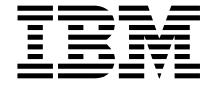


RS/6000 Enterprise Server Model H50



User's Guide

First Edition (February 1998)

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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 Règlement 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.

CAUTION:

This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect two power supply cords before servicing.

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 30 milliwatts at 830 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 Enterprise Server Model H50 Service Guide* contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.
- The *7015 Model R00 Rack Installation and Service Guide* contains information regarding the 7015 Model R00 Rack, which the RS/6000 Enterprise Server Model H50 may be installed in.
- The *7014 Model S00 Rack Installation and Service Guide* contains information regarding the 7014 Model S00 Rack, which the RS/6000 Enterprise Server Model H50 may be installed in.
- The *RS/6000 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 *RS/6000 Diagnostic Information for Multiple Bus Systems*.
- The *PCI Adapter Placement Reference* contains information regarding slot restrictions for adapters that can be used in this system.
- The *Site and Hardware Planning Information* contains information to help you plan your installation.

Trademarks

- AIX is a registered trademark of the International Business Machines Corporation.
- PowerPC is a trademark of the International Business Machines Corporation.
- Velcro is a trademark of Velcro Industries.

Chapter 1. System Description

Thank you for selecting an RS/6000 Enterprise Server Model H50!

The RS/6000 Enterprise Server Model H50 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 Enterprise Server Model H50 incorporates the new, advanced peripheral component interconnect (PCI) bus, which is faster than the industry standard architecture (ISA) bus. But the system also offers ISA as an additional bus architecture, to accommodate businesses that already have invested in ISA and ISA-based devices.

This book helps you use the system, install and remove some options, configure the system, and use the system programs 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 on page A-1 provides a section for you to record all the important information about your system.

The base configuration of the RS/6000 Enterprise Server Model H50 includes:

- One PowerPC 604 microprocessor
- 128MB system memory
- One 4.5GB hot-swappable disk drive
- One 1.44MB diskette drive
- One CD-ROM drive
- One unused media bay
- One 600 Watt power supply
- One SCSI back plane which can accept an additional five hot-swappable disk drives

The maximum configuration of the RS/6000 Enterprise Server Model H50 can include:

- Four PowerPC 604 microprocessors
- 3GB system memory
- One 4.5GB internal disk drive
- One 1.44MB diskette drive
- One CD-ROM drive
- One additional media device (may be a non-hot-swappable disk drive)
- Two 600 Watt power supplies, which provides redundant power.
- Two back planes which can accept up to twelve hot-swappable disk drives (may be either SCSI or SSA)

Chapter 2. Using the System Unit

Ergonomic Information

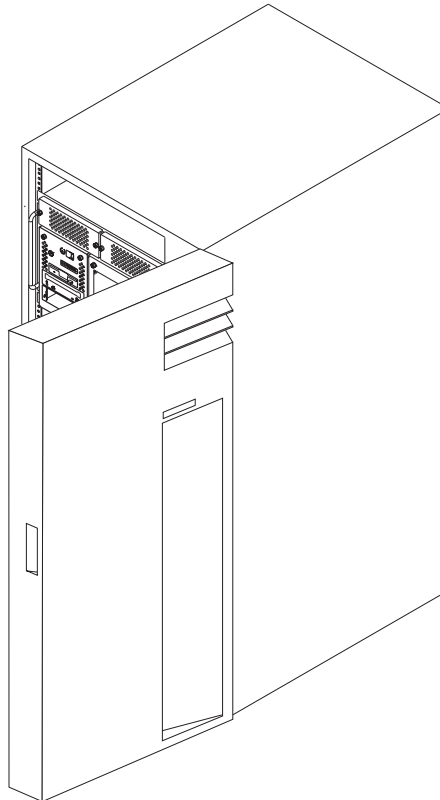
Once you have setup your system, we encourage you to visit the Healthy Computing web site. Good ergonomic practice is important to get the most from your workstation and to avoid discomfort. This means that the equipment and the workplace should be arranged to suit your individual needs and the kind of work you do.

This web site gives ergonomic guidelines to help you understand the ergonomic considerations that you should know about in working at a computer workstation. The address is:

<http://www.us.pc.ibm.com/healthycomputing>

Starting the System Unit

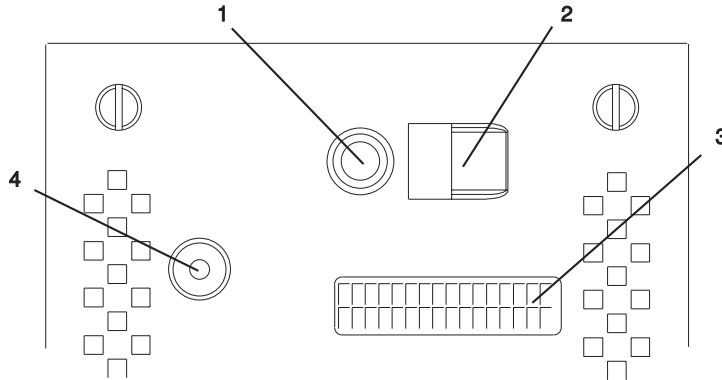
1. Open the front door of the 7014 Model S00 Rack



2. Set the power switches of the attached devices to On.

Note: When the system is plugged in but not powered on, the Power On LED flashes slowly.

