execute|                                    |X=Exit|
       ---------'                                     ------'

 ===>
```

Display Error Log: A screen similar to the following is displayed when you select this option. Here, you can view or clear your computer's error log.

```
      .------------------------------------------------------------.
      |                     Error Log                    |
      |                                                  |
      |        Date       Time      ErrorCode      Location |
      |   Entry 1. 96/ 4/ 1   12:13:22   25A8   11        -     |
      |   Entry 2. no error logged                       |
       ------------------------------------------------------------'




      .-----------------.                         .------.
      |C=Clear Error Log|                         |X=Exit|
       -----------------'                          ------'
```

Change SCSI ID: This option allows you to view and change the addresses of the SCSI controllers attached to you computer.

Update System Firmware: This selection allows you to update the firmware in your system unit from an image on a 3.5 inch diskette.

In order to create a firmware diskette with the latest level of firmware available, see

```
http://www.rs6    .ibm.com/support/micro
```

After choosing the Update option in the System Management Services, you must insert the diskette containing the firmware image after you see the following prompt.

```
    .----------------------------------------------------------------.
    | This selection will update your System Firmware. Do you want |
    | to continue? Press Y(Yes) N(No).                             |
     ----------------------------------------------------------------'
```

Firmware Recovery: If a troubleshooting procedure has indicated that the firmware information in your system unit has been corrupted, then you must perform a firmware recovery.

To perform a firmware recovery, do the following:

 1. Locate your firmware update diskette.

 2. Using another system unit, rename the ***.img** file on the firmware update diskette to **precover.img**.

 3. Make sure your system unit is turned off.

 4. Insert the firmware recovery diskette into your system unit.

 5. Turn on your system unit.

 6. When the keyboard indicator appears, press the **1** key on the system console ASCII terminal.

 7. When the System Management Services appear, choose Utilities and perform a System Firmware Update as described above.

Select Console: Selecting this option allows you to define which display is used by the system for system management.

Select Language

This option allows you to change the language used by the text-based System Management Services screens:

```
 SELECT LANGUAGE

 1.  English
 2.  Francais
 3.  Deutsch
 4.  Italiano
 5.  Espanol
 6.  Svenska


 ====>                                          .------.
                                                |x=Exit|
                                                 ------'
```

Note: Your ASCII terminal must support the ISO-8859 character set in order to properly display languages other than English.

Chapter 4. Installing Options

This chapter provides instructions to help you add options to your CPU Drawer. Some option-removal instructions are provided, in case you need to remove one option to install another. If you have several internal options to install, these instructions enable you to add them all at one time.

Before you start, be sure you are familiar with the safety and handling guidelines in "Safety Considerations" on page 4-2, and "Handling Static-Sensitive Devices" on page 4-3. These guidelines help you work safely with your server or options.

Safety Considerations

Observe the following safety precautions any time you work with this system unit.

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent and electrical shock.**
>
> **Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.**
>
> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
>
> **Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.**

CAUTION:
This product is equipped with a three–wire power cable and plug for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.

DANGER

> **To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.**

Handling Static-Sensitive Devices

Attention: Adapters, planars, diskette drives, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags, as shown in this illustration, to prevent this damage.

Take the following precautions:

If you have an antistatic wrist strap available, use it while handling the device.

Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.

With the device still in its antistatic bag, touch it to a metal frame of the system.

Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.

If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.

Handle the devices carefully in order to prevent permanent damage.
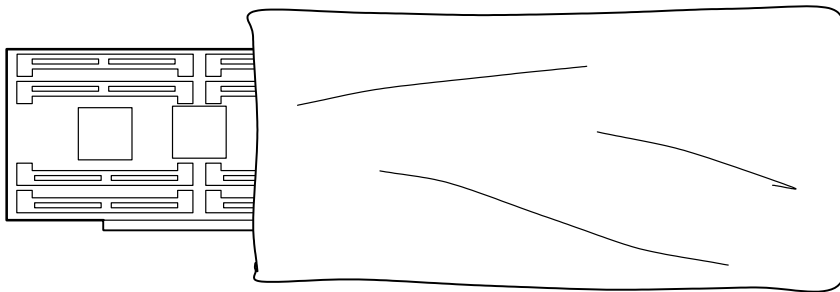
Expansion Bays

Your system comes with one 3.5-inch, 1.44MB diskette drive and a SCSI CD-ROM drive installed in bank A. The number of preinstalled disk drives in banks B and C of your CPU Drawer varies according to the model you ordered.
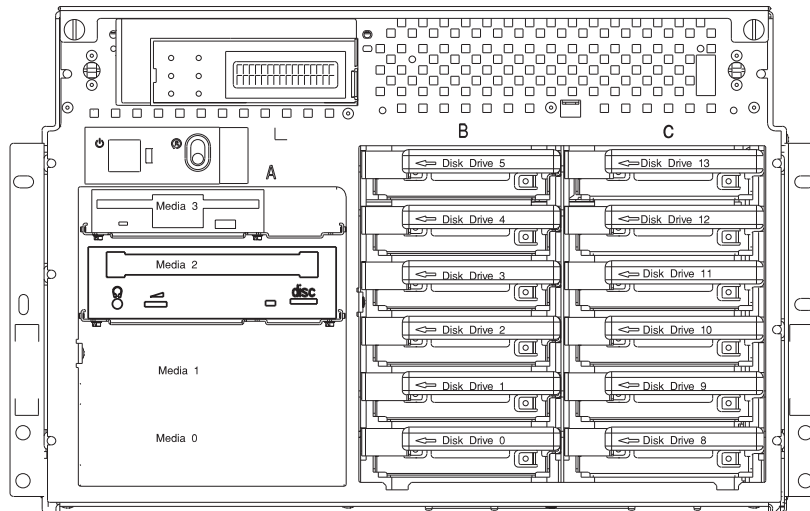
Diskette Drive: The 3.5-inch, 1.44MB diskette drive uses 1MB, and 2MB diskettes.

Open Bays: Your system's special design gives you the flexibility to use up to twelve 3.5-inch disk drives (either SCSI or SSA) in banks B and C. To install SSA drives in banks B and C, however, a SCSI disk drive must be installed on a media tray in bank A, to serve as a boot drive. There are two additional open spaces in the bottom of bank A for additional media devices. For installation instructions and information on the types of drives that you can install in each bay, see "Installing SCSI Disk Drives into the Hot Swap Bays" on page 4-8 and "Installing an SSA Disk Drive in Bank B or C." on page 4-13.

Disk Drive: All models come with one or more integrated SCSI-2 disk drives. The capacity of the disk drives varies, depending on your configuration.

Input/Output Connectors
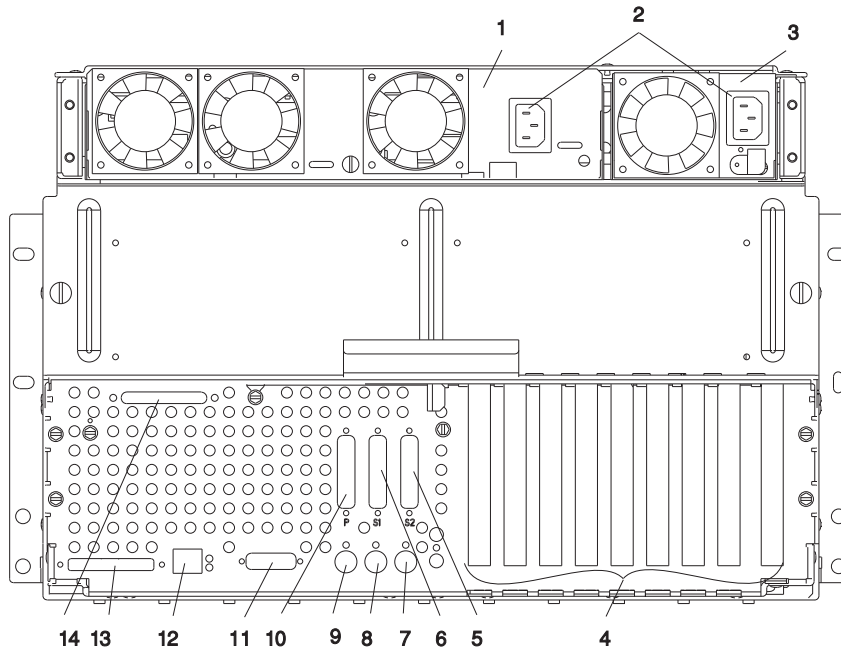
1. **Base Power Supply**

2. **Power Connector:** One for the base power supply and one for the auxiliary power supply.

3. **Auxiliary Power Supply**

4. **Adapter Slots:** Two 64-bit PCI connectors, four 32-bit PCI connectors, and two connectors that can accept either ISA or PCI adapters.

5. **Serial Connector:** 25-pin serial connector 1

6. **Serial Connector:** 25-pin serial connector 2

7. **Mouse Connector:** This is where the mouse cable connects to the system. This connector sometimes is called an auxiliary-device or pointing-device port.

8. **Keyboard Connector:** The cable from your keyboard connects here.

9. **Tablet Connector:** The cable from your tablet connects here.

10. **Parallel Connector:** One 25-pin parallel port is provided.

11. **Ethernet Connector:** The cable from your Ethernet LAN connects here.

12. **Twisted Pair Ethernet Connector:** If you need to connect to a Twisted Pair Ethernet LAN, it connects here.

13. **External SCSI Connector:** The cable from your external SCSI bus connects here.

Preinstallation Steps (All Bays)

Note: All internal drives in this system are mounted horizontally.

1. Touch the static-protective bag containing the drive to any unpainted metal surface on the system; then remove the drive from the bag.
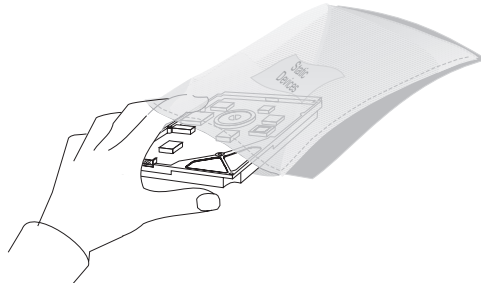
2. Check the instructions that came with the drive to see if you need to set any switches or jumpers on the drive, or if you need to attach a tray to the drive.

   Note: Automatic SCSI ID setting applies only to hot swap disk drives.

3. Choose the location in which you want to install the drive.

   To install a SCSI disk drive in bank B or C, go to page 4-8.
   To install an SSA disk drive in bank B or C, go to page 4-13.
   To remove a SCSI disk drive from bank B or C, go to page 4-17.
   To remove an SSA Disk Drive from bank B or C, go to page 4-21.

Installing SCSI Disk Drives into the Hot Swap Bays

This procedure describes how to install SCSI disk drives into a hot swap bay while the CPU Drawer is powered on.

Attention: Do not open the drive; no user adjustments or serviceable parts are inside.

Notes:

1. This procedure is similar for any hot swap disk drive that is supported by this drawer.

2. SCSI disk drives and SSA disk drives are not interchangable.

3. For additional information regarding the operation of the hot swap disk drives see the installation and users guide that came with the drives.

4. Remember that each 1.6 inch SCSI disk drive takes two bays.

This section gives the instructions for installing hot swap SCSI disk drives into banks B and C.

1. To install a hot swap disk drive, remove the front bezel by grasping each side and gently pulling the bezel toward you.
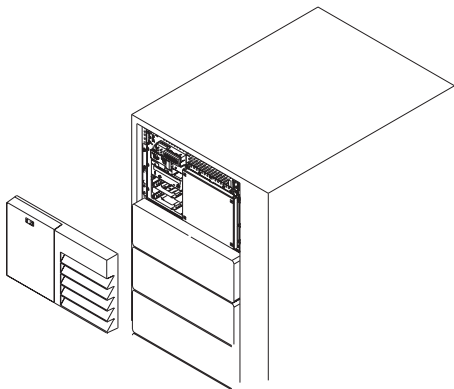
2. Loosen the retained screws that hold the disk drive cover to the drawer and remove the the disk drive cover from the drawer, storing it in a safe place.
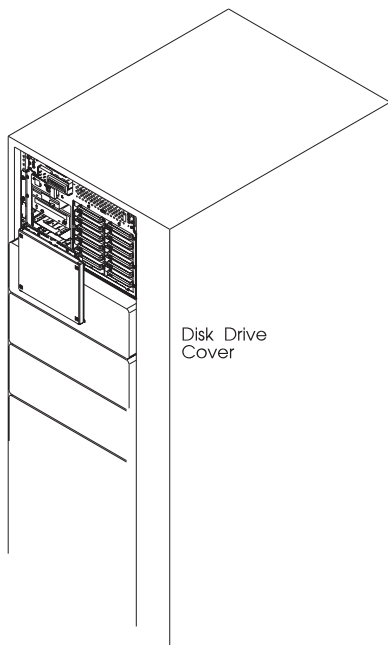
Disk Drive
Cover

3. Each hot swap disk drive you plan to install must have the hot swap SCSI disk drive carrier attached.

   Attention: Handle the hot swap disk drive with care as it is very fragile and can be easily damaged if exposed to shock, electrostatic discharge, or rough handling.

4. It is recommended that you install the hot swap disk drive in the next unused position of bank B or C.

Attention: Attaching SCSI address jumpers on the hot swap disk drive rather than using the automatic ID furnished by the backplane is not advised. Attaching jumpers can cause service problems, multiple drives at the same address, or confusion locating the correct drive.

a. Rotate the carrier latch to the open position.

Locked Position

Spin Down Button
Green
Amber

Open Position
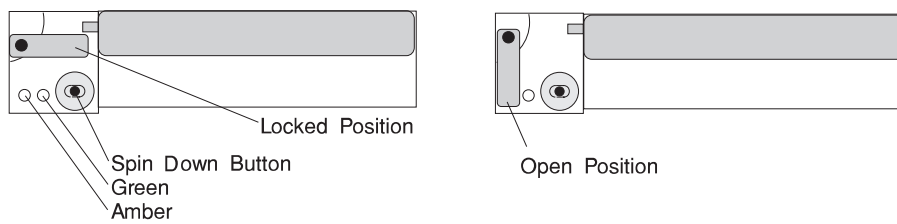
b. Position the drive carrier assembly horizontally, with the connector facing into the bay.

c. Align the side of the carrier with the raised guides on the left of the bay.

d. Slide the carrier into the bay gently to keep from damaging the hot swap disk drive. Slide the carrier to the rear of the bay until it is seated into the connector.
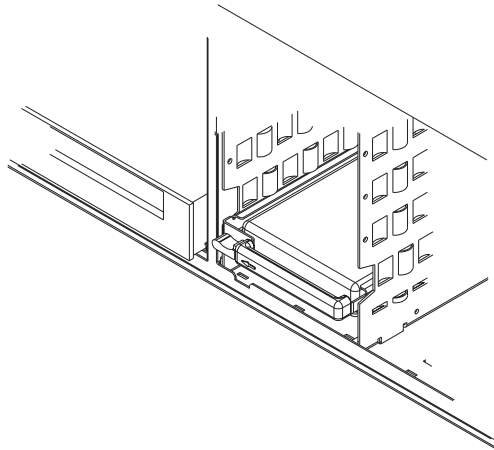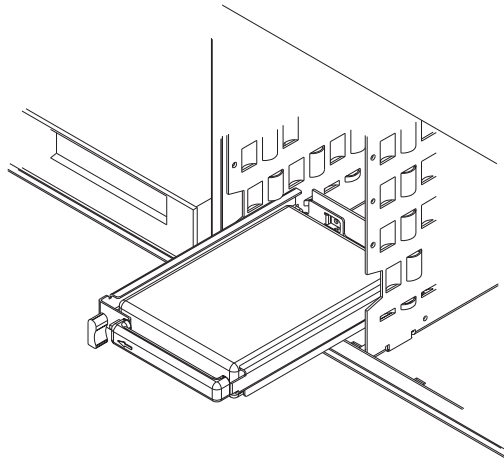
e. Move the carrier latch to the locked position. If the carrier does not lock, check that the drive carrier is fully seated in the backplane. When the drive carrier is fully seated and power is turned on, the green LED on the drive carrier illuminates.

Open Position

Locked Position

Spin Down Button
Green
Amber
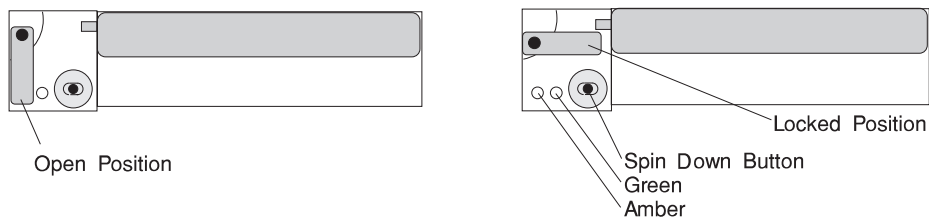
5. See "Disk Drive Status Light States" on page 2-17 for information on hot swap disk drive lights.

6. Go to Appendix A, "System Records" on page A-1 to record the drive location and the SCSI ID assigned to the drive; then return here to determine your next step.

7. If you have other hot swap disk drives to install, go to page 4-10.

8. If you do not have any other procedures to perform, replace the cover that you removed in step 2 on page 4-9.

9. Install the bezel, as described in "Installing the Bezel" on page 4-25.

Installing an SSA Disk Drive in Bank B or C.

Notes:

Banks B and C support hot-swappable disk drives only.

SSA disk drive carriers and SCSI disk drive carriers are not interchangable.

To run SSA drives in banks B and C, a SCSI disk drive must be installed on a media tray in bank A, to serve as a boot drive.

9.1GB SSA drives are 1.6" high, and require two bays for each drive.

Before installing SSA disk drives in bank C, you must also order and install an SSA disk drive backplane at the rear of bank C. You must also order and install an SSA adapter. To order, contact your authorized reseller or marketing representative.)

After the backplane is completely installed, you do not have to turn off the server to install additional hot-swappable disk drives. However, you must turn off the server when performing the steps that involve installing or removing backplanes, cables, power supplies, the fan assembly, CPU card bracket, and adapters.

1. To install a hot swap disk drive, remove the front bezel by grasping each side and gently pulling the bezel toward you.
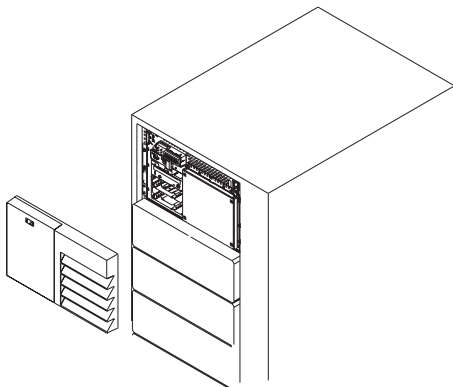
2. Loosen the retained screws that hold the disk drive cover to the drawer and remove the the disk drive cover from the drawer, storing it in a safe place.

Disk Drive
Cover
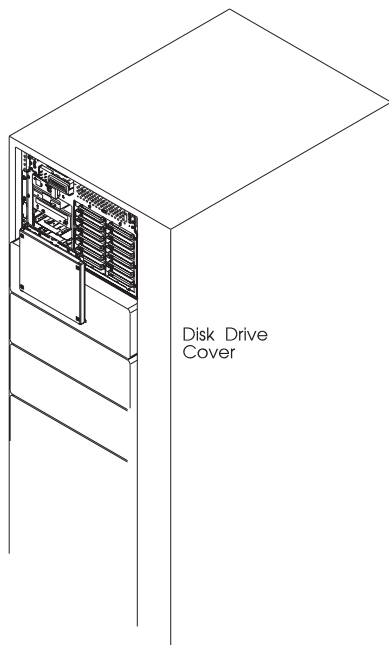
3. If you are installing drives in bank C for the first time, you must install an additional backplane before you can install drives. Contact your hardware support center to install the backplane.

4. Each drive you plan to install in bank B or C must have the hot-swap SSA disk drive carrier attached.

   Attention: Handle the disk drive with care as it is very fragile and can be easily damaged if exposed to shock, electrostatic discharge, or rough handling.

5. It is recommended that you install the disk drive in the next unused position of bank B or C.

   Attention: SSA backplanes must be fully populated. Each bay must have a disk drive or a blank carrier installed at all times. If you are installing a disk drive in a bay that was not previously utilized, you must remove the blank carrier prior to installing the disk drive.

   a. Rotate the carrier latch to the open position.

Check
Ready
Power
Locked Position
Open Position
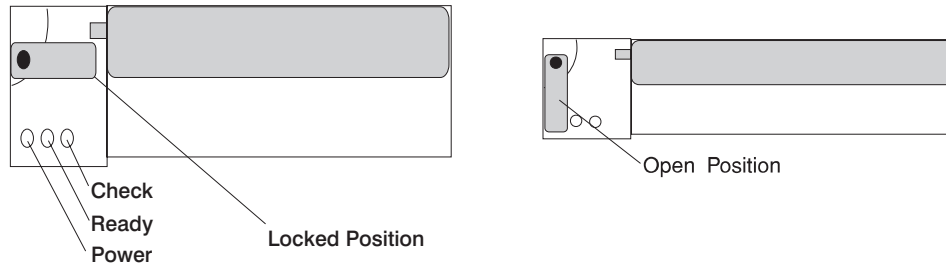
b. Position the drive carrier assembly horizontally, with the connector facing the rear of the server.

c. Align the side of the carrier with the raised guides on the left of the bay.

d. Slide the carrier into the bay gently to keep from damaging the disk drive. Slide the carrier to the rear of the bay until it stops.
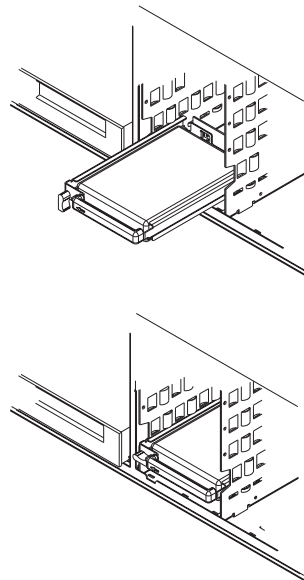
e. Move the carrier latch to the locked position. If the carrier does not lock, check that the drive carrier is fully seated in the backplane. When the drive carrier is fully seated and power is turned on, the Ready LED on the drive carrier illuminates.

Open Position

Check
Ready
Power
Locked Position
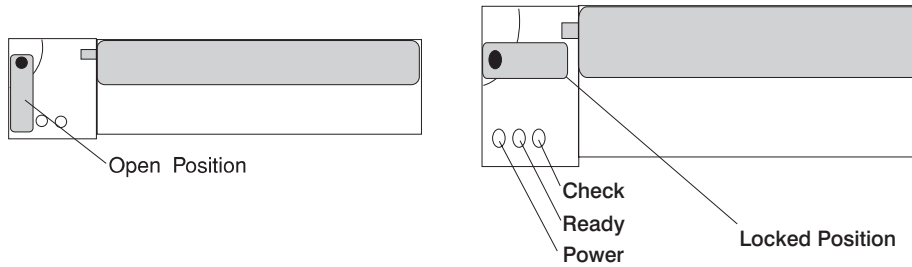
6. See "Disk Drive Status Light States" on page 2-17 for information on disk drive lights.

7. Go to Table A-2 on page A-4 to record the drive location for the drive; then return here to determine your next step.

8. If you have other drives to install, go to page 4-7.

9. If you do not have any other procedures to perform, replace the disk drive cover and bezel that you removed earlier.

Removing SCSI Disk Drives from the Hot Swap Bays

This procedure describes how to remove hot swap disk drives from a hot swap bay while the CPU Drawer is powered on.

If you remove a hot swap disk drive when the CPU Drawer power is off, steps 3 on page 4-18 and 4 on page 4-19 do not apply.

Attention: Follow all procedures for ESD-sensitive parts while performing these procedures. For ESD information, see "Handling Static-Sensitive Devices" on page 4-3.

1. If you need to remove a hot swap disk drive from the drawer, remove the front bezel by grasping each side and gently pulling the bezel towards you.
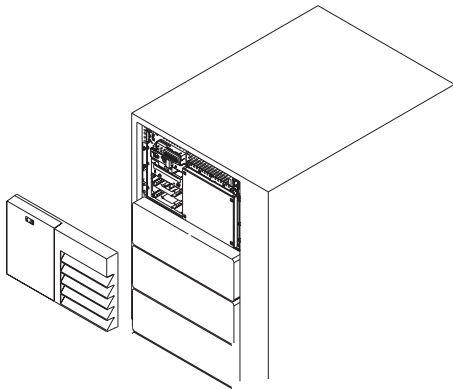
2. Loosen the retained screws that hold the disk drive cover to the drawer and remove the the disk drive cover from the drawer, storing it in a safe place.

Disk Drive
Cover
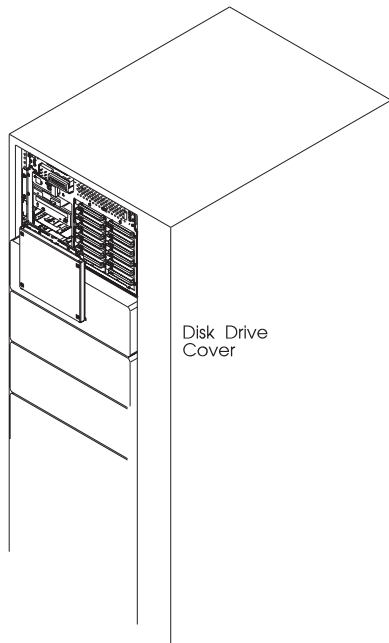
Attention: Physically removing a hot swap drive from the CPU Drawer before it has been removed from the system configuration, may cause unrecoverable data corruption.

3. Verify that the device has been removed from the system configuration; the yellow LED on the hot swap disk drive should be off.

4. Press the spin down button on the hot swap disk drive; observe the green flashing LED.

Spin Down Button

Green

Amber

5. Rotate the carrier latch to the open position.

Locked Position

Spin Down Button
Green
Amber
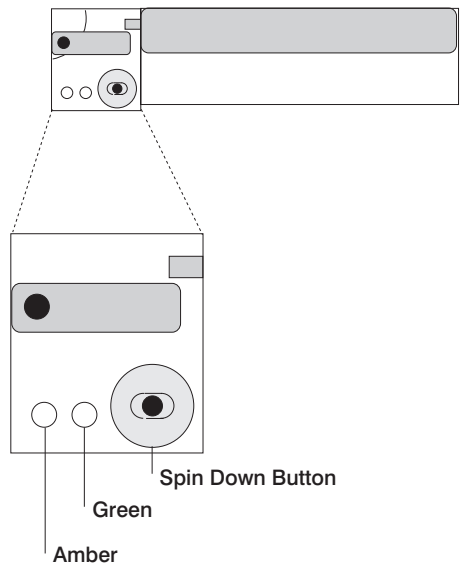
Open Position
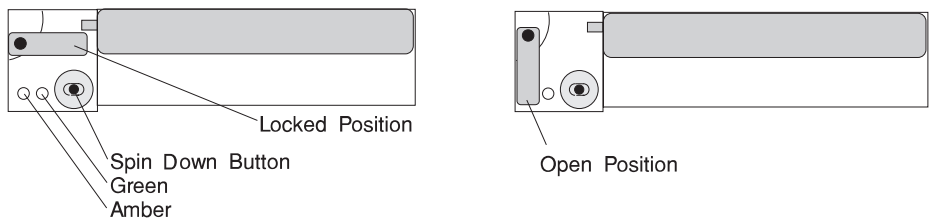
6. Pull the hot swap disk drive out of the hot swap bay, keeping it straight to prevent damage.

7. Place the hot swap disk drive in an antistatic bag if you are going to reuse it.

8. Replace the disk drive. See "Installing SCSI Disk Drives into the Hot Swap Bays" on page 4-8.

9. Replace the disk drive cover that you removed earlier.

10. Install the bezel, as described in "Installing the Bezel" on page 4-25.

Removing an SSA Disk Drive from Bank B or C

Notes:

To locate banks B and C, refer to the following illustration:
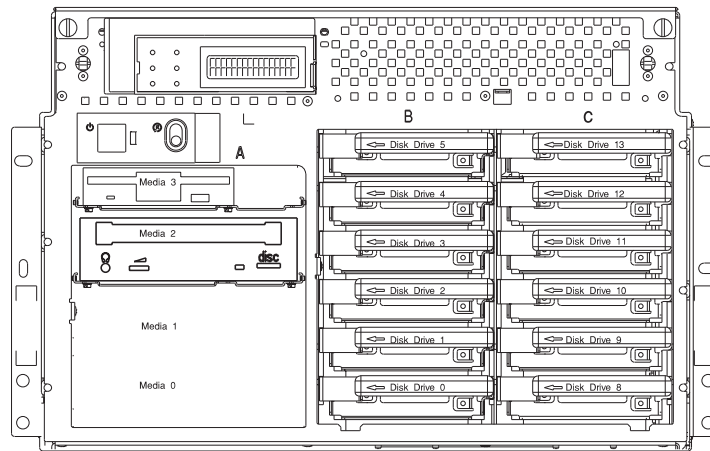
You do not have to turn off the server to remove a drive from banks B or C.

The lights on the disk drive provide status of the drives. See "Disk Drive Status Light States" on page 2-17 for a definition of the disk drive status.

Attention: An application procedure unique to your operating system must be followed which logically removes the drive from the system and spins it down. If you remove a drive while it is in use, your server may lose valuable data.

To remove a drive from bank B or C, do the following steps:

1. Remove the front bezel by grasping each side and gently pulling the bezel towards you.
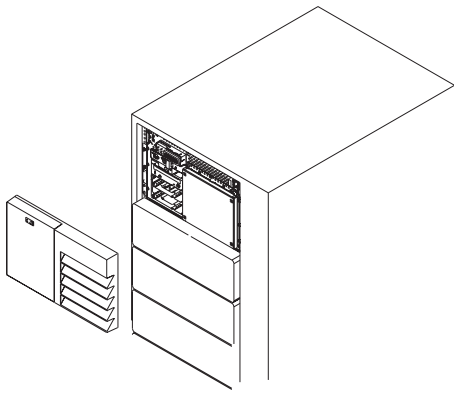
2. Loosen the retained screws that hold the disk drive cover to the drawer and remove the the disk drive cover from the drawer, storing it in a safe place.

Disk Drive Cover
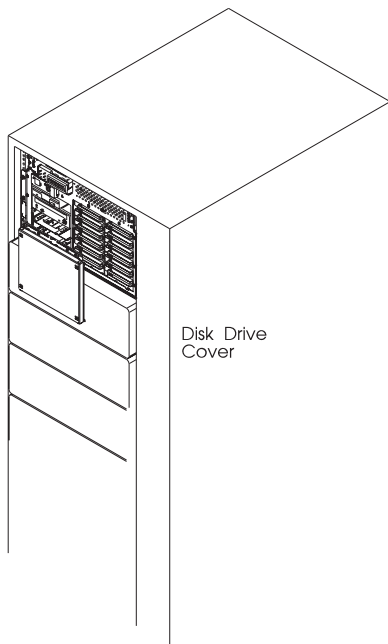
3. Remove the drive from the system configuration.

4. Locate the drive you want to remove.

5. Ensure that you have selected the correct drive (the check LED is flashing).

6. Unlock the drive by turning the carrier latch 90 degrees clockwise to the open position.

Check
Ready
Power
Locked Position
Open Position
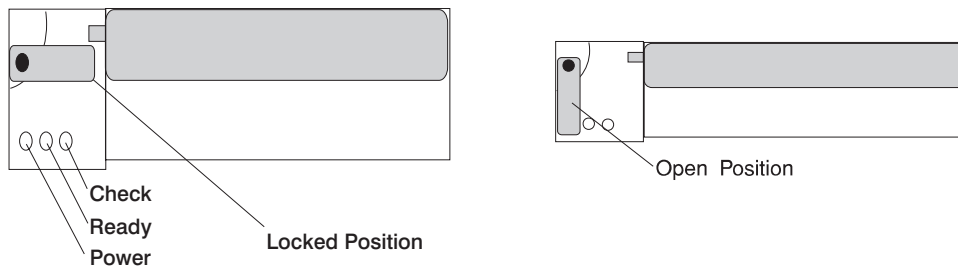
Attention: SSA backplanes must be fully populated. Each backplane connector must have a disk drive or a blank carrier installed at all times. If you remove a disk drive from a bay and do not replace it with another disk drive, you must install a blank carrier in that bay.

7. Disconnect the drive from the connector on the backplane, by grasping the handle on the drive tray and carefully pulling the drive out of the server. Store the drive in a safe place.

Attention: Handle the disk drive with care as it is very fragile and can be easily damaged if exposed to shock, ESD, or rough handling.
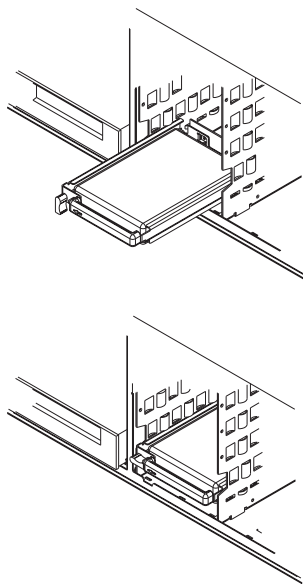
8. If you are removing another SSA disk drive, return to step 4 on page 4-22.

9. If you are installing another SSA disk drive or carrier blank in bank B or C, go to "Installing an SSA Disk Drive in Bank B or C." on page 4-13.

10. Go to Table A-2 on page A-4 and update the drive information; then return here to determine your next step.

11. If you do not have any other procedures to perform, replace the disk drive cover and bezel that you removed earlier.

Installing the Bezel

To install the bezel, locate and align the Velcro loops to the corresponding Velcro hooks on the front of the drawer and push the bezel in place.
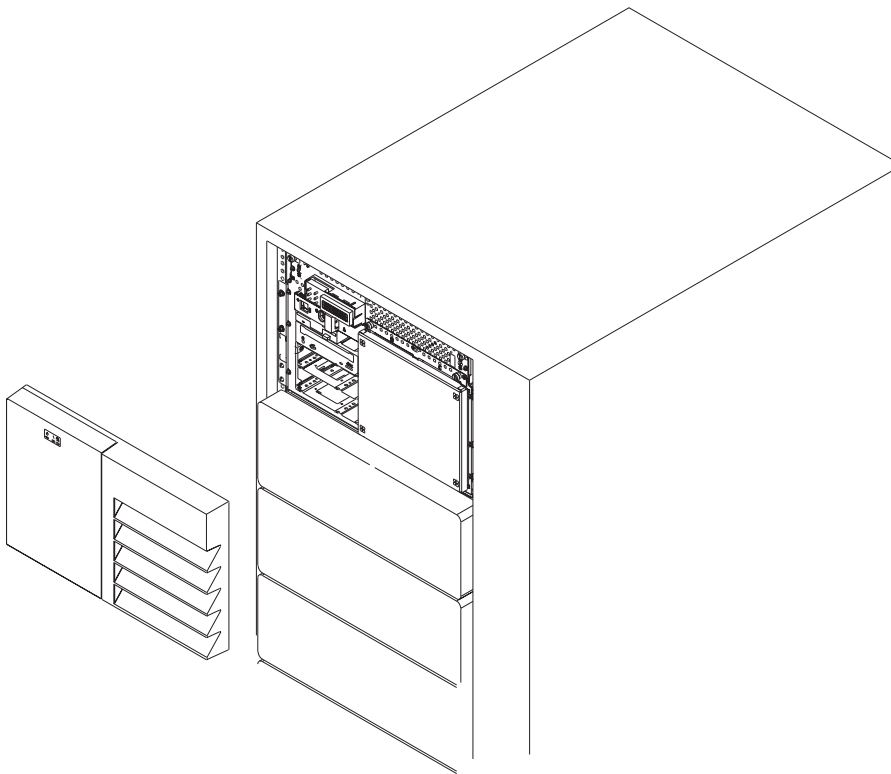
Chapter 5. Using the Standalone and Online Diagnostics

Sources for the Diagnostic Programs

The diagnostics consist of Standalone Diagnostics and Online Diagnostics. Stand-alone Diagnostics are resident on removable media. They must be booted or mounted before they can be run. If booted, they have no access to the AIX Error Log or the AIX Configuration Data. However, if mounted, they have access to the AIX Error Log and the AIX Configuration Data.

Online Diagnostics, when installed, are resident with AIX on the disk or server. They can be booted in single user mode (referred to as service mode), run in maintenance mode (referred to as maintenance mode), or run concurrently (referred to as concur-rent mode) with other applications. They have access to the AIX Error Log and the AIX Configuration Data.

Standalone and Online Diagnostics Operating Considerations

The following items identify some things to consider before using the diagnostics.

   Run Online Diagnostics in Service Mode when possible, unless otherwise directed. The Online Diagnostics perform additional functions, compared to Standalone Diagnostics.

   When running Online Diagnostics, device support for some devices may not have been installed. If this is the case, that device will not appear in the resource list.

   When running Standalone Diagnostics, device support for some devices may be contained on supplemental diagnostic media. If this is the case, the device will not appear in the resource list when running diagnostic unless the supplemental media has been processed.

   Support for some tty terminals is optionally installed. If you attach a tty terminal to a system to run diagnostics beware that it may not work properly since the AIX support for the terminal may not be installed.

Selecting a Console Display

When you run Standalone Diagnostics and under some conditions Online Diagnos-tics, you need to select the console display. The diagnostics display instructions on any graphics display and the terminal attached to the S1 port.

Identifying the Terminal Type to the Diagnostics Programs

Note: This is a different function than selecting a console display.

When you run diagnostics, the diagnostics must know what type of terminal you are using. If the terminal type is not known when the FUNCTION SELECTION menu is displayed, the diagnostics do not allow you to continue until a terminal is selected from the DEFINE TERMINAL option menu. Select lft for adapter-attached displays.

Undefined Terminal Types

If an undefined terminal type from the DEFINE TERMINAL option menu is entered, the menu will prompt the user to enter a valid terminal type, and the menu will be redisplayed until either a valid type is entered or the user exits the DEFINE TER-MINAL option.

Resetting the Terminal: If the user enters a terminal type that is valid (according to the DEFINE TERMINAL option menu) but is not the correct type for the ASCII terminal being used, difficulty may be encountered in reading the screen, using the function keys or the Enter key. These difficulties can be bypassed by pressing Ctrl-C to reset the terminal. The screen display which results from this resetting action varies with the mode in which the system is being run:

Online Normal or Maintenance Mode - The command prompt appears.

Standalone Mode or Online Service Mode -The terminal type will be reset to "dumb", the Diagnostic Operating Instruction panel will be displayed, and the user will be required to go through the DEFINE TERMINAL process again.

Running Standalone Diagnostics

Consider the following when you run Standalone Diagnostics:

The diagnostic disc must remain in the CD-ROM drive for the entire time that diagnostics are executing.

The diagnostic CD-ROM disc cannot be ejected from the CD-ROM drive once the diagnostic programs have loaded. The disc can only be ejected after the system has been powered-Off and then powered-On (Standalone mode) or after the diagnostics program has terminated (Online concurrent mode). The disc must be ejected prior to the system attempting to load the diagnostic programs again.

The CD-ROM drive from which diagnostics were loaded cannot be tested.

The SCSI adapter (or circuitry) controlling the CD-ROM drive from which diag-nostics were loaded cannot be tested.

Running Online Diagnostics

Consider the following when you run the Online Diagnostics from a server or a disk:

The diagnostics cannot be loaded and run from a disk until the AIX operating system has been installed and configured. After the installation of the AIX operating system, all three modes of operation are available.

The diagnostics cannot be loaded on a system (client) from a server if that system is not set up to IPL from a server over a network, or the server has not been setup to send a service mode IPL of the diagnostics. When the system is set up to IPL from a server, the diagnostics are executed in the same manner as they are from disk.

If the diagnostics were loaded from disk or a server, you must shutdown the AIX operating system before powering the system unit off to prevent possible damage to disk data. This is done in one of two ways:

– If the diagnostic programs were loaded in Standalone mode, press the F3 key until DIAGNOSTIC OPERATING INSTRUCTIONS displays; then follow the displayed instructions to shutdown the AIX operating system.

– If the diagnostic programs were loaded in maintenance or concurrent mode, enter the shutdown -F command.

Under some conditions the system may stop, with instructions displayed on attached displays and terminals. Follow the instructions to select a console display.

Running the Diagnostics from a tty terminal

Consider the following when you run diagnostics using a tty-type terminal as the console display:

See the operator manual for your type of tty terminal to find the key sequences you need to respond to the diagnostics. For the 3151, refer to the 3151 ASCII Display Station Guide to Operations, form number GA18-2633. For the 3164, refer to the 3164 ASCII Color Display Station Description, form number GA18-2617.

When the diagnostics present display information through the S1 port, certain attributes are used. These attributes are set as if the diagnostics were using a 3161 display terminal. The following tables list attributes for the 3161 ASCII Display Terminal and for two other ASCII display terminals commonly used with the system.

If you have a tty terminal other than a 3151, 3161 or 3164 attached to the S1 port, your terminal may have different names for the attributes. Use the attribute descriptions in the following tables to determine the settings for your terminal.

General Attributes Always Required

The following general attributes are the default settings for the diagnostics. Be sure your terminal is set to these attributes.

Note: These attributes should be set before the diagnostics are loaded.

Refer to the following table.

General Setup Attributes	3151 /11/31 /41 Set- tings	3151 /51/61 Set- tings	3161 /3164 Set- tings	Description
Machine mode	3151	3151	3161 or 3164	The diagnostics are set to emulate use of the 3161 ASCII Display Terminal. If your ter- minal can emulate a 5085, 3161 or 3164 terminal, use the following attribute settings. Otherwise, refer to your opera- tor's manual, compare the fol- lowing attribute descriptions with those of your terminal, and set your attributes accord- ingly.
Generated Code Set		ASCII		
Screen	Normal	Normal		Uses the EIA-232 interface protocol.
Row and column	24 x 80	24 x 80		Uses the EIA-232 interface protocol.
Scroll	Jump	Jump	Jump	When the last character on the bottom line is entered, the screen moves down one line.

General Setup Attributes	3151 /11/31 /41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
Auto LF	Off	Off	Off	For the "On" setting, pressing the Return key moves the cursor to the first character position of the next line. For the "Off" setting, pressing the Return key moves the cursor to the first character position of the current line. The CR and LF characters are generated by the New line setting.
CRT saver	Off	Off	10	The "10" setting causes the display screen to go blank if there is no activity for 10 minutes. When the system unit sends data or a key is pressed, the display screen contents are displayed again.
Line wrap	On	On	On	The cursor moves to the first character position of the next line in the page after it reaches the last character position of the current line in the page.
Forcing insert	Off	Off		
Tab	Field	Field	Field	The column tab stops are ignored, and the tab operation depends on the field attribute character positions.
Trace			All	Both inbound data (data to the system unit) and outbound data (data from the system unit) to and from the main port can be transferred to the auxiliary port without disturbing communications with the system unit when the Trace key is pressed.

Additional Communication Attributes

The following communication attributes are for the 3151, 3161, and 3164 terminals.

Communication Setup Attributes	3151 /11/31 /41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
Operating mode	Echo	Echo	Echo	Data entered from the keyboard on the terminal is sent to the system unit for translation and then sent back to the display screen. Sometimes called conversational mode.
Line speed	9600 bps	9600 bps	9600 bps	Uses the 9600 bps (bits per second) line speed to communicate with the system unit.
Word length (bits)	8	8	8	Selects eight bits as a data word length (byte).
Parity	No	No	No	Does not add a parity bit, and is used together with the word length attribute to form the 8-bit data word (byte).
Stop bit	1	1	1	Places a bit after a data word (byte).
Turnaround character	CR	CR	CR	Selects the carriage return (CR) character as the line turnaround character.
Interface	EIA-232	EIA-232	EIA-232	Uses the EIA-232 interface protocol.
Line control	IPRTS	IPRTS	IPRTS	Uses the permanent request to send' (IPRTS) signal to communicate with system unit.
Break signal (ms)	500	500	500	The terminal sends a break signal' to the system unit within 500 ms after the Break key is pressed.
Send null suppress	On	On		Trailing null characters are not sent to the system unit.
Send null			On	Trailing null characters are sent to the system unit.

Communication Setup Attributes	3151 /11/31 /41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
Response delay (ms)	100	100	100	The terminal waits for 100ms for the system unit to respond.

Additional Keyboard Attributes

The following keyboard attributes are for the keyboard attached to the 3151, 3161, and 3164 terminals.

Keyboard Setup Attributes	3151/11/31/41 Settings	3151/51/61 Settings	3161/3164 Settings	Description
Enter	Return	Return	Return	The Enter key functions as the Return key.
Return	New line	New line	New line	The cursor moves to the next line when the Return key is pressed.
New line	CR	CR	CR	The Return key generates the carriage return (CR) and the line feed (LF) characters. The line turnaround occurs after the CR and LF characters are generated.
Send	Page	Page	Page	The contents of the current page are sent to the system unit when the Send key is pressed.
Insert character	Space	Space	Space	A blank character is inserted when the Insert key is pressed.

Additional Printer Attributes

The following printer attributes are for a printer attached to the 3151, 3161, and 3164 terminals.

Printer Setup Attributes	3151/11/ 31/41 Set-tings	3151 /51/61 Set-tings	3161 /3164 Set-tings	Description
Line speed	9600	9600	9600	Uses 19200 or 9600 bps (bits per second) line speed to com-municate with the system unit.
Word length (bits)	8	8	8	Selects eight bits as a data word length (byte).
Parity	Even	Even	No	
Stop bit	1	1	1	Places a bit after a data word (byte).
Characters	ALL	ALL		
Line end			CR-LF	
Print			Viewport	
Print EOL			Off	
Print null			Off	

Online Diagnostics Mode of Operation

The Online diagnostics can be run in three modes:

Service Mode allows checking of most system resources.

Concurrent Mode allows the normal system functions to continue while selected resources are being checked.

Maintenance Mode allows checking of most system resources

Service Mode

Service mode provides the most complete checkout of the system resources. This mode also requires that no other programs be running on the system. All system resources except the SCSI adapter, and the disk drives used for paging can be tested. However, note that system memory and the processor are only tested during POST.

Error log analysis is done in service mode when you select *the* Problem Determination option on the DIAGNOSTIC MODE SELECTION menu.

Running the Online Diagnostics in Service Mode (Service Mode IPL)

To run Online diagnostics in service mode, take the following steps:

1. Stop all programs including the AIX operating system (get help if needed).

2. Remove all tapes, diskettes, and CD-ROM discs.

3. Turn the system unit's power off.

4. Turn the system unit's power on.

5. After the first POST indicator appears on the system unit's console, press F6 on the direct attached keyboard or 6 on the tty keyboard to indicate that diagnostics are to be loaded.

   Note: The term "POST indicator" refers to the ICONS (graphic display) or device mnemonics (ASCII terminal) that are displayed while the POST are executing.

6. Enter any requested password.

7. Follow any instructions to select a console.

8. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.

9. Follow the displayed instructions to checkout the desired resources.

10. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.

11. Press the F3 key (from a defined terminal) or press 99 (for an undefined terminal) to shutdown the diagnostics before turning off the system unit.

Note: Pressing the F3 key (from a defined terminal) produces a "Confirm Exit" popup menu which offers two options: continuing with the shutdown by pressing F3; or returning to diagnostics by pressing Enter.

For undefined terminals, pressing 99 will produce a full screen menu which offers two options: continuing with the shutdown by pressing 99 and then Enter; or returning to diagnostics by pressing Enter.

Concurrent Mode

Concurrent mode provides a way to run Online diagnostics on some of the system resources while the system is running normal system activity.

Because the system is running in normal operation, some of the resources cannot be tested in concurrent mode. The following resources cannot be tested in concurrent mode:

SCSI adapters connected to paging devices

The disk drive used for paging

Some display adapters

Memory

Processor.

There are three levels of testing in concurrent mode:

The **share-test level** tests a resource while the resource is being shared by programs running in the normal operation. This testing is mostly limited to normal commands that test for the presence of a device or adapter.

The **sub-test level** tests a portion of a resource while the remaining part of the resource is being used in normal operation. For example, this test could test one port of a multiport device while the other ports are being used in normal operation.

The **full-test level** requires the device not be assigned to or used by any other operation. This level of testing on a disk drive may require the use of the **varyoff** command. The diagnostics display menus to allow you to vary off the needed resource.

Error log analysis is done in concurrent mode when you select *the* Problem Determination option on the DIAGNOSTIC MODE SELECTION menu.

To run the Online diagnostics in concurrent mode you must be logged onto the AIX operating system and have proper authority to issue the commands (if needed, get help).

The **diag** command loads the diagnostic controller and displays the Online diagnostic menus.

Running the Online Diagnostics in Concurrent Mode

To run Online diagnostics in concurrent mode, take the following steps:

Log on to the AIX operating system as root or superuser.

Enter the diag command.

When the DIAGNOSTIC OPERATING INSTRUCTIONS are displayed, follow the instructions to check out the desired resources.

When testing is complete; use the F3 key to return to the DIAGNOSTIC OPER-ATING INSTRUCTIONS. Then press the F3 key again to return to the AIX oper-ating system prompt. Be sure to vary on any resource you had varied to off.

Press the Ctrl-D key sequence to log off from root or superuser.

Maintenance Mode

Maintenance mode runs the Online diagnostics using the customer's version of the AIX operating system. This mode requires that all activity on the AIX operating system be stopped so the Online diagnostics have most of the resources available to check. All of the system resources except the SCSI adapters, memory, processor, and the disk drive used for paging can be checked.

Error log analysis is done in maintenance mode when you select *the Problem Determination* option on the *DIAGNOSTIC MODE SELECTION* menu.

The **shutdown -m** command is used to stop all activity on the AIX operating system and put the AIX operating system into maintenance mode. Then the **diag** command is used to invoke the diagnostic controller so you can run the diagnostics. After the diagnostic controller is loaded, follow the normal diagnostic instructions.

Running the Online Diagnostics in Maintenance Mode

To run the Online diagnostics in maintenance mode you must be logged on to the customer's version of the AIX operating system as *root* or *superuser* and use the **shutdown -m** and **diag** commands. Use the following steps to run the Online diagnostics in maintenance mode:

1. Stop all programs except the AIX operating system (get help if needed).

2. Log onto the AIX operating system as *root* or *superuser*.

3. Enter the **shutdown -m** command.

4. When a message indicates the system is in maintenance mode, enter the **diag** command.

   Note: It may be necessary to set *TERM* type again.

5. When *DIAGNOSTIC OPERATING INSTRUCTIONS* is displayed, follow the displayed instructions to checkout the desired resources.

6. When testing is complete; use the F3 key to return to *DIAGNOSTIC OPER-ATING INSTRUCTIONS*. Then press the F3 key again to return to the AIX oper-ating system prompt.

7. Press Ctrl-D to log off from *root* or *superuser*.

Standalone Diagnostic Operation

Standalone Diagnostics provide a method to test the system when the Online Diagnostics are not installed and a method of testing the disk drives and other resources that can not be tested by the Online Diagnostics.

Error Log Analysis is not done by the Standalone Diagnostics.

If running from CD-ROM, the CD-ROM drive and the SCSI controller that controls it cannot be tested by the Standalone Diagnostics.

Running the Standalone Diagnostics

To run Standalone Diagnostics in service mode, take the following steps:

 1. Stop all programs including the AIX operating system (get help if needed).

 2. Remove all tapes, diskettes, and CD-ROMs.

 3. Turn the system unit's power off.

 4. Set the key mode switch to the service position.

 5. Turn the system unit's power on.

 6. Insert the diagnostic media drive.

 7. When the keyboard POST indicator appears, press the F5 key on the direct attached keyboard, or the number 5 key on the tty keyboard.

 8. Enter any requested passwords.

 9. Follow any instruction to select the console.

10. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.

11. Follow the displayed instructions to checkout the desired resources.

12. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.

General Information About Multiple Systems

This chapter presents guideline information for anyone needing to run the diagnostic programs on a system unit that is attached to another system. These guidelines are intended for both the operator of the system and the service representative.

This guideline is presented by adapter type or by system configuration type.

These considerations and actions are not detailed step-by-step instructions, but are used to ensure that you have considered the attached system before you run diagnostics on this system unit.

You are directed to the detailed procedures for the various activities as needed.

These guidelines generally present considerations for the following:

Starting and stopping the communications with the other system.

Considerations before running diagnostics on the system.

Analyzing the error log information.

Using the wrap plugs with the diagnostics.

When this system unit is attached to another system, be sure you isolate this system unit before stopping the operating system or running diagnostic programs. Some system cabling changes (such as installing wrap plugs or removing a device from the configuration) may require action by the operator of the attached system before making the cabling changes on this system.

High-Availability SCSI

A high-availability SCSI configuration consists of two system units or CPU drawers connected to a common set of SCSI devices. The configuration provides high-availability because either system unit or CPU drawer can continue to access the common devices while the other system is unavailable.

The actions needed to isolate a particular system unit or device from the configuration depends on the software controlling the systems and devices. Therefore, be sure you use the documentation with the software to prepare the configuration before turning a system unit or device off.

High-Availability Cabling

Refer to *RS/6000 Adapters, Devices, and Cable Information for Multiple Bus Systems*.

Diagnostic Summary

Memory and Processor Testing

Memory and Fixed-Point Processors are only tested during POST.

A complete memory test is run during POST.

The POST will only halt and report problems that prevent the system from booting.

All other problems are logged into Residual Data and are only analyzed and reported if the Base System or Memory Diagnostic is run.

The Base System Diagnostic also tests the Floating Point Processor.

Residual Data Analysis

Residual Data is only analyzed if the Base System or Memory Diagnostic is run.

Residual Data Analysis report problems that are logged by ROS (firmware) during boot.

Error Log Analysis

Error Log Analysis is analysis of the AIX Error Log.

Error Log Analysis is part of the diagnostic applications and is invoked by selecting a device form the DIAGNOSTIC SELECTION menu, by using the **diag** command, or selecting the Run Error Log Analysis task.

Error Log Analysis is only preformed when running online diagnostics.

Error Log Analysis is NOT preformed when running from removable media except for mounted CD-ROM.

Error Log Analysis will only report problems if the errors have reached defined thresholds. Thresholds can be from 1 to 100 depending upon the error.

Permanent errors do not necessarily mean a part should be replaced.

Automatic Error Log Analysis (diagela) provides the capability to do error log analysis whenever a permanent hardware error is logged.

Diagnostic Modes: The Diagnostic Modes consist of Problem Determination Mode and System Verification Mode. The only difference between the two modes is one performs ELA and the other does not.

Problem Determination Mode will run all tests unless the resource is being used. If a problem is not found, then Error Log Analysis is performed.

In Problem Determination Mode, Error Log Analysis is performed even if a resource is being used.

A screen will always appear informing the user that the resource needs to be freed if a resource is being used.

System Verification Mode does not do ELA. This mode should be run when doing a repair verification.

Residual Data Analysis is done in either mode.

4.2 Diagnostic Changes

Tasks are operations that can be performed on a resource. Running Diagnostics, Displaying VPD, or Formatting a Device, are examples of tasks. Service Aid functionality should also be considered a task.

Resources are devices used by the system unit. Diskette Drive, and CD ROM Drive are examples of resources.

The FUNCTION SELECTION menu was enhanced with two new selections allowing either all resources, or all tasks to be displayed. When Task Selection is made and a task has been selected a list of supporting resources will be displayed. Alternatively, when Resource Selection is made, and a resource or group of resources are selected, a list of supporting common tasks are displayed. Also, to aid with backward compatibility the FUNCTION SELECTION menu contains 'Diagnostic' and Advanced Diagnostic'.

The 'Display or Change Diagnostic Run Time Options' task can be used to set advanced mode diagnostics, looping capability, and ELA mode when running diagnostics from the Task Selection menu.

The following sections describe the 4.2 Diagnostic Subsystem.

diag Command Line Options:

```
COMMAND LINE OPTIONS:

     diag Command line flags are as follows:

     -a     Perform missing device analysis.
     -c     Machine is unattended.  No prompts should be displayed.
     -d resource  Test the named resource.
          The "resource" parameter is the /dev entry.
     -e     Error Log Analysis.
          Checks the error log for device specified in "resource"
          of the -d option.
     -s     Test the system.
     -A     Advanced Diagnostics
     -B     Base system test
     -S     Test the Test Suite Group
     -v     System Verification mode.
                    1 - Base system
                    2 - I/O Devices
                    3 - Async Devices
                    4 - Graphics Devices
                    5 - SCSI Devices
                    6 - Storage Devices
                    7 - Commo Devices
                    8 - Multimedia Devices

     Entering diag -h from the command line prints out an
     appropriate usage statement.

     Default execution mode is non-advanced mode.
```

Location Codes

The basic format of the system unit's location code is:

```
AB-CD-EF-GH    non-SCSI
        G,H    SCSI
```

For planars, cards, and non-SCSI devices the location code is defined as:

```
AB-CD-EF-GH
 |  |  |   |
 |  |  |   Device/FRU/Port ID
 |  |  Connector ID
 |  Slot or Adapter Number
 Bus Type
```

AB identifies a bus type, CD identifies a slot or adapter number, EF a connector identifier, and GH is a port identifier, address, memory module, device, or FRU. Adapters/cards are identified with just AB-CD.

The possible values for AB are as follows:

```
        for processor bus
1       for ISA buses
4       for PCI buses
5       for PCMCIA buses (not supported)
```

The possible values for CD depend on the adapter or card. For pluggable adapters/cards this is a two digit slot number in the range from 01 to 99. However, in the case of ISA cards these numbers do not actually correspond to the physical slot numbers. They are simply based on the order the ISA cards are defined/configured either by SMIT or the ISA Adapter Configuration Service Aid.

For integrated adapters the first character in CD is a letter in the range from A to Z. This letter is based on the order that the integrated adapters are defined in residual data and ensures unique location codes for the integrated adapters. The D is set to 0.

EF is the Connector ID. It is used to identify the adapter connector that a resource is attached too.

GH is a port identifier, address, memory module, device, or FRU. It identifies a port, device, or a FRU. GH has several meanings depending upon the resource type. They are:

  For memory cards GH defines a memory module. Values for GH are 1 through 16.

  For systems that have memory modules that plug directly into the system planar the location code is 00-00-00-GH where GH is the memory module slot. For system that have memory cards with memory modules, the location code is 00-CD-EF-GH where CD is the card slot and GH is the memory module slot.

  For caches GH defines the cache. Values for GH are 01 through 16.

  For PCMIAs GH defines the PCMIA. Values for GH are 01 through 16.

  For async devices GH defines the port on the fanout box. Values are 00 to 15.

  For a diskette drive H defines which diskette drive 1 or 2. G is always 0.

  For all other devices GH is equal to 00.

For integrated adapters, EF-GH will be the same as the definition for a pluggable adapter. For example, the location code for a diskette drive will be 01-A0-00-00.

For SCSI the Location Code is defined as:

```
      AB-CD-EF-G,H
       |  |  | | |
       |  |  | | Logical Unit Address of SCSI Device
       |  |  | Control Unit Address of SCSI Device
       |  |  Connector ID
       |  Slot or Adapter Number
       Bus Type
```

Where AB-CD-EF are the same as non-SCSI devices.

G defines the control unit address of the device. Values of 0 to 15 are valid.

H defines the logical unit address of the device. Values of 0 to 255 are valid.

Examples:

```
Processor-PCI bus
    -              PCI bus

Memory module in system planar
    -   -   - 1

Memory module in card
    - A-   - 1

Integrated PCI adapters for
    4-A           ISA bus (Integrated PCI-ISA bridge)
    4-B           Secondary PCI bus (Integrated PCI-PCI bridge)
    4-C           Integrated PCI SCSI controller

Non-integrated PCI adapters
    4- 1          Any PCI card in slot 1
    4- 2          Any PCI card in slot 2

Integrated ISA adapters
    1-A           Diskette adapter
    1-B           Parallel port adapter
    1-C           Serial port 1 adapter
    1-D           Serial port 2 adapter
    1-E           Keyboard adapter
    1-F           Mouse adapter

Non-integrated ISA adapters
    1- 1          First ISA card defined/configured
    1- 2          Second ISA card defined/configured
    1- 3          Third ISA card defined/configured
    1- 4          Fourth ISA card defined/configured