3. Press the Power On button.



1	Reset Button	3	Operator Panel Display
2	Power On Button	4	Power On LED

When you press the Power On button, the Power On LED displays a steady green light, and the system starts a POST (power-on self test).

During POST, progress codes display in the operator panel display.

4. If the Power On LED does not come on and there is no indication of power when you press the Power On button, ensure that the power cord, located at the back of the system unit, is plugged into a grounded electrical outlet. If this does not solve the problem, go to Chapter 9 on page 9-1. If the LED is not flashing and 0K is not displayed in the operator panel display, go to the section on running the diagnostics.

For a more complete discussion of power-on methods, see “System Power-On Methods” on page 3-26.

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.

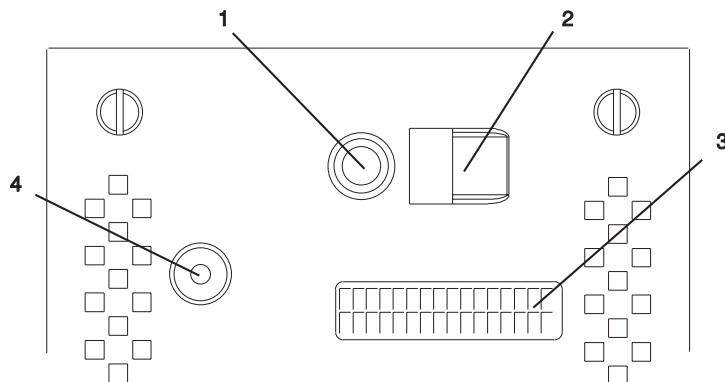
1. Before stopping the system unit, you must first perform a shutdown procedure of the operating system to prevent the loss of data.

2. After you shut down the operating system, set the power switches of the attached devices to Off.
3. The system unit is powered down by the shut down procedure.

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.



1 Reset Button
2 Power On Button

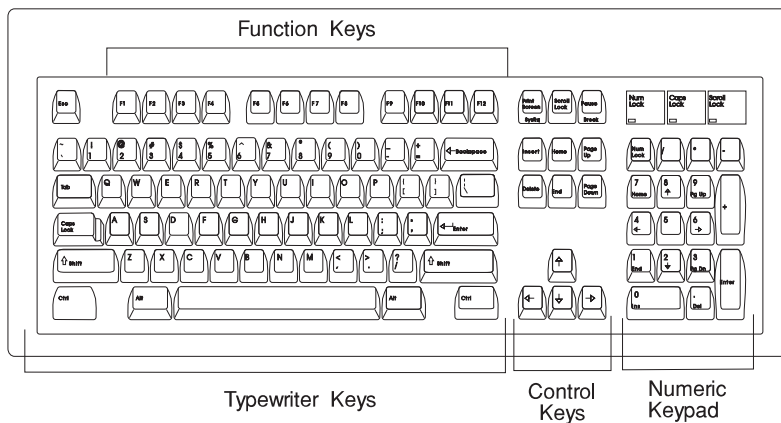
3 Operator Panel Display
4 Power On LED

During power-on self-test (POST), 4 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.

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.

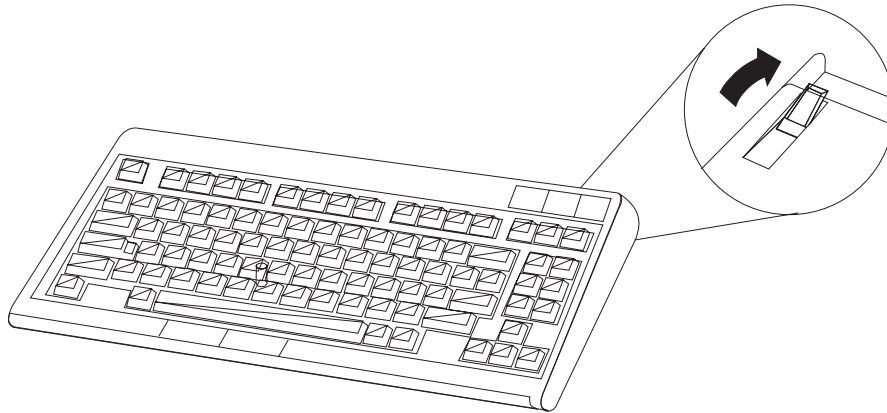


The keyboard is divided into four sections:

- 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.

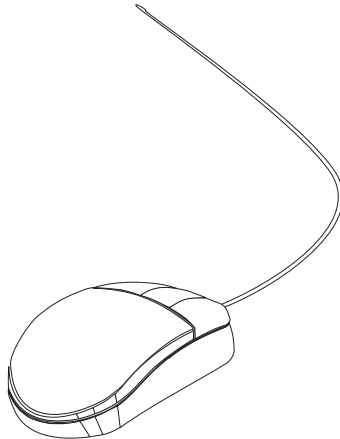
The keyboard cable plugs into the keyboard connector at the rear of the system unit.



Using the Three-Button Mouse

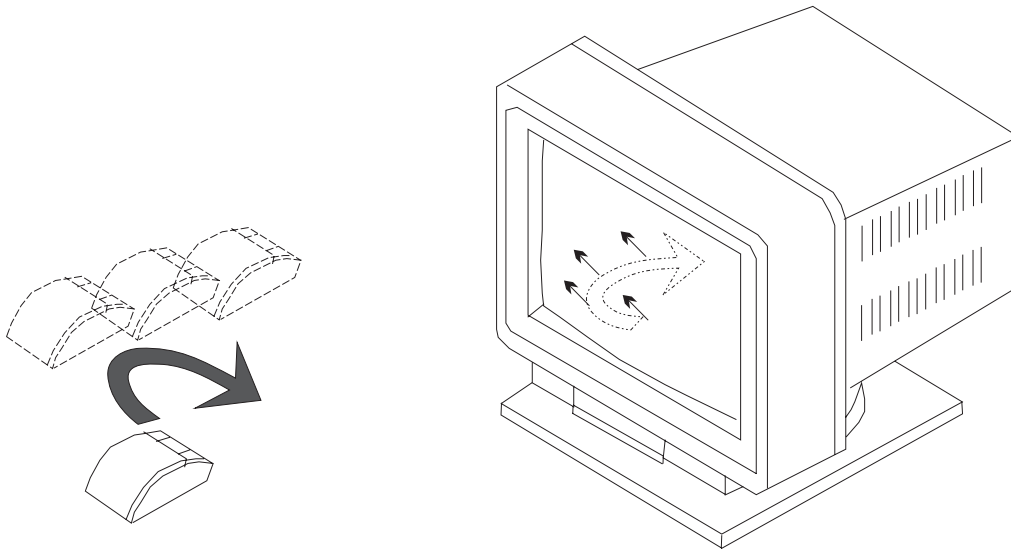
The mouse is a hand-operated locating device. A three-button mouse is available for use with the system unit.

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:

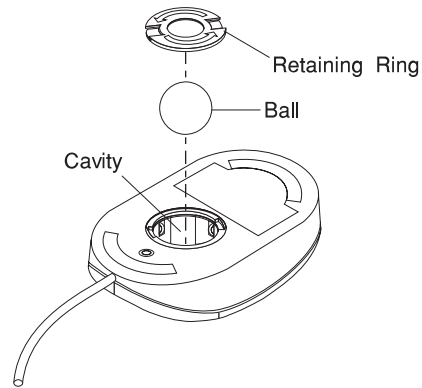
- Finished wood
- Glass
- Enamel
- Plastic
- Paper (except newspaper)
- Metal

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.



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 vertically in the front.

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

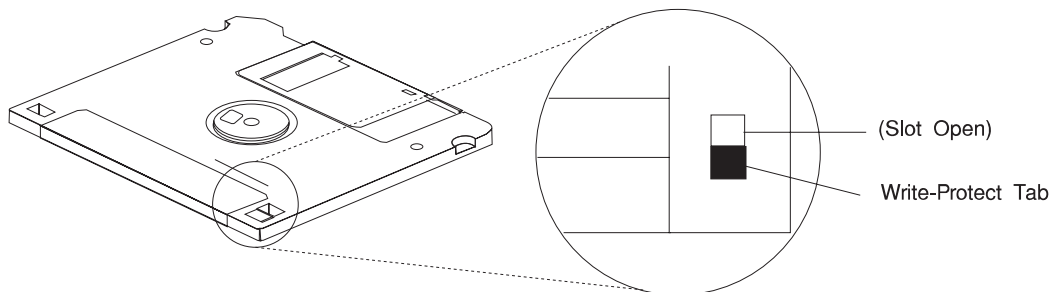
Write-protecting diskettes is necessary so that important information is not accidentally lost.

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

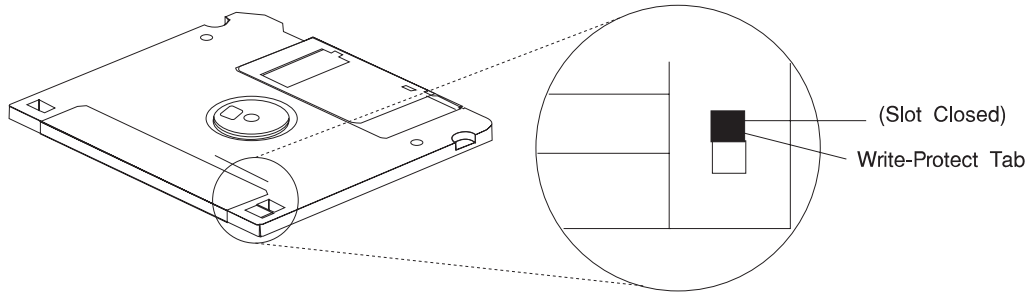
There is a write-protect tab on the 3.5-inch diskette.

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.



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.

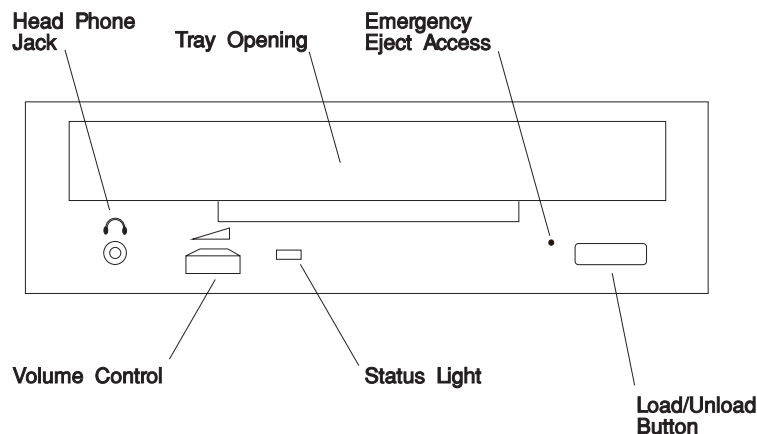
To unload the diskette, push the diskette-unload button. The diskette unloads partially from the drive. Pull the diskette out.