Device attached to SCSI controller
    4-C - 1-4,      Device attached to Integrated PCI SCSI controller
```

Chapter 6. Introduction to Tasks and Service Aids

The AIX Diagnostic Package contains programs that are referred to as either Tasks or Service Aids. These programs are accessed differently depending on the level of AIX diagnostics installed. If you are running AIX Diagnostics version 4.2 or later, the programs are called Tasks. Tasks perform a given function; while service aids act as a subset of the chosen task.

To perform a Task, use the following from the Function Selection Menu:

Task Selection (Diagnostics, Advanced Diagnostics, Service Aids, etc).

This selection lists the tasks supported by these procedures. Once a task is selected, a resource menu may be presented showing all resources supported by the task.

If you are running AIX Diagnostics prior to and including version 4.1.x, the programs are called Service Aids.

To perform a Service Aid, use the following from the Function Selection Menu:

Service Aids

This selection looks at the machine configuration, exercises external interfaces, formats media, looks at past diagnostic results, controls what resources are tested, checks out media, etc.

Tasks

Service Aids are invoked via a task selection from the following list:

Note:

Add or Delete Drawer Configuration

Add Resource to Resource List

AIX Shell Prompt

Backup and Restore Media

Change Hardware Vital Product Data

Check Spare Sectors Service

Configure Dials and LPFKeys

Configure ISA Adapters

Configure Ring Indicate Power On

Configure Service Processor

Create Customized Diagnostic Configuration Diskette

Delete Resource from Resource List

Disk Maintenance

Disk Media

Display/Alter Bootlist

Display Configuration and Resource List

Display Hardware Error Report

Display Hardware Vital Product Data

Display Machine Check Error Log

Display or Change Diagnostic Run Time Options

Display Previous Diagnostic Results

Display Resource Attributes

Display Service Hints

Display Software Product Data

Display Test Patterns

Generic Microcode Download

Local Area Network Analyzer

Microcode Download

Periodic Diagnostics

PCI RAID Physical Disk Identify

Process Supplemental Media

Run Diagnostics

Run Error Log Analysis

SCSI Bus Analyzer

SCSI Device Identification and Removal

SCSI Tape Utility

SSA Service Aid

Update Disk Based Diagnostics

7135 RAIDiant Array Service Aids

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AIX Shell Prompt Service Aid

This service aid allows access to the AIX command line. In order to use this service aid the user must know the root password (when a root password has been established).

Backup/Restore Media Service Aid

This service aid allows verification of backup media and devices. It presents a menu of tape and diskette devices available for testing and prompts for selection of the desired device. It then presents a menu of available backup formats and prompts for selection of the desired format. The supported formats are tar, backup, and cpio. After the device and format are selected, the service aid backups a known file to the selected device, restores that file to /tmp, and compares the original file to the restored file. The restored file is also left in /tmp to allow for visual comparison. All errors are reported.

Configure Ring Indicate Power On Service Aid

This service aid allows the user to display and change the NVRAM settings for the Ring Indicate Power On capability of the service processor.

The settings allows the user to:

Enable/Disable power on from Ring Indicate

Read/Set the number of rings before power on

Configure Service Processor Service Aid

This service aid allows you to display and change the NVRAM settings for the service processor.

Enter one of the following service aids:

Surveillance Setup

Modem Configuration

Call In/Call Out Setup

Site Specific Call In/Call Out Setup

Surveillance Setup Service Aid

This service aid allows you to display and change the NVRAM settings for the surveillance capability of the service processor.

The settings allow you to:

Enable/disable surveillance

Set the surveillance time interval, in minutes

Set the surveillance delay, in minutes

The current settings are read from NVRAM and displayed on the screen. Any changes made to the data shown are written to NVRAM.

Modem Configuration Service Aid

Use this service aid when setting the NVRAM for a modem attached to any of the Service Processor's serial ports. The user inputs the file name of a modem configuration file and the serial port number. The formatted modem configuration file is read, converted for NVRAM than loaded into NVRAM. Refer to the "Service Processor Installation and User's Guide" for more information.

Call In/Out Setup Support Service Aid

This service aid allows the user to display and change the NVRAM settings for the Call In/Call Out capability of the service processor.

The settings allows the user to:

Enable/Disable call in on either serial port.

Enable/Disable call out on either serial port.

Set the line speed on either serial port.

Site Specific Call In/Out Setup Support Service Aid

This service aid allows you to display and change the NVRAM settings that are site specific for the call in/call out capability of the service processor.

The site specific NVRAM settings allow you to:

Set the phone number for the service center

Set the phone number for the customer administration center

Set the phone number for a digital pager

Set the phone number for the customer system to call in

Set the phone number for the customer voice phone

Set the customer account number

Set the call out policy

Set the customer RETAIN id

Set the customer RETAIN password

Set the remote timeout value

Set the remote latency value

Set the number of retries while busy

Set the system name

The current settings are read from NVRAM and displayed on the screen. Any changes made to the data shown are written to NVRAM.

Create Customized Diagnostic Configuration Diskette

This service aid provides a means of creating a diagnostic diskette from the diagnostics on the disk. This service aid is only supported on version 2.x.

Diagnostic Package Utility Service Aid

The Diagnostic Package Utility Service Aid allows the user to perform the following actions:

Format a 1, 2, or 4MB diskette

This function was moved to the Format Media Task at version 4.2.

Create a Standalone Diagnostic Package Configuration Diskette

The Standalone Diagnostic Package Configuration Diskette allows the following to be changed from the console:

– Default refresh rate for a LFT

The refresh rate used by the standalone diagnostic package is 60Hz. If the display's refresh rate is 77Hz, then set the refresh rate to 77.

– Different async terminal console

A console configuration file that allows a terminal attached to any RS232 or RS422 adapter to be selected as a console device can be created using this

service aid. The default device is a RS232 tty attached to the first standard
serial port (S1).

Dials and LPFK Configuration Service Aid

This service aid provides a tool for configuring and removing dials/LPFKs to the
standard serial ports.

Since version 4.1.3 a tty must be defined on the async port before the Dials and
LPFKs can be configured on the port. Before version 4.2 the Dials and LPFKs could
only be configured on the standard serial ports. At version 4.2 the Dials and LPFKs
can be configured on any async port.

Dials and LPFKs Configuration Service Aid Before version 4.2

The Dials and LPFKs Configuration Service Aid provides a tool for configuring and
removing dials/LPFKs to the standard serial ports.

Configure Dials and LPFKs Task Version 4.2+

The Dials and LPFKs can be configured on any async port. A tty must be in the
available state on the async port before the Dials and LPFKs can be configured on
the port. The task allows an async adapter to be configured, then a tty port defined
on the adapter, and then Dials and LPFKs can be defined on the port.

Disk Based Diagnostic Update Service Aid and Update Disk Based Diagnostic Task

This service aid allows fixes (APARs) to be applied.

Disk Based Diagnostic Update Service Aid Before Version 4.2

Prior to version 4.2 this service aid is used to update the diagnostics on the disk
drive. The updates may be new diagnostics or an update to the existing diagnostics.
It uses the **installp** command to do this.

Update Disk Based Diagnostic Task Version 4.2

Beginning with version 4.2 this service aid is replaced by the Update Disk Based
Diagnostics task. The task invokes the SMIT Update Software by Fix (APAR) task.
The task allows the input device and APARs to be selected. Any APAR can be
installed using this task.

Disk Media Service Aids

This service aid consists of a Format, Certify, and Erase service aid for each type of hard disk supported, and Optical Disk service aid for supported optical disks.

Certify

Certify reads all of the ID and data fields. It checks for bad data and counts all errors encountered. If more than 10 hard data errors or more than 1 hard equipment error is found, the user is prompted to replace the drive. One or less recovered data errors per megabyte is normal. More than one recoverable data error per megabyte indicates that the disk should be formatted and certified. Disk errors are not logged during certify.

Format

Format writes all the disk. The pattern put on the disk is device dependent, i.e. some drives may put all 0s, while some may put hexadecimal number 5F. No bad block reassignment occurs

Format and Certify

Format and Certify does the same as format does. After the Format is completed, Certify is run. This Certify reassigns all bad blocks encountered.

Erase Disk

This option can be used to overwrite (remove) all data currently stored in user-accessible blocks of the disk. The Erase Disk option writes one or more patterns to the disk. An additional option allows data in a selectable block to be read and displayed on the system console.

To use the Erase Disk option, specify the number (0-3) of patterns to be written. Select the patterns to be written; the patterns are written serially. That is, the first pattern is written to all blocks. Then the next pattern is written to all blocks, overlaying the previous pattern. A random pattern is written by selecting the "Write random pattern?" option.

The Erase Disk service aid has not been certified as meeting the Department of Defense or any other organizations security guidelines. The following steps should be followed if the data on the drive is to be overwritten:

1. Run the "Erase Disk" Service Aid to overwrite the data on the drive.

2. Do a format without certify.

3. Run a second pass of the erase service aid.

For a newly installed drive, you can insure that all blocks on the drive are overwritten with your pattern if you use the following procedure:

1. Format the drive.

2. Check the defect map by running the Erase Disk Service Aid.

    Note: If you use the "Format and Certify" option, there may be some blocks which get placed into the grown defect map.

3. If there are bad blocks in the defect map, record the information presented and ensure that this information is kept with the drive. This data is used later when the drive is to be overwritten.

4. Use the drive as you would normally.

5. When the drive is no longer needed and is to be erased, run the same version of the Erase Disk Service Aid which was used in step 2.

    Note: Using the same version of the service aid is only critical if there were any bad blocks found in step 3.

6. Compare the bad blocks which were recorded with the drive in step 3 with those which now appear in the grown defect map.

    Note: If there are differences between the saved data and the newly obtained data, then all of the sectors on this drive cannot be over-written. The new bad blocks are not overwritten.

7. If the bad block list is the same, continue running the service aid to overwrite the disk with the chosen pattern(s).

Before version 4.2 the Disk Media Service Aid is entered via the Disk Media selection from the Service Aid Selection Menu. At version 4.2+ the Disk Media service aid is entered via the Format Media or Certify Media options from the Task Selection Menu.

Optical Disk Service Aids

The Optical Disk Service Aids consist of Initialize, Format and Certify, and Spare Sector Availability service aids.

Initialize

This service aid is used to format the optical disk without certifying it. This option does not reassign the defective sectors; however, it is a quick way of formatting after cleaning the disk.

Format and Certify

This service aid is used to format the optical disk and certify it. The certification process is drive specific and performs the surface analysis of all user data and spare sectors. The defective sectors are reassigned.

Spare Sector Availability

This service aid checks the number of spare sectors available on the optical disk. The spare sectors are used to reassign when defective sectors are encountered during normal usage or during a format and certify operation. Low availability of spare sectors indicates that the disk needs to be backed up and replaced. Formatting the disk does not improve the availability of spare sectors.

Disk Maintenance Service Aid

Disk to Disk Copy Service Aid

Display/Alter Sector Service Aid

Disk to Disk Copy Service Aid

The service aid allows you to recover data from an old drive when replacing it with a new drive. The service aid only supports copying from a drive to another drive of similar size. This service aid cannot be used to update to a different size drive. The **migratepv** command should be used when updating drives. The service aid recovers all LVM software reassigned blocks. To prevent corrupted data from being copied to the new drive, the service aid aborts if an unrecoverable read error is detected. To help prevent possible problems with the new drive, the service aid aborts if the number of bad blocks being reassigned reaches a threshold.

The procedure for using this service aid requires that both the old and new disks be installed in or attached to the system with unique SCSI addresses. This requires that the new disk drive SCSI address must be set to an address that is not currently in used and the drive be installed in an empty location. If there are no empty locations, then one of the other drives has to be removed. Once the copy is complete, only one drive may remain installed. Either remove the target drive to return to the original configuration, or perform the following procedure to complete the replacement of the old drive with the new drive.

1. Remove both drives.

2. Set the SCSI address of the new drive to the SCSI address of the old drive.

3. Install the new drive in the old drive's location.

4. Install any other drives that were removed into their original location.

To prevent problems that may occur when running this service aid from disk, it is suggested that this service aid be run from the diagnostics that are loaded from removable media when possible.

Display/Alter Sector Service Aid

This service aid allows the user to display and alter information on a disk sector. Care must be used when using this service aid because inappropriate modification to some disk sectors may result in total loss of all data on the disk. Sectors are addressed by their decimal sector number. Data is displayed both in hex and in ASCII. To prevent corrupted data from being incorrectly corrected, the service aid does not display information that cannot be read correctly.

Diskette Media Service Aid

This service aid provides a way to verify the data written on a diskette. When this service aid is selected, a menu asks you to select the type of diskette being verified. The program then reads all of the ID and data fields on the diskette one time and displays the total number of bad sectors found. Diskette format support was added in version 4.2.

Prior to version 4.2 the Diskette Media Service Aid was entered via the Diskette Media selection from the Service Aid Selection Menu. At version 4.2 and later the Diskette Media Service Aid is entered via the Format Media or Certify Media options from the Task Selection Menu.

Display/Alter Bootlist Service Aid

This service aid allows the bootlists to be displayed, altered, or erased.

The system attempts to perform an IPL from the first device in the list. If the device is not a valid IPL device or if the IPL fails, the system proceeds in turn to the other devices in the list to attempt an IPL.

Display or Change Configuration or Vital Product Data (VPD) Service Aid

This service aid allows the user to display, change configuration, data and vital product data (VPD).

Prior to version 4.2 this service aid was entered via the Service Aid Selection Menu. From version 4.2 on, this service aid is entered via the Task Selection Menu.

The following are the task selections which appear on the Task Selection Menu:

    Display Configuration and Resource List

    Display Hardware Vital Product Data

    Change Hardware Vital Product Data

    Add or Delete Drawer configuration

Display Vital Product Data (VPD) Service Aid and Display Hardware
Vital Product Data Task

This service aid displays all installed resources along with any VPD for those

resources. Use this service aid when you want to look at the VPD for a specific resource.

Display Software Product Data Prior to Version 4.2

This service aid displays information about the installed software.

Display Software Product Data beginning with Version 4.2

This service aid displays information about the installed software and provides the following functions:

List Installed Software

List Applied but Not Committed Software Updates

Show Software Installation History

Show Fix (APAR) Installation Status

List Fileset Requisites

List Fileset Dependents

List Files Included in a Fileset

List File Owner by Fileset

Display Configuration Service Aid and Display Configuration and
Resource List Task

This service aid displays the item header only for all installed resources. Use this service aid when there is no need of seeing the VPD. (No VPD is displayed.)

Change Hardware Vital Product Data Task

Use this service aid to display the Display/Alter VPD Selection Menu. The menu lists all resources installed on the system. When a resource is selected a menu is displayed that lists all the VPD for that resource.

Note: The user cannot alter the VPD for a specific resource unless it is not machine readable.

Add Resource to Resource List Task

Use this task to add resources back to the resource list.

Delete Resource from Resource List Task

Use this task to delete resources from the resource list.

Change Configuration Service Aid and Add or Delete Drawer Configuration Task

Use this service aid to add or delete features to the system configuration.

Note: Drawers are the only features that can be added or deleted.

Add or Delete Drawer Configuration Task

This task provides the following options:

List all Drawers

Add a Drawer

Remove a Drawer

The supported drawer types are:

Media SCSI Device Drawer

DASD SCSI DASD Drawer

Display and Change Diagnostic Test List Service Aid

Note: Beginning with version 4.2 this service aid is no longer supported. The Display Configuration and Resource List, Add Resource to Resource List, and Delete Resource from Resource List Tasks have replaced it.

This service aid provides a way to:

Display the Diagnostic Test List

This selection lists all of the resources tested by the diagnostics.

Add a resource to the Diagnostic Test List

This selection allows resources to be added back to the Diagnostic Test List. The Diagnostic Test List Menu lists all resources that can be added back to the Diagnostic Test List.

Note: Only resources that were previously detected by the diagnostics and deleted from the Diagnostic Test List is listed. If no resources are available to be added, then none are listed.

Delete a resource from the Diagnostic Test List

This selection allows resources to be deleted from the Diagnostic Test List. The Diagnostic Test List Menu lists all resources that can be deleted from the Diagnostic Test List.

Note: Only resources that were previously detected by the diagnostics and have not been deleted from the Diagnostic Test List are listed. If no resources are available to be deleted, then none are listed.

Display Machine Check Error Log Service Aid

Note: The Machine Check Error Log Service Aid is available only on Standalone Diagnostics.

When a machine check occurs, information is collected and logged in a NVRAM error log before the system unit shuts down. This information is logged in the AIX error log and cleared from NVRAM when the system is rebooted from either hard disk or LAN. The information is not cleared when booting from Standalone Diagnostics. When booting from Standalone Diagnostics, this service aid can take the logged information and turn it into a readable format that can be used to isolate the problem. When booting from the hard disk or LAN, the information can be viewed from the AIX error log using the Hardware Error Report Service Aid. In either case the information is analyzed when running the `sysplanar` diagnostics in Problem Determination Mode.

Display Previous Diagnostic Results Service Aid

Note: This service aid is not available when you load the diagnostics from a source other than a disk drive or from a network.

Each time the diagnostics produce a service request number (SRN) to report a problem, information about that problem is logged. The service representative can look at this log to see which SRNs are recorded. This log also records the results of diagnostic tests that are run in loop mode.

When this service aid is selected, information on the last problem logged is displayed. The Page Down and Page Up keys can be used to look at information about previous problems.

This information is *not* from the error log maintained by the AIX operating system. This information is stored in the **/etc/lpp/diagnostics/data/*.dat** file.

Display Resource Attributes

This task displays the Customized Device Attributes associated with a selected resource. This task is similar to running the **lsattr -E -l resource** command.

Display or Change Diagnostic Run Time Options Task

The Display or Change Diagnostic Run Time Options task allows the diagnostic run time options to be set.

Note: The run time options are used only when running the Run Diagnostic task.

The run time options are:

Display Diagnostic Mode Selection Menus

This option allows the user to select whether the DIAGNOSTIC MODE SELECTION MENU is displayed or not (the default is yes).

Include Advanced Diagnostics

This option allows the user to select if the Advanced Diagnostics should be included or not (the default is no).

Include Error Log Analysis

This option allows the user to select if the Error Log Analysis (ELA) should be included or not (the default is no).

Run Tests Multiple Times

This option allows the user to select if the diagnostic should be run in loop mode or not (the default is no).

Note: This option is only displayed when running Online Diagnostics in Service Mode.

Display Test Patterns Service Aid

This service aid provides a means of making adjustments to system display units by providing displayable test patterns. Through a series of menus the user selects the display type and test pattern. After the selections are made the test pattern is displayed.

Generic Microcode Download Service Aid

This service aid provides a means of restoring a diskette (or other media) and executing a restored program. This program does whatever is required to download the microcode onto the adapter or device.

This service aid is supported in both concurrent and standalone modes from disk, LAN, or loadable media.

When entered, this service aid displays information about what it does. It then asks for a microcode diskette to be inserted into the diskette drive. The diskette is in backup format. The service aid then restores the diskette to the **/tmp** directory and execute a program called **diagucode**. Once diagucode has completed, you are then returned to the service aid.

Hardware Error Report Service Aid and Display Hardware Error Log Task

This service aid provides a tool for viewing the hardware error log. It uses the **errpt** command.

The Display Error Summary and Display Error Detail selection provide the same type of report as the **errpt** command. The Display Error Analysis Summary and Display Error Analysis Detail selection provide additional analysis. The Error Analysis and Error Analysis Detail options were removed at version 4.1.3.

ISA Adapter Configuration Service Aid

The ISA Adapter Configuration Service Aid allows the identification and configuration of ISA adapters on systems that have an ISA bus and adapters.

This service aid also displays all ISA adapters supported by diagnostics. Diagnostic support for ISA adapters not shown in the list may be supported from a Supplemental Diskette. ISA adapter support can be added from a Supplemental Diskette with this service aid.

Whenever an ISA adapter is installed, this Service Aid must be run and the adapter configured before the adapter can be tested. This Service Aid must also be run (and the adapter removed) whenever an ISA adapter is physically removed from the system.

If diagnostics are run on an ISA adapter that has been removed from the system,the diagnostics fail.

This service aid is only supported by the Standalone Diagnostics. SMIT should be used to configure ISA adapters for AIX.

ISA adapters cannot be detected by the system.

Note: When using this service aid choose the option that places the adapter in the "Defined State". Do not select the option that places the device in the "Available State.

Local Area Network Service Aid and Local Area Network Analyzer Task

This service aid and task are used to exercise the LAN communications adapters (Token-Ring, Ethernet, and Fiber Distributed Data Interface (FDDI). The following services are available:

Connectivity testing between two network stations. Data is transferred between the two stations. This requires the user to input the Internet Addresses of both stations.

Monitoring ring (Token-Ring only). The ring is monitored for a period of time. Soft and hard errors are analyzed.

Additional information about this service aid can be found in the Local Area Network Service Aids CIS.

Prior to version 4.2 this service aid was accessed via the Local Area Network Service Aids selection of the Service Aid Selection Menu. Beginning with version 4.2 this service aid is accessed via the Local Area Network Analyzer options from the Task Selection Menu.

Microcode Download Service Aid

This service aid provides a way to copy device microcode to a device. It is used to update the microcode on a device. It presents a list of devices that use microcode. The device on which the microcode is to be installed is selected. The service aid instructs the user on its use.

PCI RAID Physical Disk Identify

This selection identifies physical disks connected to a PCI SCSI-2 F/W RAID adapter.

Periodic Diagnostics Service Aid

This service aid provides a tool for configuring periodic diagnostics and automatic error log analysis. A hardware resource can be chosen to be tested once a day, at a user specified time. If the resource cannot be tested because it is busy, error log analysis is performed. Hardware errors logged against a resource can also be monitored by enabling Automatic Error Log Analysis. This allows error log analysis to be performed every time a hardware error is put into the error log. If a problem is detected, a message is posted to the system console and a mail message sent to the user(s) belonging to the system group with information about the failure such as Service Request Number.

The service aid provides the following functions:

Add or delete a resource to the periodic test list

Modify the time to test a resource

Display the periodic test list

Modify the error notification mailing list

Disable Automatic Error Log Analysis

Process Supplemental Media Task

Notes:

This task is supported in Standalone Diagnostics only.

Process and test one resource at a time.

Do not process multiple supplements at a time.

Diagnostic Supplemental Media contain all the diagnostic programs and files required to test a resource. Supplemental media is normally released and shipped with the resource.

When prompted, insert the supplemental media. Then press Enter. After processing has completed, go to the resource selection list to find the resource to test.

This prompts for either diskette or tape media, reads in media using cpio, and executes **diagstart** shell script.

Run Diagnostics Task

The Run Diagnostics task invokes the Resource Selection List menu. When the commit key is pressed, Diagnostics are run on all selected resources.

The procedures for running the diagnostics depends on the states of the Diagnostics Run Time Options. The run time options are:

Display Diagnostic Mode Selection Menus

If this option is on, the Diagnostic Mode Selection Menu displays when the commit key is pressed.

Include Advanced Diagnostics

If this option is on, Advanced Diagnostics is be included.

Include Error Log Analysis

If this option is on, Error Log Analysis is included.

Run Tests Multiple Times

If this option is on, diagnostic are run in loop mode. This option is only valid when running Online Diagnostics in Service Mode.

Run Error Log Analysis Task

The Run Error Log Analysis task invokes the Resource Selection List menu. When the commit key is pressed, Error Log Analysis is run on all selected resources.

SCSI Bus Service Aid and SCSI Bus Analyzer Task

This service aid provides a means to diagnose a SCSI Bus problem in a free-lance mode.

Prior to version 4.2 the SCSI Bus Service Aid was accessed via the SCSI Bus selection from the Service Aid Selection Menu. Beginning with version 4.2 the SCSI Bus Service Aid is accessed via the SCSI Bus Analyzer option from the Task Selection Menu.

To use this service aid, the user should have an understanding of how a SCSI Bus works. This service aid should be used when the diagnostics cannot communicate with anything on the SCSI Bus and cannot isolate the problem. Normally the procedure for finding a problem on the SCSI Bus with this service aid is to start with a single device attached, ensure that it is working, then start adding additional devices

and cables to the bus ensuring that each one works. This service aid works with any valid SCSI Bus configuration.

The SCSI Bus Service Aid transmits a SCSI Inquiry command to a selectable SCSI Address. The service aid then waits for a response. If no response is received within a defined amount of time, the service aid displays a timeout message. If an error occurs or a response is received, the service aid then displays one of the following messages:

   The service aid transmitted a SCSI Inquiry Command and received a valid response back without any errors being detected.

   The service aid transmitted a SCSI Inquiry Command and did not receive any response or error status back.

   The service aid transmitted a SCSI Inquiry Command and the adapter indicated a SCSI bus error.

   The service aid transmitted a SCSI Inquiry Command and an adapter error occurred.

   The service aid transmitted a SCSI Inquiry Command and a check condition occur.

When the SCSI Bus Service Aid is entered a description of the service aid is displayed.

Pressing the Enter key displays the Adapter Selection menu. This menu allows the user to enter which address to transmit the SCSI Inquiry Command.

When the adapter is selected the SCSI Bus Address Selection menu is displayed. This menu allows the user to enter which address to transmit the SCSI Inquiry Command.

Once the address is selected the SCSI Bus Test Run menu is displayed. This menus allows the user to transmit the SCSI Inquiry Command by pressing the Enter key. The Service Aid then indicates the status of the transmission. When the transmission is completed, the results of the transmission is displayed.

Notes:

   A Check Condition can be returned when there is nothing wrong with the bus or device.

   AIX does not allow the command to be sent if the device is in use by another process.

SCSI Device Identification and Removal

This service aid allows the user to choose a SCSI device or location from a menu and to identify a device, located in the system unit.

The service aid also does the following:

Generate a menu which displays all SCSI devices.

Lists the device and all of it's sibling devices.

List all SCSI adapters and their ports.

List all SCSI devices on a port.

SCSI Tape Utilities Service Aid

This service aid provides a means to obtain the status or maintenance information from a SCSI tape drive. Only some models of SCSI tape drive are supported.

The service aid provides the following options:

Display time since a tape drive was last cleaned.

The time since the drive was last cleaned is displayed onto the screen. In addition, a message whether the drive is recommended to be cleaned is also displayed.

Copy a tape drive's trace table.

The trace table of the tape drive is written to diskettes.

The required diskettes must be formatted for DOS. Writing the trace table may require several diskettes. The actual number of required diskettes is determined by the service aid based on the size of the trace table. The names of the data files is of the following format:

'TRACE<X>.DAT' where 'X' is the a sequential diskette number. The complete trace table consists of the sequential concatenation of all the diskette data files.

Display or copy a tape drive's log sense information.

The service aid provides options to display the log sense information to screen, to copy it to a DOS formatted diskette or to copy it to a file. The file name "LOGSENSE.DAT" is used when the log sense data is written on the diskette. The service aid prompts for a file name when the log sense data is chosen to be copied to a file.

Service Hints Service Aid

This service aid reads and displays the information in the CEREADME file from the diagnostics source (diskettes, disk, or CD-ROM). This file contains information that is not in the publications for this version of the diagnostics. It also contains information about using this particular version of diagnostics.

Use the Enter key to page forward through the information or the - (dash) and Enter keys to page backward through the file.

SSA Service Aids

This service aid provides tools for diagnosing and resolving problems on SSA attached devices. The following tools are provided:

Set Service Mode

Link Verification

Configuration Verification

Format and Certify Disk

7135 RAIDiant Array Service Aid

The 7135 RAIDiant Array service aids contain the following functions:

Certify LUN

This selection reads and checks each block of data in the LUN. If excessive errors are encountered the user is notified.

Certify Spare Physical Disk

This selection allows the user to certify (check the integrity of the data) on drives designated as spares.

Format Physical Disk

This selection is used to format a selected disk drive.

Array Controller Microcode Download

This selection allows the microcode on the 7135 controller to be updated when required.

Physical Disk Microcode Download

This selection is used to update the microcode on any of the disk drives in the array.

Update EEPROM

This selection is used to update the contents of the EEPROM on a selected con-
troller.

Replace Controller

Use this selection when it is necessary to replace a controller in the array.

7318 Serial Communications Network Server Service Aid

This service aid provides a tool for diagnosing terminal server problems.

SSA Location Code Format

Location codes identify the locations of adapters and devices in the using system
and their attached subsystems and devices. These codes are displayed when the
diagnostic programs isolate a problem. For information about the location codes that
are used by the using system, see the operator guide for the using system.