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 A1 of the system unit, see page 2-17. 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 disc is dusty.
- 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. Slip out the bottom tabs to hold the disc in place. 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

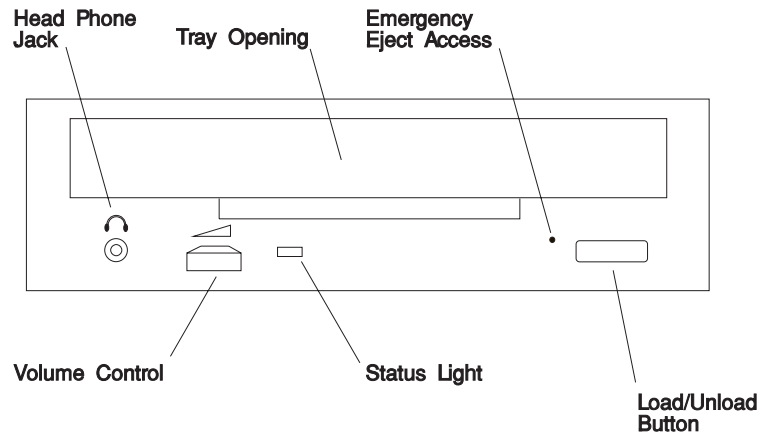
This CD-ROM drive has an internal head-cleaning mechanism, and therefore does not require an external cleaning device. The internal cleaning mechanism cleans the head every time the tray is operated.

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 (tray 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

For information on installing SSA hot swap drives refer to “Installing Disk Drives into the Hot Swap Bays” on page 5-6.

For information on installing SCSI hot swap drives refer to “Installing Disk Drives into the Hot Swap Bays” on page 5-6.

Relationship of AIX Prompts and Physical Drive Location

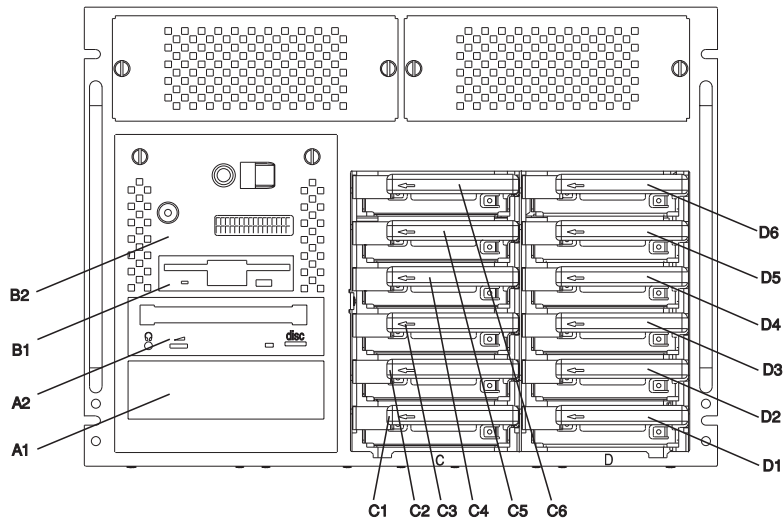
A SCSI adapter and a SCSI drive address can be displayed on a user display. The AIX command **lsccfg** list the attached devices on the system display. A SCSI adapter and drives might be listed as:

scsi0	00 - 01	SCSI I/O Controller
hdisk0	00 - 01 - 00 - 0,0	1.08GB SCSI Disk Drive
hdisk1	00 - 01 - 00 - 3,0	2.2GB SCSI Disk Drive

SCSI ID
SCSI Bus
PCI Slot Address for SCSI Adapter
PCI Bus Indicator

Labels on the right side of each bank, identify the PCI Bus indicator and PCI Slot address for the SCSI adapter attached to each bank.

Physical Slot of SCSI Adapter	Bank Label
9I/P	30 - 78
8I/P	30 - 70
7P	30 - 68
6P	30 - 60
5P	10 - 78
4P	10 - 70
3P	10 - 68
2P	20 - 60
1P	20 - 58
Second Integrated SCSI Controller	30 - 58
First Integrated SCSI Controller	10 - 60



C1 hot-swappable Disk Drive
 C2 hot-swappable Disk Drive
 C3 hot-swappable Disk Drive
 C4 hot-swappable Disk Drive
 C5 hot-swappable Disk Drive
 C6 hot-swappable Disk Drive

D1 hot-swappable Disk Drive
 D2 hot-swappable Disk Drive
 D3 hot-swappable Disk Drive
 D4 hot-swappable Disk Drive
 D5 hot-swappable Disk Drive
 D6 hot-swappable Disk Drive

Handling Guidelines

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

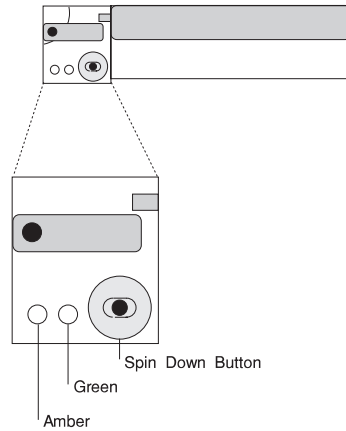
- Do not drop the disk drive or subject the drive to excessive shock.
- Do not expose the disk drive to temperatures lower than -40° F (-40° C) or higher than 158 ° F (70° C).
- If drive temperature changes, allow approximately one hour of temperature acclimatization for every 18° F (10° C) of temperature 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.
- Media can take as long as 30 seconds to spin down. Make sure that there is at least a 30 second delay before switching off the hot-swap drives for removal.

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.

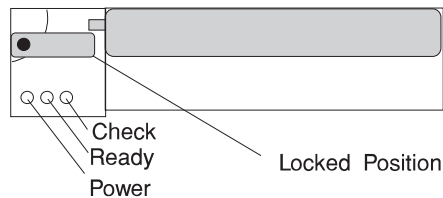
Disk Drive Status LED States

SCSI Disk Drives: The following table explains the meaning of the green and amber status LEDs and spin down button.



Status LEDs		
LED 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.



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 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 2-28.

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.

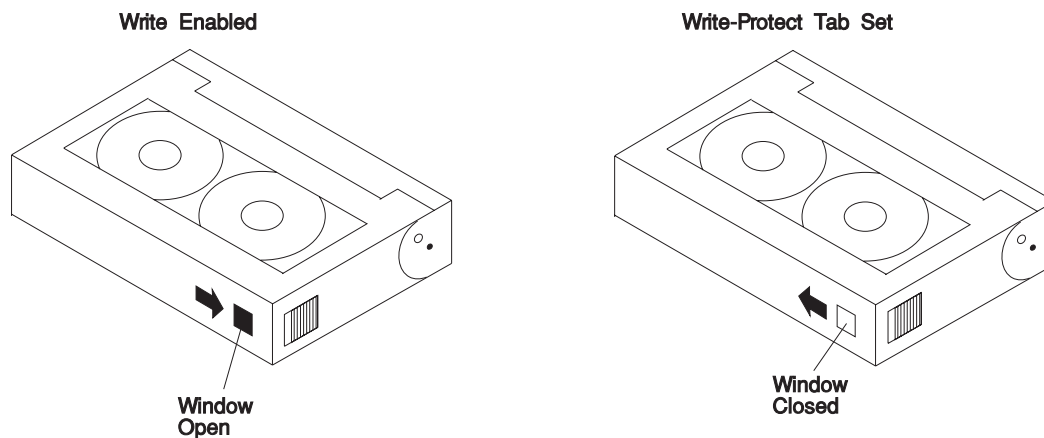
Note: 160 meter cartridges are not processed and are automatically ejected by the drive.

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.



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 2-23 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.

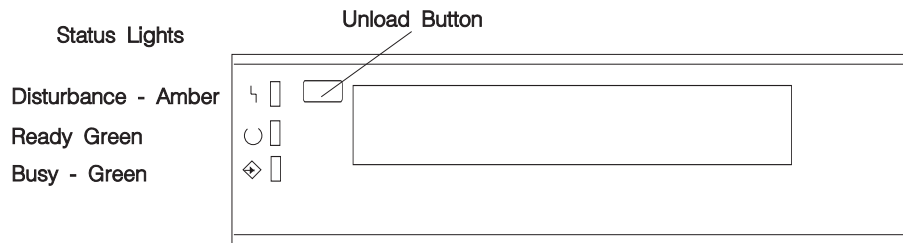
Using the 5.0GB 8-mm Tape Drive

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 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: <ul style="list-style-type: none">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 2-28.	Off or On	Off or Flashing	On

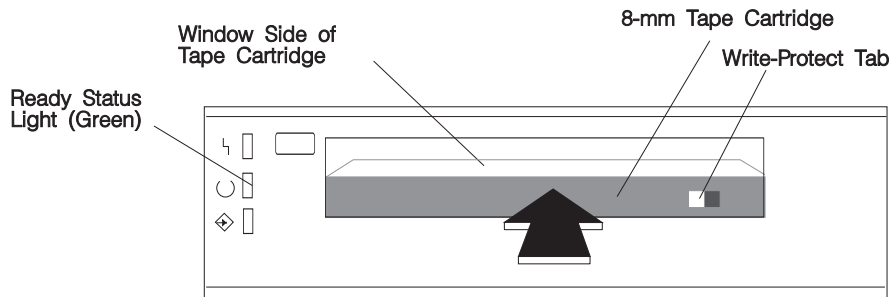
Note: If a fault or an error condition occurs, first try to recover by pressing the unload button. If this does not correct the fault, switch off the power to the 8-mm tape drive and then switch on the power to the drive. If the condition continues, call your service representative.

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 2-22. 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 to the right.
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.