```
A B – C D – E F – G H


                         Always

                         Always

                          Always

                          P = Physical disk drive module
                     L = Logical disk drive

                           Adapter position (number of the slot, 1 through 8, containing
                     the SSA adapter)

                           System I/O bus identifier

                           Always

                           Always
```

The location code shows only the position of the SSA adapter in the using system
and the type of device that is attached. Use a service aid to find the location of the
device (disk drive module). For more information, see "SSA Service Aids" on
page 6-30.

SSA Loops and Links

The disk drive modules of the system unit are connected through two SSA links to an SSA adapter that is located in the using system. The disk drive modules, SSA links, and SSA adapter are configured in loops. Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (SSA cable) to the disk drive modules. The path continues through the disk drive modules, then returns through another link to a second connector on the SSA adapter.

The SSA Adapter

The system unit can be attached to an SSA adapter. The adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair.

Connector B2
Green Light
Connector B1
Connector A2
Green Light
Connector A1
Type-Number
Label
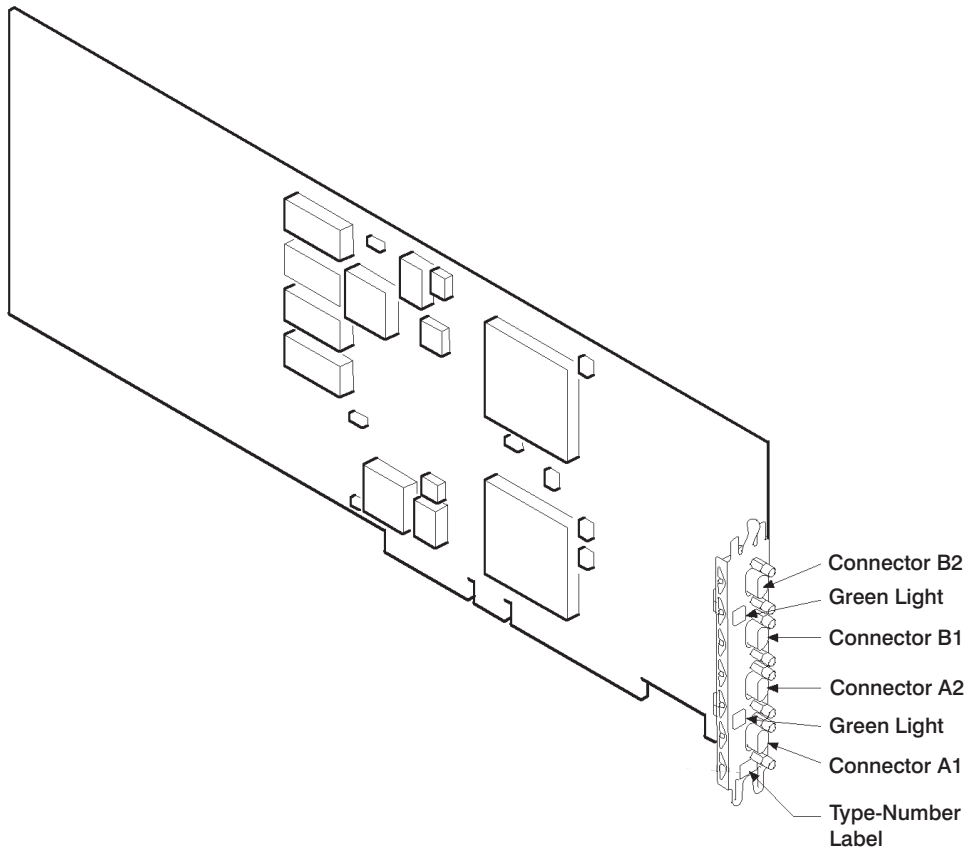
The SSA links must be configured as loops. The loop is connected to the internal connectors at the SSA adapter card. These connectors *must* be a valid pair (that is, A1 and A2, or B1 and B2); otherwise, the disk drive modules on the loop are not fully configured, and the diagnostics fail. Operations to all the disk drive modules on a particular loop can continue if that loop breaks at any one point.

Each pair of connectors has a green light that indicates the operational status of its related loop:

Status of Light	Meaning
Off	Both SSA connectors are inactive. If disk drive modules are connected to these connectors, either those modules are failing, or their SSA links have not been enabled.
Steady on	Both SSA links are active (normal operating condition).
Slow Flash	Only one SSA link is active.

Disk Drive Module Strings

In the system unit, the disk drive modules are arranged in a string of 2 to 6 disk drive modules. This string has its own two SSA connectors. This string is connected through an internal SSA cable to a pair of connectors on the SSA adapter to make an SSA loop. (The SSA cables provide the SSA links.)

The following diagram shows the relationships between the SSA connectors and the disk drive module string in a system unit.
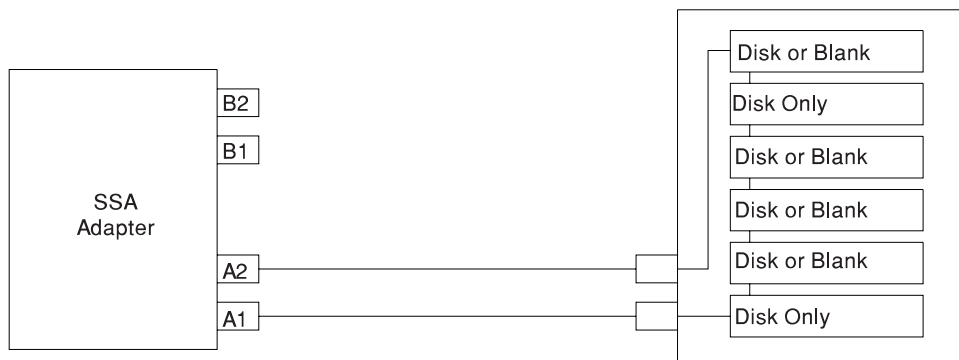
Pdisks, Hdisks, and Disk Drive Module Identification

The *physical disk drives (pdisks)* in an SSA subsystem can be configured as logical units (LUNs). A LUN is also known as an *hdisk*, and can consist of one or more physical disk drives. An hdisk in an SSA subsystem might therefore consist of one or more pdisks.

The configuration software also allocates an identification (hdisk and pdisk number) to each disk drive module during the configuration of the SSA link. The disk drive modules do not have fixed physical addresses.

The configuration software first recognizes the disk drive module by the machine-readable serial number that is written on the disk. Then, it assigns an identification that is related to the position of the disk drive-module in the SSA string. After configuration, the disk drive module always has the same identification. It can be moved to any position on the SSA link, but can always be found by the software.

Service actions are always related to physical disk drives. For this reason, errors that occur on SSA disk drives are always logged against the physical disk drive (pdisk).

The numeric identifier of pdisks, hdisks, and disk drive module slots of the system unit are not related to each other. For example, pdisk1 is not necessarily installed in slot 1 of the 6-pack.

The disk drive module serial number, on the label on the front of the carrier, is also displayed by the service aids. It is the last eight digits of the drives IEEE SSA unique ID, which is stored on the drive's electronics card.

Rules for SSA Loops

The following are the rules for connecting SSA loops:

   The SSA loop must be connected to the internal pair of connectors on the SSA adapter.

   Only one pair of adapter connectors can be connected to a particular SSA loop.

   A maximum of 18 disk drive modules can be connected in a particular SSA loop.

   A maximum of three dummy disk drive modules can be connected next to each other in a particular SSA loop.

Loops and Data Paths

All devices that are attached to an SSA adapter card are connected through SSA links. The SSA links are configured as loops. Data and commands to a particular device pass through all other devices on the link between the adapter and the target device.

Data can travel in either direction around a loop. The adapter can, therefore, access the disk drive modules through two data paths. The using system cannot detect which data path is being used.

If a disk drive module fails, or is turned off, the loop is broken, and one of the data paths to a particular module is no longer available. The disk drive modules on the loop continue to work, but an error is reported to the using system.

The following diagram shows that the disk drive module in slot 3 has failed. The disk drive modules in slots 1 and 2 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive modules in slots 4, 5, and 6 can communicate only through connector A2 of the SSA adapter.
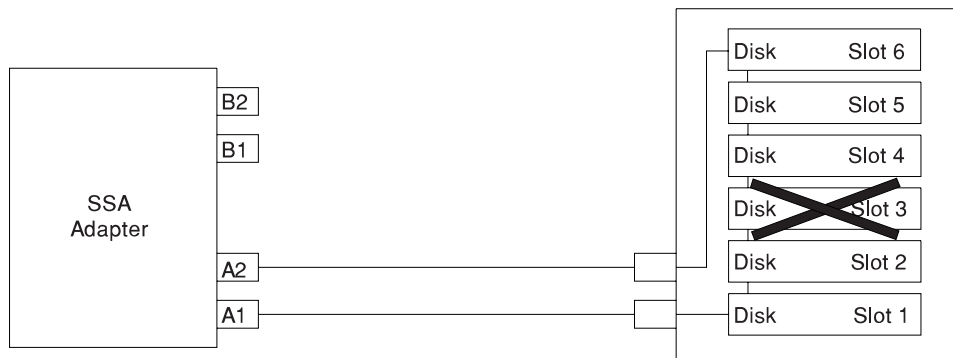
If two or more disk drive modules are turned off, fail, or are removed from the loop, some modules might become isolated from the SSA adapter.

The following diagram shows that the disk drive modules in slots 2 and 4 have failed. The disk drive module in slot 1 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive module in slots 5 and 6 can communicate with the using system only through connector A2 of the SSA adapter. The disk drive module in slot 3 is isolated from the SSA adapter.
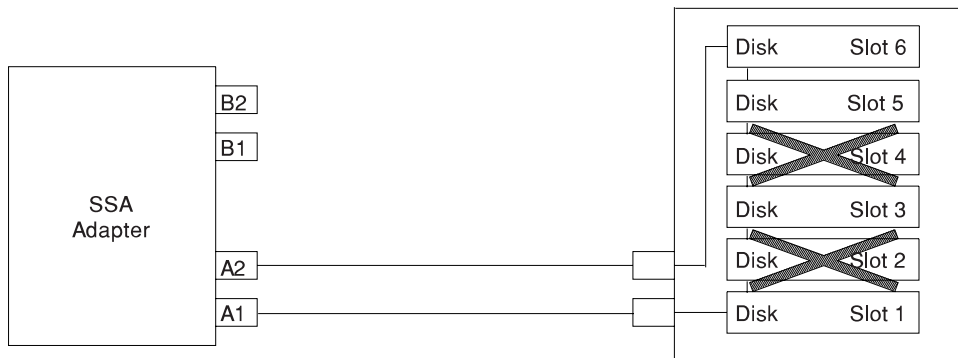
SSA Service Aids

SSA service aids help you service the &option.. This section describes those service aids, and tells how to use them.

Attention: Do not run the service aids from more than one system at a time; otherwise, unexpected results might occur.

The SSA service aids are:

Set Service Mode   This service aid enables you to determine the location of a particular disk drive module on the SSA link and to remove that module from the link.

Link Verification   This service aid tells you the operational status of an SSA link.

Configuration Verification   This service aid lets you determine the relationship between physical and logical disk drives.

Format Disk   This service aid formats an SSA disk drive module.

Certify Disk   This service aid verifies that all the data on a disk drive can be read correctly.

Before you use the service aids, ensure that you are familiar with the principles of SSA links and physical disk drives (pdisks). If you are not familiar with these principles, first read "SSA Loops and Links" on page 6-25.

The Identify Function

The identify function can be accessed from any of the service aids.

This function enables you to determine the location of a particular disk drive module that you want to identify but do not want to remove from the system unit. The identify function causes the check light of the disk drive module to flash for identification (1 second on, 1 second off), but has no effect on the normal operation of the disk drive module. You can use the identify function on any number of disk drive modules at the same time.

Instructions displayed by the service aids tell you when you can select the identify function.

Note: You cannot use the identify function on a device that is in reserved status.

Starting the SSA Service Aids

To start the SSA service aids:

1. Start the system diagnostics (see the *Common Diagnostics Information Manual*), and go to the DIAGNOSTIC OPERATING INSTRUCTIONS screen.

2. Follow the instructions to display the FUNCTION SELECTION menu.

3. Select the SERVICE AIDS options from the FUNCTION SELECTION menu.

4. Select SSA SERVICE AIDS from the Service Aids menu.

   The SSA Service Aids menu displays.

```
 SSA SERVICE AIDS                                        8 238

  Move cursor onto selection, then press Enter.


          Set Service Mode
          Link Verification
          Configuration Verification
          Format Disk
          Certify Disk








       F3=Cancel       F1 =Exit
```

Note: In some configurations of the using-system console:

Esc and 0 = Exit
Esc and 3 = Cancel

In such configurations the displayed instructions for the function keys remain the same as those shown in the SSA SERVICE AIDS menu.

5. Select the service aid that you require, then go to the relevant instructions in this chapter:

"Set Service Mode Service Aid" on page   6-33

"Link Verification Service Aid" on page   6-38

"Configuration Verification Service Aid" on page   6-41

"Format Disk Service Aid" on page   6-43

"Certify Disk Service Aid" on page   6-45

Set Service Mode Service Aid

The Set Service Mode service aid enables you to determine the location of a partic-
ular disk drive module and to remove that module from the system unit. It causes
the check light of that disk drive module to come on for identification, and it stops all
SSA link activity through the module. Only one disk drive module at a time can be in
the service mode.

Before using this service aid, you must make the selected disk drive module unavail-
able to the using system; otherwise, an error occurs.

SSA disk drive modules can be maintained concurrently; that is, they can be
removed, installed, and tested on an SSA link while the other modules on the link
continue to work normally. If a disk drive module has its check light on, you can
remove that module from the SSA link without taking any special actions.

If a disk drive module does *not* have its check light on, the SSA link that passes
through it might still be active, even though the disk drive module itself might not be
working. You must put that module into the service mode before you remove it from
the SSA link.

If you quit the Set Service Mode service aid, the service mode is reset.

To use the Set Service Mode service aid:

 1. Select SET SERVICE MODE from the SSA Service Aids menu (see "Starting the
    SSA Service Aids" on page 6-31). A list of physical disk drives (pdisks) is dis-
    played:

```
   SSA SERVICE AIDS                                              8 238


   SET SERVICE MODE                                             8 2381

  Move cursor onto selection, then press Enter.

   {TOP}

   pdisk     11111111     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk1    22222222     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk2    33333333     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk3    44444444     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk4    55555555     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk5    66666666     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk6    77777777     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk7    88888888     - 4-P     9.1 GB SSA F Physical Disk Drive
   pdisk8    99999999     - 4-P     9.1 GB SSA F Physical Disk Drive


   {BOTTOM}

  F3=Cancel      F1 =Exit
```

The columns of information displayed on the SSA SERVICE AIDS menu have the following meanings:

pdisk0 through pdisk8   Physical disk drive resource identifiers.

11111111 through 99999999   Serial numbers of the physical disk drive modules. The actual serial number of a disk drive module is shown on the front of the disk drive module.

00-04-P   See "SSA Location Code Format" on page 6-24.

9.1 GB SSA F Physical Disk Drive   Descriptions of the disk drive modules.

2. Select the pdisk that you want to identify or put into Service Mode (for example, pdisk3). The following display appears with details of the disk drive module that you have just selected.