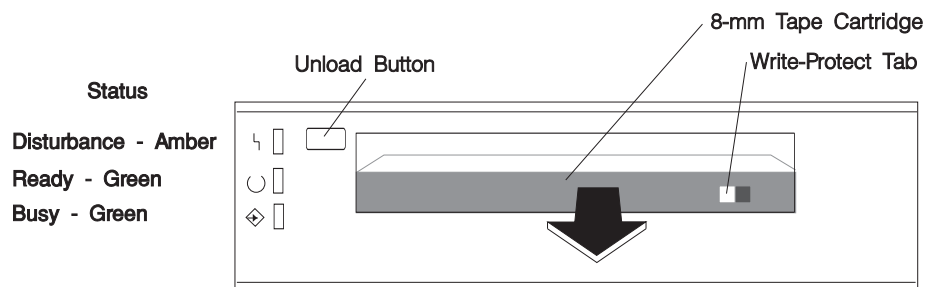
Unloading the 8-mm Tape Cartridge

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 go 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.

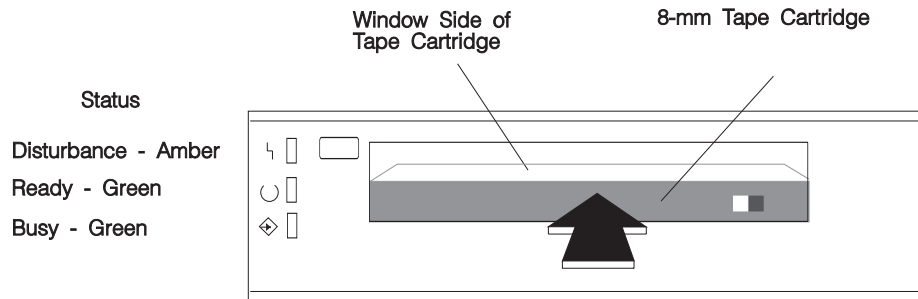
The cleaning cartridge cleans the 8-mm tape drive. If you attempt to use an 8-mm cleaning cartridge more times than allowed, the tape drive automatically detects the error and ejects the cleaning cartridge. The disturbance status light (amber) remains on if it was on prior to the cleaning operation being 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 to the right.
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 2-39. |

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:

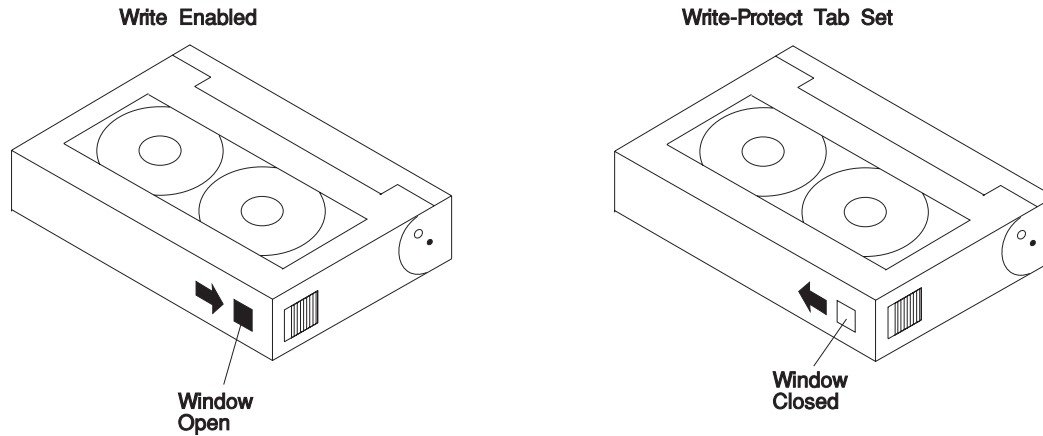
- For DDS||||
 - American National Standard (ANSI) standard, X3.203-191, Helical-scan Digital Computer Tape Cartridge, 3.81mm.
 - European Computer Manufacturers Association (EMCA) standard, EMCA-150 , 3.81mm Wide Magnetic Tape Cartridge and DDS|||| format.
- For DDS2
 - European Computer Manufacturers 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.



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 2-39 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.

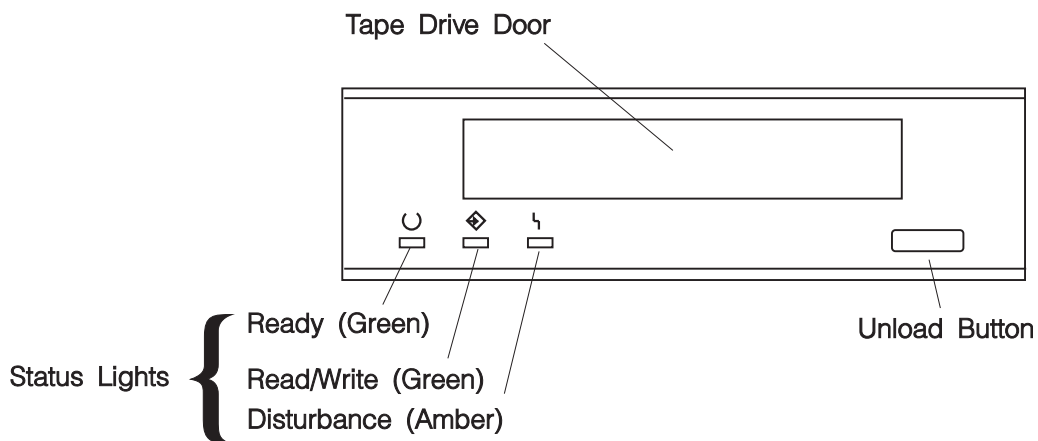
Using the 4.0GB 4-mm Tape Drive

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:



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: <ul style="list-style-type: none"> 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 2-39.	Off or On	Off or Flashing	On

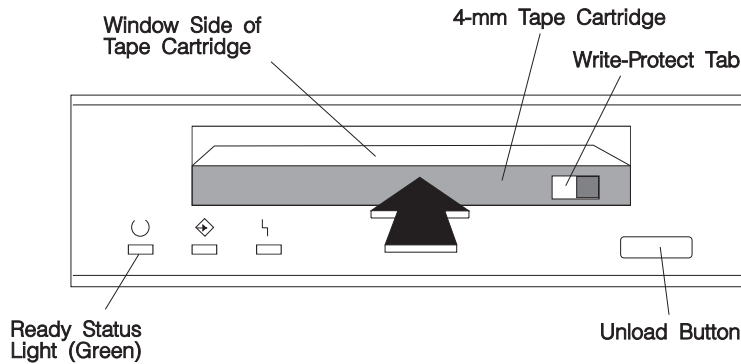
Note: If an error condition occurs, first try to recover by pressing the unload button. If this does not correct the error, switch off the power to the 4-mm tape drive and then switch on the power to the drive. If the condition continues, call your service representative.

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 2-33. 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.

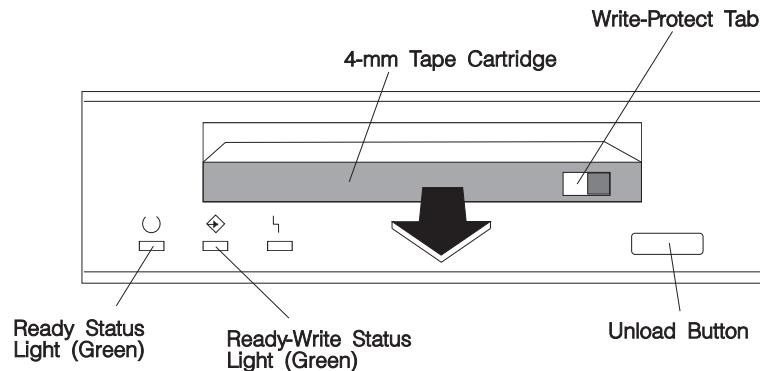
Unloading the 4-mm Tape Cartridge

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.



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.

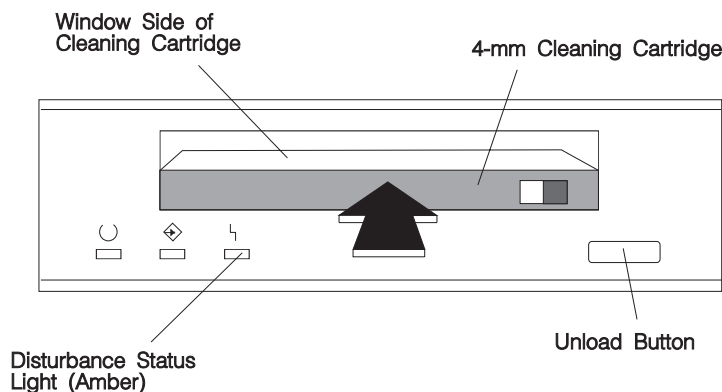
More frequent cleaning may be required if the drive is operated in a dusty environment or in humid conditions. If the dust is allowed to accumulate, the drive has to perform more reads and writes. This can cause data loss, and may be prevented by regularly scheduled cleaning of the drive.

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.

Chapter 3. Service Processor Menus

The Service Processor menus enable you to configure Service Processor options and to enable and disable functions.

Service Processor menus are available using an ASCII terminal when the server is powered off and the Service Processor is operating with standby power. Service Processor menus are also available when server power is on and the Service Processor has detected a server problem (such as loss of surveillance).

During the first power up (i.e. power cord is plugged into the outlet), Service Processor menus are not available for 45 seconds while the Service Processor is running self-tests and initializing the server. If the server powers down, Service Processor menus become available after 15 seconds.

For a summary of the Service Processor functions and the methods for invoking them, see the table on page 3-2.

Service Processor Functions	Service Processor Menus (ASCII terminals)	Service Processor Service Aids (ASCII or graphics terminals)	SMS (ASCII or graphics terminals)
Read VPD	Y ³		Y ³
View System Environmental Conditions	Y ³		
Read System POST Errors	Y ³		
Read Service Processor Error Logs	Y ³		
View Progress Indicators from last Boot	Y ³		
Power-on System	Y ³		
Power-off System	Y ²		
Read NVRAM	Y ²		
Reset Service Processor	Y ²		
Setup Reboot/Restart Policy	Y ²		
Start Talk Mode	Y ²		
Enable/Disable Console Mirroring	Y ²	Y ¹	
Select Modem Line Speed	Y ²	Y ¹	
Enable/Disable Modem	Y ²	Y ¹	
Setup Modem Configuration	Y ²	Y ¹	
Setup Ring Indicate Power-On	Y ²	Y ¹	
Setup Dial-out Phone Numbers	Y ²	Y ¹	
Setup Surveillance	Y ²	Y ¹	
Update Service Processor Flash EPROM	Y ²	Y ¹	Y ²
Change General Access Password	Y ²		Y ²
Change Privileged Access Password	Y ²		Y ²
Select Language	Y ²		Y ²
Enable/Disable Unattended Start Mode	Y ²		Y ²

¹ Operating system root password

² Privileged access password

³ General access (power-on) password

Service Processor Menus

The Service Processor menus are divided into two groups:

- General user menus - the user must know the general access password.
- Privileged user menus - the user must know the privileged access password.