```
 SSA SERVICE AIDS                                              8 238


 SET SERVICE MODE                                             8 2381


 SET SERVICE MODE                                             8 2382

 pdisk3    44444444       - 4-P     9.1 GB SSA F Physical Disk Drive

 Move cursor onto selection, then press Enter.

 + Set or Reset Identify.
    Select this option to set or reset the Identify indicator
    on the disk drive.
 > Set or Reset Service Mode.
    Select this option to set or reset Service Mode
    on the disk drive.




  F3=Cancel       F1 =Exit
```

3. Select either the service mode or the identify function. (For this example, assume that you have selected the service mode function.) The list of pdisks is displayed again, and the disk drive module that you selected is marked by a >, which shows that the module is in the service mode.

```
 SSA SERVICE AIDS                                           8 238

 SET SERVICE MODE                                           8 2381

 SET SERVICE MODE                                           8 2382

 SET SERVICE MODE                                           8 2381

 Move cursor onto selection, then press Enter.

   {TOP}

   pdisk     11111111    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk1    22222222    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk2    33333333    - 4-P    9.1 GB SSA F Physical Disk Drive
 > pdisk3    44444444    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk4    55555555    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk5    66666666    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk6    77777777    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk7    88888888    - 4-P    9.1 GB SSA F Physical Disk Drive
   pdisk8    99999999    - 4-P    9.1 GB SSA F Physical Disk Drive


   {BOTTOM}

 F3=Cancel      F1 =Exit
```

Notes:

a. You can select only one disk drive module at a time.

b. If you select the service mode function, and the selected disk drive module is not in a closed loop (see "SSA Loops and Links" on page 6-25), your selection fails and an error message is displayed. Use the Link Verification service aid to identify any open-link problems before trying to reselect the service mode function.

c. If you select the service mode function, and a file system is mounted on the selected disk drive module, your selection fails. Use the Configuration Verification service aid to determine which hdisk must have its file system unmounted before you can select the service mode function.

d. If the check light of the disk drive module that you have put into the service mode does not come on, and if you are not sure of the location of that module, use the identify function to help you find the disk drive module (see "The Identify Function" on page 6-31).

4. Select a second disk drive module, if required (for example, pdisk5). The fol-
lowing display appears:

```
SSA SERVICE AIDS                                         8 238

SET SERVICE MODE                                         8 2381

SET SERVICE MODE                                         8 2382

SET SERVICE MODE                                         8 2381

SET SERVICE MODE                                         8 2382
> pdisk5    66666666     - 4-P  9.1 GB SSA F Physical Disk Drive


Move cursor onto selection, then press Enter.

+ Set or Reset Identify.
   Select this option to set or reset the Identify indicator
   on the disk drive.
> Set or Reset Service Mode.
   Select this option to set or reset Service Mode
   on the disk drive.


 F3=Cancel       F1 =Exit
```

5. Select either the service mode or the identify function. If the original disk drive
   module is to remain in service mode, you can select only the identify function
   now. (Only one disk drive module at a time can be in the service mode.) The
   list of pdisks appears again. The pdisk that is in identify mode is identified by a
   +.

```
SSA SERVICE AIDS                                              8 238

SET SERVICE MODE                                             8 2381

SET SERVICE MODE                                             8 2382

SET SERVICE MODE                                             8 2381

SET SERVICE MODE                                             8 2382

SET SERVICE MODE                                             8 2381
Move cursor onto selection, then press Enter.

  {TOP}

  pdisk    11111111     - 4-P  9.1 GB SSA F Physical Disk Drive
  pdisk1   22222222     - 4-P  9.1 GB SSA F Physical Disk Drive
  pdisk2   33333333     - 4-P  9.1 GB SSA F Physical Disk Drive
> pdisk3   44444444     - 4-P  9.1 GB SSA F Physical Disk Drive
  pdisk4   55555555     - 4-P  9.1 GB SSA F Physical Disk Drive
+ pdisk5   66666666     - 4-P  9.1 GB SSA F Physical Disk Drive
  pdisk6   77777777     - 4-P  9.1 GB SSA F Physical Disk Drive
  pdisk7   88888888     - 4-P  9.1 GB SSA F Physical Disk Drive
  pdisk8   99999999     - 4-P  9.1 GB SSA F Physical Disk Drive




  {BOTTOM}

 F3=Cancel      F1 =Exit
```

6. Identify other disk drive modules in the same way, if required.

Link Verification Service Aid

The Link Verification service aid helps you determine:

Where an SSA link has been broken

The status of the disk drive modules on that SSA link

The location of a power fault that has been detected by the disk drive modules
on that SSA link

To use the Link Verification service aid:

1. Select Link Verification from the SSA Service Aids menu (see "Starting the SSA
   Service Aids" on page 6-31). The Link Verification adapter menu is displayed:

```
  SSA SERVICE AIDS                                             8 238


  LINK VERIFICATION                                            8 2385

  Move cursor onto selection, then press Enter.

   ssa      - 3    SSA Adapter
   ssa1     - 5    SSA Adapter
   ssa2     - 6    SSA Adapter
   ssa3     - 7    SSA Adapter














      F3=Cancel       F1 =Exit
```

2. Select the adapter that you want to test.

   The columns of information displayed on the screen have the following
   meanings:

ssa0 through ssa3	Adapter resource identifiers.
00-03 through 00-07	Adapter location codes. These codes specify the location of the SSA adapter in the using system.
SSA Adapter	Descriptions of the adapters.

3. When you have selected an adapter, a list is displayed showing the status of all
   the disk drive modules that are attached to the adapter:

```
SSA SERVICE AIDS                                              8 238


LINK VERIFICATION                                            8 2385


LINK VERIFICATION                                            8 2386

SSA Link Verification for:
 ssa1    - 5   SSA Adapter

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#      Adapter Port

                     A1  A2  B1  B2            Status
 {TOP}
 pdisk     11111111        7                   Good
 pdisk1    22222222    1   6                   Good
 pdisk2    33333333    2   5                   Good
 pdisk3    44444444    3   4                   Good
 pdisk4    55555555    4   3                   Good
 pdisk5    66666666    5   2                   Good
 pdisk6    77777777    6   1                   Good
 pdisk7    88888888    7                       Good
 pdisk8    99999999            1               Good
 pdisk9    nnnnnnnn        1   9               Good
 {MORE}

 F3=Cancel      F1 =Exit
```

The columns of information displayed on the screen have the following
meanings:

pdisk0 through pdisk9	Physical disk drive resource identifiers.
11111111 through 99999999	Serial numbers of the physical disk drive modules. The actual serial number of a disk drive module is shown on the front of the disk drive module.
A1 A2 B1 B2	Adapter connector number (see "The SSA Adapter" on page 6-25).
Status	Statuses are:

	Good	The disk drive module is working correctly.
	Failed	The disk drive module has failed.
	Power	The disk drive module has detected a loss of power.
	Reserved	The disk drive module is used by another using system.

An SSA link must be configured in a loop around which data can travel in either
direction. The loop is broken if a cable fails or is removed, or if a disk drive
module fails. Because each disk drive module on the loop can be accessed

from either direction, the broken loop does not prevent access to any data, unless that data is on the failed disk drive module. If the loop is broken between two disk drive modules, the ready lights on those modules flash to show that only one SSA path is active. Also, the Link Verification service aid shows that only one path is available to each disk drive module on the broken loop.

You can find the physical location of any disk drive module on the link by using the identify function (see "The Identify Function" on page 6-31).

Notes:

 a. In the lists of physical disk drives (pdisks) that are displayed by the service aids, you might see:

   ?????   Question marks show where an SSA loop is broken. No informa-tion is available about any devices that are beyond this point.

   *****   Asterisks indicate an unconfigured device. That device might be:

                 Another SSA adapter that is in the same using system or in a different using system.

                 An SSA device that is in the SSA network, but whose type is not known. Such a condition can occur if, for example, devices are added to the network, but the **cfgmgr** command is not run to configure those devices into the using system.

   For example:

```
 LINK VERIFICATION                                              8 2386

 SSA Link Verification for:
  ssa1     - 5   SSA ADAPTER

 To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#      Adapter Port

                      A1  A2  B1  B2              Status
  {TOP}
 pdisk    11111111                               Good
 pdisk1   22222222      1                        Good
 ?????
 pdisk3   44444444          4                    Good
 pdisk4   55555555          3                    Good
 pdisk5   66666666          2                    Good
 pdisk6   77777777          1                    Good
 pdisk7   88888888                               Good
 pdisk8   99999999                  3            Good
 pdisk9   1                     1   2            Good
  {MORE}

  F3=Cancel      F1 =Exit
```

   Note that the missing disk drive module (pdisk2) is represented by a line of question marks.

b. If you have just made changes to or have just turned on the system unit, you might need to wait up to 30 seconds before detailed information about the SSA network becomes available to the service aids.

4. When you have solved a problem, press F3 (Esc and 3 on some consoles) to leave the display; then press Enter to reselect it. The display shows the new status of the SSA links.

Configuration Verification Service Aid

The Configuration Verification service aid enables you to determine the relationship between SSA logical units (hdisks) and SSA physical disk drives (pdisks). It also displays the connection information and operational status of the disk drives.

Note: User applications communicate with the hdisks; error data is logged against the pdisks.

To use the Configuration Verification service aid:

1. Select Configuration Verification from the SSA Service Aids menu to display a list of pdisks and hdisks (see "Starting the SSA Service Aids" on page 6-31).

```
 SSA SERVICE AIDS                                            8 238


 CONFIGURATION VERIFICATION                                  8 239

 Move cursor onto selection, then press Enter.

   {TOP}
   pdisk     22222222      - 3-P    9.1 GB SSA F Physical Disk Drive
   pdisk1    33333333      - 5-P    9.1 GB SSA F Physical Disk Drive
   pdisk2    44444444      - 7-P    9.1 GB SSA F Physical Disk Drive
   hdisk3    22222222      - 3-L      SSA Logical Disk Drive
   hdisk4    33333333      - 5-L      SSA Logical Disk Drive
   hdisk5    44444444      - 7-L      SSA Logical Disk Drive






    {BOTTOM}

  F3=Cancel       F1 =Exit
```

2. Select the hdisk or pdisk that you want to test.

3. If you select an hdisk, a list of pdisks is displayed:

```
SSA SERVICE AIDS                                            8 238

CONFIGURATION VERIFICATION                                  8 239

CONFIGURATION VERIFICATION                                  8 2391

 hdisk3   22222222     - 3-L    SSA Logical Disk Drive

To set or reset Identify, move cursor onto selection, then press enter.

 Physical    Serial#   Adapter    Port    SSA_Addr    Status

 {TOP}
 pdisk        22222222     - 2     A1         5      Good
                          - 2     A2         5      Good
                          - 3     A1         1      Good
                          - 3     A2                Good




   {BOTTOM}
 F3=Cancel       F1 =Exit
```

If you select a pdisk, a list of hdisks is displayed:

```
SSA SERVICE AIDS                                            8 238

CONFIGURATION VERIFICATION                                  8 239

CONFIGURATION VERIFICATION                                  8 2392

 pdisk    22222222     - 3-P  9.1 GB SSA F Physical Disk Drive

Move cursor onto selection, then press Enter.

 hdisk3   22222222     - 3-L    SSA Logical Disk Drive


   {BOTTOM}
 F3=Cancel       F1 =Exit
```

Note: If you select the hdisk from this screen, the hdisk configuration is displayed.

Format Disk Service Aid

The Format Disk service aid formats SSA disk drive modules.

Attention: Formatting a disk drive module destroys all the data on that module. Use this procedure only when instructed to do so by the service procedures.

To use the Format Disk service aid:

1. Select Format Disk from the SSA Service Aids menu (see "Starting the SSA Service Aids" on page 6-31). A list of pdisks is displayed:

```
 SSA SERVICE AIDS                                            8 238


 FORMAT DISK                                                 8 2395

 Move cursor onto selection, then press Enter.

  {TOP}
  pdisk     11111111      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk1    22222222      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk2    33333333      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk3    44444444      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk4    55555555      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk5    66666666      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk6    77777777      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk7    88888888      - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk8    99999999      - 4-P     9.1 GB SSA F Physical Disk Drive




  {BOTTOM}

  F3=Cancel       F1 =Exit
```

2. Select the pdisk that you want to format. The following instructions are displayed:

```
SSA SERVICE AIDS                                             8 238


FORMAT DISK                                                  8 2395


FORMAT DISK                                                  8 2396

 pdisk1    22222222      - 4-P     9.1 GB SSA F Physical Disk Drive

  Set or Reset Identify.
     Select this option to set or reset the Identify indicator
     on the disk drive.
  Format.
     Select this option only if you are sure that you have selected
     the correct disk drive.
     FORMATTING DESTROYS ALL DATA ON THE DISK DRIVE.






     F3=Cancel       F1 =Exit
```

3. If you are not sure of the identification (pdisk number) of the disk drive module that you want to format, use the identify function to get a positive physical identification of the module (see "The Identify Function" on page 6-31). You can further ensure that you have selected the correct disk drive module by verifying that the serial number on the front of the disk drive module is the same as the serial number that is displayed on the screen.

4. When you are sure that you have selected the correct disk drive module, select Format.

Certify Disk Service Aid

The Certify Disk service aid verifies that all the data on a disk drive module can be read correctly. Instruction given elsewhere in this book tell you when you need to run this service aid.

To use the Certify Disk service aid:

1. Select Certify Disk from the SSA Service Aids menu (see "Starting the SSA Service Aids" on page 6-31). A list of pdisks is displayed:

```
SSA SERVICE AIDS                                        8 238


CERTIFY DISK                                            8 24 4

Move cursor onto selection, then press Enter.

  {TOP}
  pdisk    11111111     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk1   22222222     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk2   33333333     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk3   44444444     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk4   55555555     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk5   66666666     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk6   77777777     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk7   88888888     - 4-P     9.1 GB SSA F Physical Disk Drive
  pdisk8   99999999     - 4-P     9.1 GB SSA F Physical Disk Drive




  {BOTTOM}

F3=Cancel       F1 =Exit
```

2. Select the pdisk that you want to certify. The following instructions are dis-
   played:

```
   SSA SERVICE AIDS                                                8 238


   CERTIFY DISK                                                    8 24 4


   CERTIFY DISK                                                    8 24 5

    pdisk1    22222222      - 4-P      9.1 GB SSA F Physical Disk Drive

   Move cursor onto selection, then press Enter.

    Set or Reset Identify.
        Select this option to set or reset the Identify indicator
        on the disk drive.
    Certify.
        Select this option to start the Certify operation.







        F3=Cancel        F1 =Exit
```

3. If you are not sure of the identification (pdisk number) of the disk drive module
   that you want to format, use the identify function to get a positive physical iden-
   tification of the module (see "The Identify Function" on page 6-31). You can
   further ensure that you have selected the correct disk drive module by verifying
   that the serial number on the front of the disk drive module is the same as the
   serial number that is displayed on the screen.

4. When you are sure that you have selected the correct disk drive module, select
   Certify.

Service Aid Error Codes

If the SSA service aids detect an unrecoverable error and are unable to continue, one of the following error codes might occur:

SSA01　Not enough using-system memory is available for this service aid to continue. Take one of the actions described here:

> This problem might be caused by a failed application program. Ask the user to end any failed application program, then try to run the service aid again.
> Run diagnostics in the problem determination mode on the system unit. If you find any problems, solve them; then try to run the service aid again.
> Close down and reboot the using system; then try to run the service aid again.
> Run diagnostics from diskette or CD-ROM to isolate the problem. If you do not find a problem, the operating system might have failed.

SSA02　An unknown error has occurred. Take one of the actions described here:

> Run diagnostics in the problem determination mode to the system unit. If you find any problems, solve them; then try to run the service aid again.
> If diagnostics fail or if the same problem occurs when you try the service aid again, run the diagnostics from diskette or CD-ROM to isolate the problem. If you do not find a problem, the operating system might have failed.

SSA03　The service aid was unable to open an hdisk. This problem might have occurred because a disk drive module has failed or has been removed from the system. Take the actions described here:

> 1. Use the Configuration Verification service aid (see "Configuration Verification Service Aid" on page 6-41) to determine the location code of the SSA adapter to which the hdisk is attached. (For example, if the location code of the hdisk is 00-03-L, the location code of the SSA adapter is 00-03.)
> 2. Run the Link Verification service aid (see "Link Verification Service Aid" on page 6-38) to the SSA adapter.
> 3. If a link failure is indicated by the service aid, go to "SSA Maintenance Analysis Procedures (MAPS)" in *7026 H Series CPU Drawer Installation and Service Guide*.
> 4. If no link failures are indicated, run the diagnostics in the system verification mode to each pdisk that is attached to the SSA adapter.

Using the Service Aids for SSA-Link Problem Determination

If you have a problem with an SSA link, use the Link Verification service aid (see "Link Verification Service Aid" on page 6-38). The following examples show various loops and the associated information that is displayed by the Link Verification service aid.

Example 1. Normal Loops In the following diagram, eight disk drive modules are connected to connectors A1 and A2 of the SSA adapter. Five disk drive modules are connected to connectors B1 and B2 of the same SSA adapter.
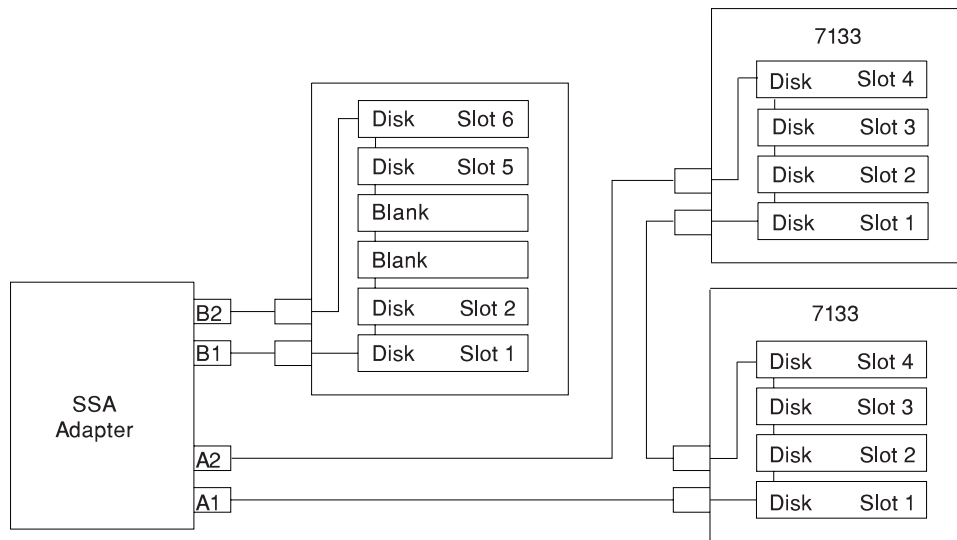
For this example, the Link Verification service aid displays the following information:

```
LINK VERIFICATION                                         8 2386

SSA Link Verification for:
 ssa1     - 5   SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#      Adapter Port

                    A1  A2  B1  B2              Status
 {TOP}
 pdisk     nnnnnnnn        7                    Good
 pdisk1    nnnnnnnn    1   6                    Good
 pdisk2    nnnnnnnn    2   5                    Good
 pdisk3    nnnnnnnn    3   4                    Good
 pdisk4    nnnnnnnn    4   3                    Good
 pdisk5    nnnnnnnn    5   2                    Good
 pdisk6    nnnnnnnn    6   1                    Good
 pdisk7    nnnnnnnn    7                        Good
 pdisk8    nnnnnnnn                3            Good
 pdisk9    nnnnnnnn            1   2            Good
 {MORE}

 F3=Cancel      F1 =Exit
```

Note: Scroll the display to see all the connected disk drive modules.

Example 2. Broken Loop (Cable Removed): Each disk drive module normally communicates with the adapter through one data path. Because data can pass around the loop in either direction, however, the adapter automatically reconfigures the loop to enable communication to continue to each disk drive if the loop becomes broken.

In the following diagram, eight disk drive modules should be connected to connectors A1 and A2 of the SSA adapter. However, the loop is broken because the SSA cable has been disconnected from connector A2. Four disk drive modules are connected to connectors B1 and B2 of the same SSA adapter.

Although the broken loop is reported as an error, all the disk drive modules can still communicate with the using system. The eight disk drive modules can communicate through connector A1 of the SSA adapter . The five disk drive modules can communicate through connectors B1 and B2 of the same SSA adapter (normal loop).
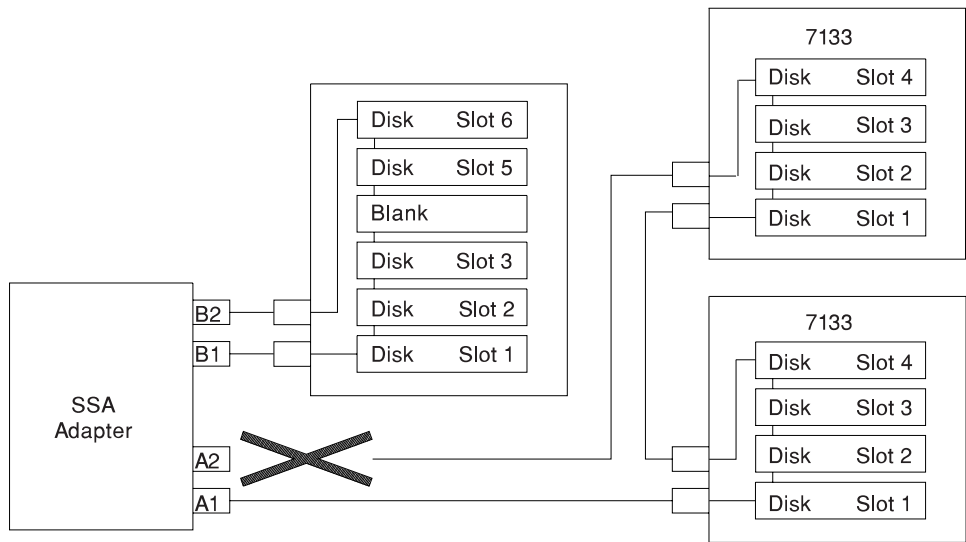
For this example, the Link Verification service aid displays the following information:

```
LINK VERIFICATION                                         8 2386

SSA Link Verification for:
 ssa1      - 5    SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical    Serial#       Adapter Port

                       A1  A2  B1  B2              Status
  {TOP}
  pdisk     nnnnnnnn                               Good
  pdisk1    nnnnnnnn      1                         Good
  pdisk2    nnnnnnnn      2                         Good
  pdisk3    nnnnnnnn      3                         Good
  pdisk4    nnnnnnnn      4                         Good
  pdisk5    nnnnnnnn      5                         Good
  pdisk6    nnnnnnnn      6                         Good
  pdisk7    nnnnnnnn      7                         Good
  pdisk8    nnnnnnnn                 3              Good
  pdisk9    nnnnnnnn             1   2              Good
  {MORE}

  F3=Cancel      F1 =Exit
```

Note that the column for adapter connector A2 shows no connections.

Example 3. Broken Loop (Disk Drive Module Removed): The following
diagram shows eight disk drive modules connected to connectors A1 and A2 of the
SSA adapter, but the loop is broken because disk drive module in slot 3 has been
removed. Four disk drive modules are connected to connectors B1 and B2 of the
same SSA adapter.

Although the missing disk drive module is reported as an error, all the remaining disk
drive modules can still communicate with the using system. Two disk drive modules
can communicate through connector A1 of the SSA adapter. Five disk drive
modules can communicate through connector A2 of the SSA adapter. Five disk
drive modules can communicate through connectors B1 and B2 of the same SSA
adapter (normal loop).
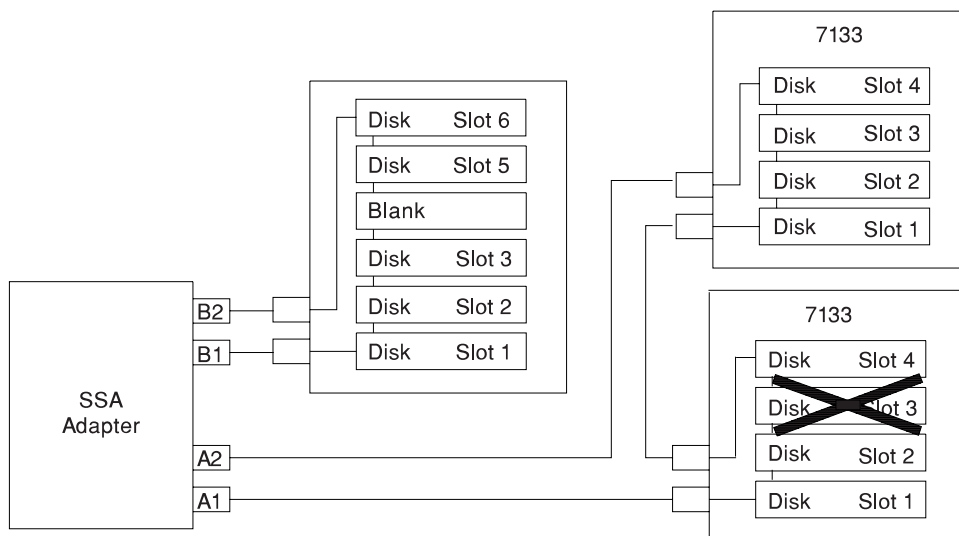
For this example, the Link Verification service aid displays the following information:

```
LINK VERIFICATION                                        8 2386

SSA Link Verification for:
 ssa1     - 5    SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical    Serial#       Adapter Port

                       A1  A2  B1  B2              Status
  {TOP}
  pdisk     nnnnnnnn                               Good
  pdisk1    nnnnnnnn      1                         Good
  ?????
  pdisk3    nnnnnnnn          4                     Good
  pdisk4    nnnnnnnn          3                     Good
  pdisk5    nnnnnnnn          2                     Good
  pdisk6    nnnnnnnn          1                     Good
  pdisk7    nnnnnnnn                                Good
  pdisk8    nnnnnnnn                  3              Good
  pdisk9    nnnnnnnn              1   2              Good
  {MORE}

 F3=Cancel      F1 =Exit
```

Note that the missing disk drive module (pdisk2) is represented by a line of question marks.

Finding the Physical Location of a Device

The physical location of a device (for example, a disk drive module or an SSA adapter) cannot be reported directly by the using system because of the way in which the SSA interface works. The address of an SSA device is related to the position of that device on the SSA loop. The address can, therefore, change if the configuration is changed.

Finding the Device When Service Aids Are Available

To help you to find the correct physical disk drive, the SSA service aids include an identify function. This function, when selected, causes the check light of the selected disk drive module to flash. For more details, see "SSA Service Aids" on page 6-30.

Some devices (for example, adapters) do not have check lights. To find such a device, you can either use the identify function to identify devices that are next to the SSA adapter on the SSA link, or use the procedure described in "Finding the Device When No Service Aids Are Available."

Finding the Device When No Service Aids Are Available

When no service aids are available, you must find the device by using the port (P) and SSA-address (AA) values that are provided by some service request numbers (SRNs). Examples of these SRNs are 43nnn, 44nnn, and 45nnn, where nnn represents the PAA values.

The port (P) value can be a number from 0 to 3, which indicates the port connector on the SSA adapter:

    0 = Connector A1
    1 = Connector A2
    2 = Connector B1
    3 = Connector B2

The AA value is the decimal SSA-address value. It indicates the position of the device that you are trying to find (counted *along* the SSA link).

Use the port value to locate the relevant connector on the SSA adapter, then follow the SSA cable to the first disk drive module or adapter in the same SSA loop. Do not include dummy disk drive modules.

The first disk drive module or adapter that you reach represents SSA-address count 0. Continue to follow the SSA link from disk drive module or adapter, increasing the

SSA-address count by 1 for each device, until you reach the disk drive module or adapter that is indicated in the SRN.

Microcode Maintenance

Updates to the microcode are loaded into the using system from diskettes. If the level of the microcode that is stored in the using system is higher than the level of the microcode that is installed on the SSA adapter or the disk drive modules, the higher-level microcode is automatically downloaded to the adapter and disk drive modules when the using system runs the device configuration method.

For some problems, the service request number (SRN) might ask you to check the microcode package ID before you exchange any field-replaceable units (FRUs). You can determine the package ID for the adapter in either of the following two ways:

On the command line, type the following command and press Enter:

```
lsattr -E -l <adapter> -a ucode
```

where *adapter* is the ID of the adapter that you want to check; for example, ssa0.

The response to this command is:

```
ucode 8F97.  .nn <name of adapter> download False
```

where *nn* is the adapter code package ID.

Use the Display or Change Configuration or Vital Product Data (VPD) service aid to display the VPD for the adapter. The first two characters of the ROS Level field contain the adapter code package ID.

To determine the ID of the microcode package that is being used on a disk drive module, use the Display or Change Configuration or Vital Product Data (VPD) service aid to display the VPD for the disk drive module. The first two characters of the ROS Level field contain the ID of the microcode package for the disk drive module.

Note: During the configuration of the complete system, all the VPD files in the system are updated *before* any microcode is downloaded from the using system to the 6-pack. If the using system later downloads a new level of microcode to the subsystem, the VPD for the adapter or disk drive module will not show the ID of the new microcode package until the next time the configuration manager command (**cfgmgr**) is run.

Vital Product Data (VPD)

The vital product data (VPD) for the system unit and for the SSA adapter can be displayed by using the using-system service aids. This section shows the types of information that are contained in the VPD.

Abbreviations used in this section are:

DRAM   Dynamic random-access memory
FRU   Field-replaceable unit
RAM   Random-access memory
ROM   Read-only memory
ROS   Read-only storage
SSA   Serial storage architecture

The VPD for the 4.5 GB and 9.1 GB SSA Disk Drives is:

Part number   Disk drive module part number
EC level   Disk enclosure engineering change level
Serial number   Disk enclosure serial number
Machine type and model   Type and model
Manufacturer   Manufacturer and plant code
ROS level and ID   ROM and RAM code revision levels
Device specific Z2   RAM code load part number
Device specific Z3   Electronics card assembly part number
Device specific Z4   Disk enclosure date of manufacture

The VPD for the SSA Adapter is:

Part number   Adapter card FRU part number
Serial number   Adapter card serial number
Engineering change level   Adapter card engineering change level
Manufacturing location   Manufacturer and plant code
ROS level and ID   Version of ROS code loaded on the adapter
Loadable microcode level   Version of loadable code needed for the satisfactory operation of this card
Device driver level   Minimum level of device driver needed for this level of card
Description of function   SSA adapter
Device specific (Z0)   If the adapter contains additional DRAM modules, Z0 indicates the total DRAM size in megabytes
Device specific (Z1)   If the adapter contains a pluggable fast-write cache module, Z1 indicates the cache size in megabytes

Chapter 7. Using the System Verification Procedure

The system verification procedure is used to check the system for correct operation.

When you are analyzing a hardware problem, you should use Chapter 8, "Hardware Problem Determination" on page 8-1.

Step 1. Considerations before Running This Procedure

Notes:

1. If this system unit is directly attached to another system unit or attached to a network, be sure communications with the other system unit is stopped.

2. This procedure requires use of all of the system resources. No other activity can be running on the system while you are doing this procedure.

   This procedure requires a display connected to the video port or an ASCII terminal attached to the S1 port.

   Before starting this procedure, you should stop all programs and the operating system.

   This procedure runs the Online Diagnostics in Service mode or Standalone Diagnostics. If the Online Diagnostics are installed, they should be run. See the operator manual for your type of ASCII terminal to find the key sequences you need in order to respond to the diagnostics.

   If you need more information about diagnostics see Chapter 5, "Using the Standalone and Online Diagnostics" on page 5-1.

   If a console display is not selected, the diagnostics stop. The instructions for selecting a console display are displayed on all of the graphic displays and any terminal attached to the S1 port. Follow the displayed instructions to select a console display.

   ISA adapters cannot be detected by the system. The ISA adapter Configuration Service Aid allows the identification and configuration of ISA adapters when running standalone diagnostics.

   Go to Step 2.

Step 2. Loading the Diagnostics

1. Stop all application programs running on the operating system.

2. Stop the operating system.

3. Turn the power off.

4. If you are loading the Standalone Diagnostics and running them from an ASCII terminal:

   The attributes for the terminal must be set to match the defaults of the diagnostics.

   If you need to change any settings, record the normal settings, and be sure the terminal attributes are set to work with the diagnostics. If needed, see "Running the Diagnostics from a tty terminal" on page 5-3.

   Return to substep 5 when you finish checking the attributes.

5. Turn the power on.

   a. When the keyboard indicator appears, press F5 on the direct attached keyboard (5 on the ASCII keyboard) to load the Standalone Diagnostics or F6 on the directly-attached keyboard (6 on the ASCII terminal keyboard) to load the Online Diagnostics.

   b. Enter any requested passwords.

   c. Follow any instructions to select a console.

6. When the Diagnostic Operating Instructions display, go to Step 3. If you are unable to load the diagnostics, go to "Problem Determination When Unable to Load Diagnostics" on page 8-10.

Step 3. Running System Verification

The Diagnostic Operating Instructions should be displayed.

1. Press the Enter key.

2. If the terminal type has not been defined, you must use the `Initialize Terminal` option on the Function Selection menu to initialize the operating system environment before you can continue with the diagnostics.

3. If you want to do a general checkout without much operator action, Select the `Diagnostic Routines` option on the Function Selection menu.

   If you want to do a more complete checkout including the use of wrap plugs, select the `Advanced Diagnostics` option on the Function Selection menu. The advanced diagnostics are primarily for the service representative; they may instruct you to install wrap plugs to better isolate a problem.

4. Select the `System Verification` option on the Diagnostic Mode Selection menu.

5. If you want to run a general checkout of all installed resources, Select the `System Checkout` (if displayed) option on the Diagnostic Selection menu.

   If you want to check one particular resource, select that resource on the Diagnostic Selection menu.

6. Go to Step 4.

Step 4. Additional System Verification

The checkout programs end with either the Testing Complete menu and a message stating `No trouble was found` or the A Problem Was Detected On (Time Stamp) menu with an SRN.

1. Press Enter to return to the Diagnostic Selection menu.

2. If you want to check other resources, select the resource. When you have checked all of the resources you need to check, go to Step 5.

Step 5. Stopping the Diagnostics

1. If running Online diagnostics, the system first should be shut down using the following procedure:

    a. Press F3 repeatedly until you get to the Diagnostic Operating Instructions, then follow the displayed instructions.

    b. Press F3 once, and then follow the displayed instructions to shut down system.

2. If you changed any attributes on your ASCII terminal to run the diagnostics, change the settings back to normal.

3. This completes the system verification. Report the SRN to the service organization if you received one. To do a normal boot, turn off the system unit and wait 30 seconds, and then set the power switch of the system unit to On.

Chapter 8. Hardware Problem Determination

Problem Determination Using the Standalone or Online Diagnostics

Use this procedure to obtain a service request number (SRN) when you are able to load the Standalone or Online Diagnostics. If you are unable to load the Standalone or Online Diagnostics, go to "Problem Determination When Unable to Load Diagnostics" on page 8-10. The service organization uses the SRN to determine which field replaceable units (FRUs) are needed to restore the system to correct operation.

Step 1. Considerations before Running This Procedure

Note: See the operator manual for your ASCII terminal to find the key sequences you need to respond to the diagnostic programs.

The diagnostics can use a display connected to the video port or a ASCII terminal attached to a serial port.

This procedure asks you to select the type of diagnostics you want to run. If you need more information about the types, see "Standalone and Online Diagnostics Operating Considerations" on page 5-1.

ISA adapters cannot be detected by the system. The ISA adapter Configuration Service Aid allows the identification and configuration of ISA adapters for Standalone Diagnostics. ISA adapters must be identified and configured before they can be tested.

Go to "Step 2."

Step 2

Are the Online Diagnostics installed on this system?

NO Go to "Step 15."

YES Go to "Step 3."

Step 3

Determine if the operating system is accepting commands.

Is the operating system accepting commands?

NO   The system must be turned off in order to run diagnostics.

              1. Verify with the system administration and users that the system may be turned off. If so, then turn off the system unit and go to "Step 6."

YES   Go to "Step 4."

Step 4

Diagnostic tests can be run on many resources while the operating system is running. However, more extensive problem isolation is obtained by running Online diagnostics in Service mode.

Do you want to run the Online diagnostics in Service mode?

NO   Go to "Step 5."

YES   Do the following to shut down your system:

              1. At the system prompt, stop the operating system using the proper command for your operating system.

              2. After the operating system is stopped, power off the system unit.

              3. Go to "Step 6."

Step 5

This step invokes the Online Diagnostics in concurrent mode.

1. Log on as `root` or as `superuser`.

2. Enter the diag command.

3. Wait until the Diagnostic Operating Instructions are displayed, or wait for three minutes.

Are the Diagnostic Operating Instructions displayed without any obvious console display problems?

NO   Do the following to shut down your system:

        1. At the system prompt, stop the operating system using the proper command for your operating system.

        2. After the operating system is stopped, power off the system unit.

        3. Go to "Step 6."

YES   Go to "Step 9."

Step 6

This step loads Online diagnostics in service mode. If you are unable to load the diagnostics, go to "Step 7."

1. Turn the power on.

2. When the keyboard indicator (icon or text) appears, press F6 on the directly-attached keyboard or 6 on the ASCII terminal keyboard to indicate that diagnostics are to be loaded.

3. Enter any requested passwords.

4. Follow any instructions to select a console.

Did the Diagnostics Operating Instructions display without any obvious display problem?

NO   Go to "Step 7."

YES   Go to "Step 9."

Step 7

Starting at the top of the following table, find your symptom and follow the instructions given in the Action column.

Symptom	Action
Display problem.	Go to "Step 8."
All other symptoms.	Go to "Problem Determination When Unable to Load Diagnostics" on page 8-10

Step 8

The following steps analyze a console display problem.

Find your type of console display in the following table, then follow the instructions given in the Action column.

Console Display	Action
Display Device	Go to the display documentation for problem determination.
ASCII terminal	Go to the documentation for problem determination for this type of terminal.

Step 9

The diagnostics loaded correctly.

Press the Enter key.

Is the Function Selection menu displayed?

NO   Go to "Step 10."

YES   Go to "Step 11."

Step 10

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table, then follow the instructions given in the Action column.

Keyboard Type	Action
101–key keyboard. Identify by the type of Enter key used. The Enter key is within one horizontal row of keys.	Record error code M0KBD001 and report the problem to the service organization.
102–key keyboard. Identify by the type of Enter key used. The Enter key extends into two horizontal rows of keys.	Record error code M0KBD002 and report the problem to the service organization.
Kanji keyboard. Identify by the Japanese characters.	Record error code M0KBD003 and report the problem to the service organization.
ASCII–terminal keyboard. This applies to all attached terminals.	Go to the documentation for problem determination for this type terminal.

Step 11

1. If the terminal type has not been defined, you must use the `Initialize Terminal` option on the Function Selection menu to initialize the operating system environment before you can continue with the diagnostics. This is a separate and different operation than selecting the console display.

2. Select `Diagnostic` Routines.

3. Press the Enter key.

4. In the following table, find the menu or system response you received when you selected `Diagnostics`. Follow the instructions given in the Action column.

System Response	Action
The Diagnostic Mode Selection menu is displayed.	Select Problem Determination and go to "Step 12."
The Missing Resource menu is displayed.	Follow the displayed instructions until either the Diagnostic Mode Selection menu or an SRN is displayed.
	If the Diagnostic Mode Selection menu is displayed, select Problem Determination and go to "Step 12."
	If you get an SRN, record it, and go to "Step 14."
The New Resource menu is displayed.	Follow the displayed instructions.
	Note: Devices attached to serial ports S1 or S2 will not appear on the New Resource menu. Also, ISA adapters do not appear unless they have been identified and configured.
	If the Diagnostic Mode Selection menu is displayed, select Problem Determination and go to "Step 12."
	If you get an SRN, record it, and go to "Step 14."
	If you do not get an SRN, go to "Step 17."
The system does not respond to selecting `diagnostics`	Go to "Step 10."

Step 12

Did the Diagnostic Selection Menu display?

NO   If `Problem Determination` was selected from the Diagnostic Mode
           Selection menu, and if a recent error has been logged in the error log, the
           diagnostics automatically begin testing the resource.

           Follow the displayed instructions.

           If the No Trouble Found screen is displayed, press Enter.

           If another resource is tested, repeat this step.

           If the Diagnostic Selection menu is displayed, go to "Step 13."

           If an SRN is displayed, record it, and go to "Step 14."

YES   Go to "Step 13."

Step 13

The system checkout option checks most of the configured adapters and devices.

Notes:

1. System checkout is only supported in Online Diagnostics in Service Mode.

2. ISA adapters cannot be detected by the system. The ISA adapter Configuration
   Service Aid allows the identification and configuration of ISA adapters for Stand-
   alone Diagnostics. ISA adapters must be identified and configured before they
   can be tested.

Select and run the diagnostic tests on the resources you are having problems with or
run system checkout to check all of the configured resources. Find the response in
the following table and take the Action for it.

Diagnostic Response	Action
An SRN is displayed.	Go to "Step 14."
The system hangs.	Report SRN 109-200.
The Testing Complete menu and the `No trouble was found` message is displayed, and you have not tested all of the resources.	Press Enter and continue with the testing.

Diagnostic Response	Action
The Testing Complete menu and the `No trouble` was found message displayed and you have tested all of the resources.	Go to "Step 17."

Step 14

The diagnostics produced an SRN for this problem.

1. Record the SRN and other numbers read out.

2. Report the SRN to the service organization.

3. **STOP.** You have completed these procedures.

Step 15

When you are loading the Standalone Diagnostics, the attributes for the terminal must be set to match the defaults of the diagnostic programs. The ASCII terminal must be attached to serial port 1 on the system unit.

Are you going to load Standalone Diagnostics and run them from a ASCII terminal?

NO   Go to "Step 16."

YES   Go to "Running the Diagnostics from a tty terminal" on page 5-3 and be sure your terminal attributes are set to work with the diagnostic programs.

           Return to "Step 16" when you finish checking the attributes. Record any settings that are changed.

Step 16

This step loads the Standalone Diagnostics. If you are unable to load the diagnostics, go to "Step 7."

1. Turn the power on.

2. Insert the diagnostic CD-ROM into the CD-ROM drive.

3. When the keyboard indicator appears, press F5 on the direct attached keyboard or 5 on the ASCII keyboard to indicate that diagnostics are to be loaded.

4. Enter any requested passwords.

5. Follow any instructions to select a console.

Did the Diagnostics Operating Instructions display without any obvious display problem?

NO　　　　Go to "Step 7."

YES　　　Go to "Step 9."

Step 17

The diagnostics did not find a hardware problem. If you still have a problem, contact your software support center.

Problem Determination When Unable to Load Diagnostics

Use this procedure to obtain an error code. The service organization uses the error code to determine which field replaceable units (FRUs) are needed to restore the system to correct operation.

Step 1. Considerations before Running This Procedure

The diagnostics can use a display connected to the video port or a ASCII terminal attached to a serial port.

Go to "Step 2."

Step 2

Are the Online Diagnostics installed on this system?

NO   Go to "Step 4."

YES   Go to "Step 3."

Step 3

This step attempts to load Online diagnostics in service mode.

1. Turn the power to off.

2. Turn the power on.

3. If the keyboard indicator appears, press F6 on the direct attached keyboard or 6 on the ASCII keyboard to indicate that diagnostics are to be loaded.

4. Enter any requested passwords.

5. Follow any instructions to select a console.

6. Wait until the diagnostics load or the system appears to stop.

Did the diagnostics load?

NO   Go to "Step 5."

YES   Go to "Step 6."

Step 4

This step attempts to load the Standalone diagnostics.

1. Turn the power to off.

2. Turn the power to on.

3. Insert the diagnostic CD-ROM into the CD-ROM drive.

4. If the keyboard indicator appears, press F5 on the direct attached keyboard or 5 on the ASCII keyboard to indicate that diagnostics are to be loaded.

5. Enter any requested passwords.

6. Follow any instructions to select a console.

7. Wait until the diagnostics load or the system appears to stop.

Did the diagnostics load?

NO   Go to "Step 5."

YES   Go to "Step 6."

Step 5

Starting at the top of the following table, find your symptom and follow the
instructions given in the Action column.

Symptom	Action
The power LED does not come on, or comes on and does not stay on.	Check the power cable to the outlet. Check the circuit breakers and check for power at the outlet. Assure the room temperature is within 60 - 90°F. If you do not find a problem, record error code M0PS0000 and report the problem to the service organization.
The system appears to be stopped and NO beep was heard from the system unit.	Processor POST failure. Report error code M0CPU000.
The system appears to be stopped and NO beep was heard from the system unit. F22, F23, or F24 is displayed on the operator panel display.	No good memory could be found. Report error code M0MEM000.
The system appears to be stopped a beep WAS heard from the system unit.	No good memory could be found. Report error code M0MEM001.
The diagnostics are loaded and there was NO beep heard from the system unit during the IPL sequence.	Record error code M0SPK001.
The system stops with the Diagnostic Operating Instructions displayed.	Go to "Step 6."
The diskette LED is blinking rapidly, or FEA or FEB is displayed on the operator panel.	The flash EPROM data is corrupted. The recovery procedure for the flash EPROM should be executed.
The system stops with a prompt to enter a password.	Enter the password. You are not be allowed to continue until a correct password has been entered. When you have entered a valid password, wait for one of the other conditions to occur.
The system stops with an eight-digit error code(s) displayed on the console.	Record the error code(s) and report the problem to the service organization.
The system login prompt is displayed.	You may not have pressed the correct key or you may not have pressed the key soon enough when you were to indicate a Service Mode boot of diagnostic programs. If this was the case, start over at the beginning of this step. If you are sure you pressed the correct key in a timely manner go to Step 7.

Symptom	Action
The system does not respond when the password is entered.	Go to Step 7.
The system stopped and an indicator is displayed on the system console and an eight-digit error code is not displayed.	If the indicator (text or icon) represents: a keyboard, record error code M0KBD000 and report the problem to the service organization. memory, record error code M0MEM002 and report the problem to the service organization. SCSI, record error code M0CON000 and report the problem to the service organization. Network, record error code M0NET000 and report the problem to the service organization. Speaker/Audio, record error code M0BT0000 and report the problem to the service organization.
The System Management Services menu is displayed.	The device or media you are attempting to boot from may be faulty. 1. Check the SMS error log for any errors. To check the error log: Choose tools Choose error log If an error is logged, check the time stamp. If the error was logged during the current boot attempt, record it and report it to your service person. If no recent error is logged in the error log, continue to the next step below. 2. If you are attempting to load the Online Diagnostics, try loading the Standalone Diagnostics. Otherwise, record error code M0SCSI01 and report to the service organization.
The system appears to be stopped, the disk activity light is on continuously, and a beep was heard from the system unit.	Record error code M0MEM001 and report the problem to the service organization.
The system stops and the message "STARTING SOFTWARE PLEASE WAIT ..." is displayed.	Report error code M0BT0000.
The message "The system will now continue the boot process" is displayed continuously on the system unit's console.	Report error code M0SCSI01.

Step 6

The diagnostics loaded correctly.

Go to "Problem Determination Using the Standalone or Online Diagnostics" on page 8-1.

Step 7

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table, then follow the instructions given in the Action column.

Keyboard Type	Action
101–key keyboard. Identify by the type of Enter key used. The Enter key is within one horizontal row of keys.	Record error code M0KBD001 and report the problem to the service organization.
102–key keyboard. Identify by the type of Enter key used. The Enter key extends into two horizontal rows of keys.	Record error code M0KBD002 and report the problem to the service organization.
Kanji keyboard. Identify by the Japanese characters.	Record error code M0KBD003 and report the problem to the service organization.
ASCII–terminal keyboard. This applies to all attached terminals.	Go to the documentation for problem determination for this type terminal.

Chapter 9. SSA Problem Determination Procedures

Problem determination procedures are provided by power-on self-tests (POSTs), service request numbers (SRNs), and maintenance analysis procedures (MAPs). Some of these procedures use the using system service aids that are described in "SSA Service Aids" on page 6-30.

Disk Drive Module Power-On Self-Tests (POSTs)

Attention: Disk drive modules are fragile. Handle them with care. Follow all ESD-sensitive (electro-static discharge) parts procedures when handling disk drive modules. For ESD information, see "Handling Static-Sensitive Devices" on page 4-3.

The disk drive module POSTs start each time the module is switched on or when a **Send Diagnostic** command is received from the SSA adapter. They check whether the disk drive module is working correctly. The POSTs also help verify a repair after a FRU has been exchanged.

There are two power-on self-tests: POST-1 and POST-2.

POST-1 runs immediately after the 'power-on reset' line goes inactive and before the disk drive module motor starts. POST-1 includes tests of the:

    Microprocessor
    ROM
    Safety circuits

If POST-1 completes successfully, POST-2 is enabled.

If POST-1 fails, the disk drive module check light stays on, and the disk drive module is not configured into the SSA network.

POST-2 runs after the disk drive module motor has started. POST-2 includes tests of:

    Motor control
    Servo control
    Read and write on the diagnostic cylinder (repeated for all heads)
    Error checking and correction (ECC)

If POST-2 completes successfully, the disk drive module is ready for use by the using system.

Adapter Power-On Self-Tests (POSTs)

Two power-on self-tests (POSTs) are resident in the SSA adapter. The tests are POST-1 and POST-2.

POST-1 tests all the functions that are necessary to enable the adapter to communi-cate with the Micro Channel. POST-1 can fail for either of two reasons:

A hardware error has been detected. In such instances, the POST code enters a tight loop, and does not put the identification of the SSA adapter into the pro-grammable option select (POS) registers. If this error occurs, the SSA adapter must be exchanged for a new one.

The flash erasable programmable read-only memory (EPROM) has a check sum that is not valid. This error can be caused if the power fails while microcode is being downloaded. In such instances, the POST checks all the hardware that is needed to download the microcode. If all the hardware is correct, the POST sets the ROS level to zero, puts the identification of the SSA adapter into POS 0-1, and puts error data into the adapter status register.

To recover from this type of error, microcode must be downloaded to the SSA adapter. If the using system can have an initial program load (IPL) without the adapter, the configuration code detects the down-level ROS code and downloads the latest level of code. The configuration code then uses control register bit 7 to reset the adapter and restart POST-1.

If no error is detected during POST-1, the identification of the SSA adapter is put into the POS registers, and POST-2 is started.

POST-2 tests the remaining hardware on the SSA adapter card and tests the other FRUs that are attached to the adapter. If this test fails, an error code is saved and sent to the using-system error log when the error logger becomes available. An internal health check continues to send the error code at regular intervals.

Appendix A. System Records

Record the Identification Numbers

Record and retain the following information.

Product Name	RS/6000 7026 CPU Drawer
CPU Type/Speed	_____
Serial Number	_____
Key Serial Number	_____

The server's identification numbers are located on the front and on the rear of the drawer.
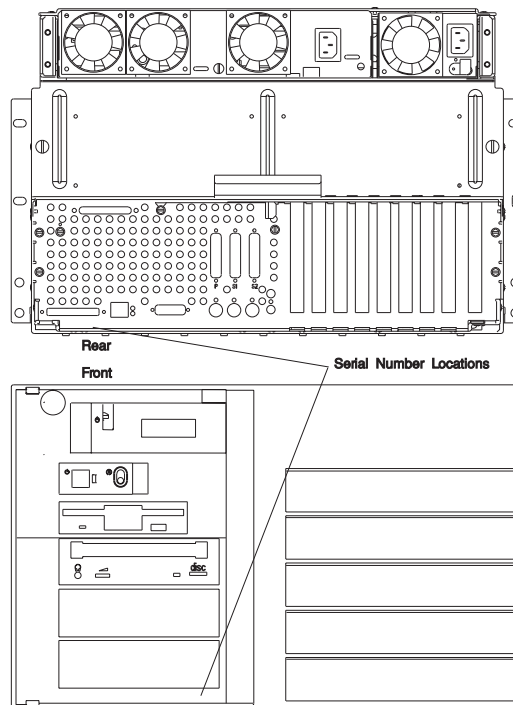
Device Records

Use the following tables to keep a record of the options installed in or attached to your system. This information can be helpful when you install additional options in your server or if you ever need to have your server serviced.

Table A-1. Internal and External Options					
Location	**Option Description**				
Memory (J26)	8MB	16MB	32MB	64MB	128MB
Memory (J25)	8MB	16MB	32MB	64MB	128MB
Memory (J24)	8MB	16MB	32MB	64MB	128MB
Memory (J23)	8MB	16MB	32MB	64MB	128MB
Memory (J22)	8MB	16MB	32MB	64MB	128MB
Memory (J21)	8MB	16MB	32MB	64MB	128MB
Memory (J20)	8MB	16MB	32MB	64MB	128MB
Memory (J19)	8MB	16MB	32MB	64MB	128MB
Mouse Connector	IBM Mouse Other:_____				
Keyboard Connector	Space Saving Enhanced Other:_____				
Expansion Slot 9	_____				
Expansion Slot 8	_____				
Expansion Slot 7	_____				
Expansion Slot 6	_____				
Expansion Slot 5	_____				
Expansion Slot 4	_____				
Expansion Slot 3	_____				
Expansion Slot 2	_____				
Expansion Slot 1	_____				
Parallel Port	_____				
Serial Port 1	_____				
Serial Port 2	_____				

Refer to the following diagram of your server's bays when completing Table A-2 on page A-4.
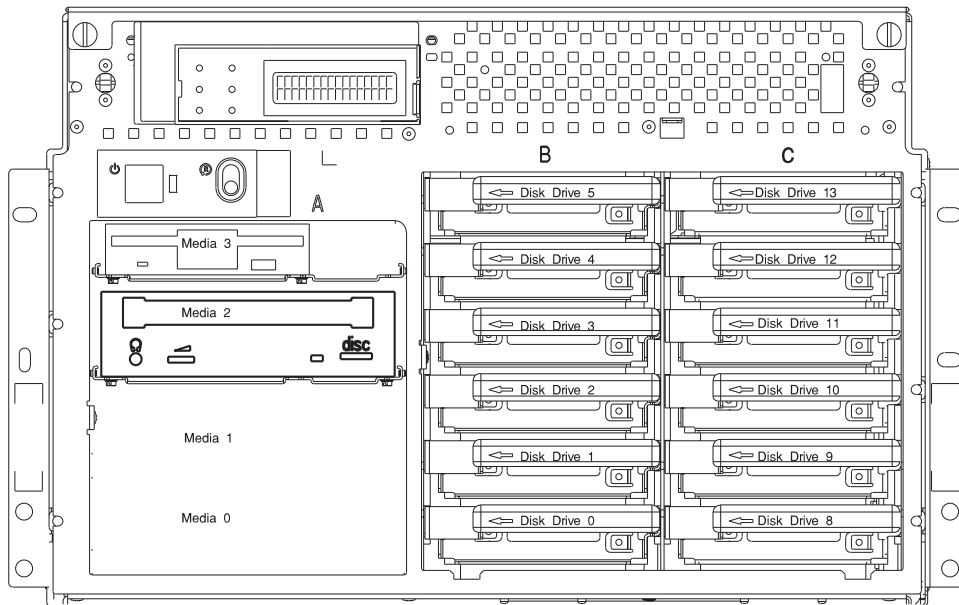
Notes:

If you attach a drive or other device to an adapter, record the expansion-slot number for that adapter in the *adapter* field of table A-2.
Your model might have more preinstalled drives than shown in this table.

Table A-2 (Page 1 of 2). Internal Files and Devices			
Adapter	**Location**	**SCSI ID**	**Drive Description**
Integrated	Bank A Bay 3	Non-SCSI	<u>3.5-Inch 1.44MB Diskette Drive</u>
Integrated	Bank A Bay 2	4	<u>CD-ROM Drive</u>
Integrated	Bank A Bay 1	6	_____
Integrated	Bank A Bay 0	5	_____
Integrated 2	Bank B Bay 1	0	_____
	Bank B Bay 2	1	_____
	Bank B Bay 3	2	_____
	Bank B Bay 4	3	_____
	Bank B Bay 5	4	_____
	Bank B Bay 6	5	_____
Integrated 2 or PCI	Bank C Bay 1	8	_____
	Bank C Bay 2	9	_____
	Bank C Bay 3	10	_____
	Bank C Bay 4	11	_____
	Bank C Bay 5	12	_____
	Bank C Bay 6	13	_____

Table A-2 (Page 2 of 2). Internal Files and Devices			
Adapter	**Location**	**SCSI ID**	**Drive Description**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Appendix B. Replacing the Battery

The manufacturer has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you need to replace the battery, contact your service representative.

CAUTION:
A lithium battery can cause fire, explosion, or severe burn. Do not recharge, disassemble, heat above 100°C (212°F), solder directly to the cell, incinerate, or expose cell contents to water. Keep away from children. Replace only with the part number specified for your system. Use of another battery may present a risk of fire or explosion.

The battery connector is polarized; do not attempt to reverse polarity.

Dispose of the battery according to local regulations.

Note: After you replace the battery, you must reconfigure your system (bootlist, IP parameters, etc.) and reset the system date and time.

1. If you have not already done so, open the rear door of the rack unit.

2. Loosen the screws that hold the rear access cover to the drawer and remove the cover.

3. Slide the accoustic baffle out of the drawer.

4. Remove the air duct from over the memory area of the system board.

5. You may need to remove the power supplies for better access to the inside of the drawer. If so, see *7026 H Series CPU Drawer Installation and Service Guide*.

6. Locate the battery on the system board.
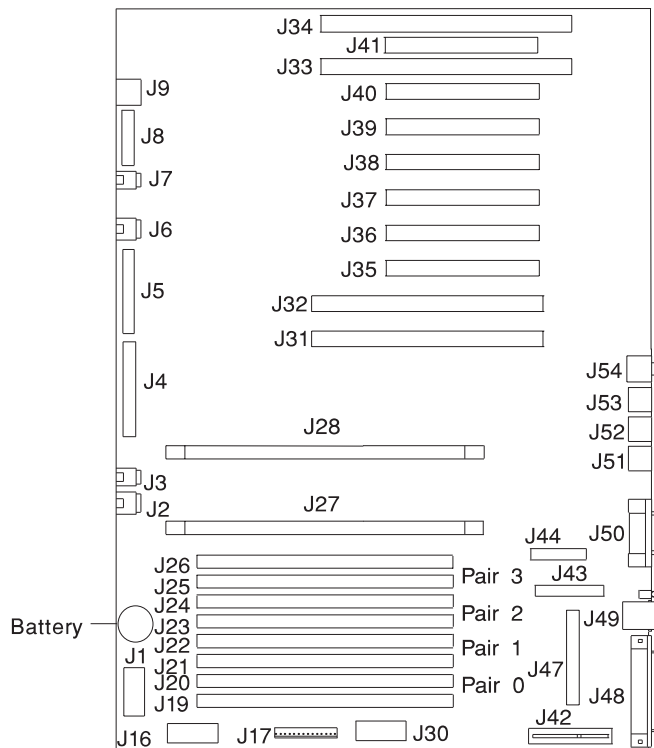
7. Remove the battery:

   a. Use one finger to slightly slide the battery toward the front of the server. (The spring mechanism behind the battery pushes it out toward you as you slide it forward.)

   b. Use your thumb and index finger to hold the battery as it pushes out of the socket.
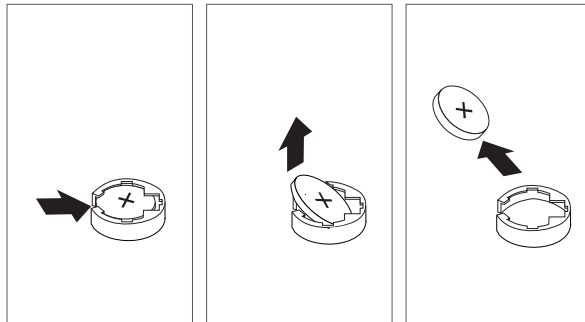
8. Insert the new battery:

   a. Tilt the battery so that you can insert it into the front of the socket.

   b. As you slide it toward the front of the server, push it down into the socket.
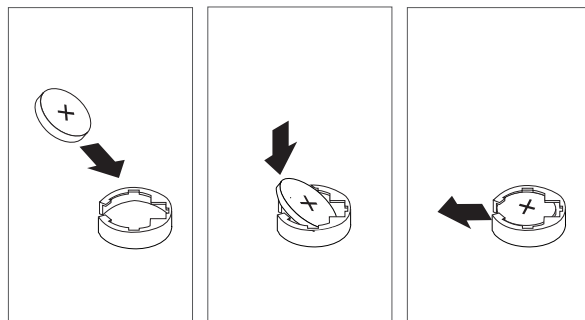
9. Reconfigure your system and reset the system date and time.

10. Replace the air duct, accoustic baffle, rear access cover, and power supplies in the reverse order that they were removed, and then close the rear door of the rack unit.

Appendix C. Supplies

This appendix contains a list of supplies and the part numbers needed to order them.

Part Number Description

21F8763   4mm Cleaning Cartridge

21F8758   4mm DDS|||| Data Tape Cartridge (5-pack)

21F8762   4mm DDS|||| Diagnostic Cartridge

8191160   4mm DDS2 Data Tape Cartridge (5-pack)

8191146   4mm DDS2 Diagnostic Cartridge

21F8732   1/4-inch 1.2GB Data Tape Cartridge (5-pack)

21F8587   1/4-inch 525MB Data Tape Cartridge (5-pack)

21F8588   1/4-inch 150MB Data Tape Cartridge (5-pack)

21F8570   1/4-inch Cartridge Head Cleaning Kit

21F8595   8mm Data Tape Cartridge (5-pack)

16G8467   8mm Cleaning Tape Cartridge

21F8577   8mm Test Tape Cartridge

13F5647   Tape Cleaning Solution

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IBM

Part Number: 93H8481

SA38- 534- 1

93H8481