The following section describes these two groups of menus, how to access them, and the functions associated with each option.

When the server is powered down, the Service Processor menus may be accessed locally or remotely.

Menu Inactivity

To prevent loss of control in unstable power environments, the Service Processor leaves the menu mode after 5 minutes of inactivity. Menus may be resumed by pressing any key on the terminal, local or remote.

How to access Service Processor menus locally

Service Processor menus may be accessed locally by connecting an ASCII terminal to either serial port. Because the presence of the ASCII terminal cannot be confirmed by the Service Processor, you must press a key on the ASCII terminal to confirm its presence. Next the Service Processor prompts you for a password (if set), and when verified, displays the Service Processor menus.

How to access Service Processor menus remotely

Service Processor menus may be accessed remotely by connecting a modem to serial port 1 or serial port 2.

- Power off the server, unplug the power cord, and press the power button to drain capacitance while power is disconnected.
- Connect the modem to the appropriate serial port and turn the modem on.
- Plug in the server.

Note: If your modem has not been configured, go to “CALL-IN/CALL-OUT SETUP MENU” on page 3-16.

With a terminal or terminal emulator, call the server's modem. The Service Processor prompts you for a password (if set), and when verified, displays the Service Processor menus.

General User Menu

The menu options presented to the General user are a subset of the options available to the Privileged user. The user must know the General Access Password in order to access these menus.

GENERAL USER MENU

1. Power-On System
2. Read VPD
3. Read Progress Indicators from Last System Boot
4. Read Service Processor Error Logs
5. Read System POST Errors
6. View System Environmental Conditions
99. Exit from Menu

- **Power-On System**

Allows the user to power-on the system.

- **Read VPD**

Displays manufacturer vital product data, such as serial numbers, part numbers, etc.

- **Read Progress Indicators from Last System Boot**

Displays the boot progress indicators (check points), up to a maximum of 100, from the system boot prior to the one in progress now. This historical information may be useful to help diagnose system faults.

The progress indicators are displayed in two sections. Above the dashed line are the progress indicators from the boot that produced the current sessions. Below the dashed line are progress indicators from the boot preceding the one that produced the current sessions.

The progress indication codes are chronological from bottom to top. The dashed line merely represents the point where the latest boot started.

- **Read Service Processor Error Logs**

Displays the Service Processor error logs.

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time. See 3-35 for an example of the error log.

- **Read System POST Errors**

Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults. See 3-36 for an example of the POST error screen.

- **View System Environmental Conditions**

On selection of this menu, the Service Processor reads all environmental sensors and reports the results to the user. This option maybe useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure. See 3-14 for an example of the System Environmental Conditions screen.

Privileged User Menus

The following menus are available to privileged users only. The user must know the Privileged Access Password in order to access these menus.

MAIN MENU

At the top of the MAIN Menu is a listing containing:

- Your Service Processor's current firmware version
- The firmware copyright notice
- The System Name given to your server during setup

You need the firmware version for reference when you either update or repair the functions of your service processor.

The System Name, an optional field, is the name your server reports in problem messages. This name helps your support team, (for example, your system administrator, network administrator, or service representative) to more quickly identify the location, configuration, and history of your server. The System Name is set from the Main Menu using option 6.

Note: The information under the Service Processor Firmware heading in the Main Menu example that follows is example information only.

```
Service Processor Firmware
EPROM: 19970915
FLASH: 19970512
Copyright 1997, IBM Corporation
SYSTEM NAME
```

MAIN MENU

1. Service Processor Setup Menu
2. System Power Control Menu
3. System Information Menu
4. Language Selection Menu
5. Call-In/Call-Out Setup Menu
6. Set System Name
99. Exit from Menus

Service Processor SETUP MENU

Service Processor SETUP MENU

1. Change Privileged Access Password
2. Change General Access Password
3. Enable/Disable Console Mirroring:
Currently Disabled
4. Start Talk Mode
5. OS Surveillance Setup Menu
6. Reset Service Processor
7. Reprogram Service Processor Flash EPROM
98. Return to Previous Menu
99. Exit from Menus

Note

Unless otherwise stated in menu responses settings become effective when a menu is exited using option 98 or 99.

Passwords

Passwords can be any combination of up to 8 alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first 8 characters. Passwords can be set from the Service Processor menu or from the SMS menus.

For security purposes, the Service Processor counts the number of attempts to enter correct passwords. The results of not recognizing a correct password within this error threshold are different, depending on whether the attempts are being made locally (at the server) or remotely (via a modem). The error threshold is 3.

If the error threshold is reached by someone entering passwords at the server, the Service Processor exits the menus. This action is taken based on the assumption that the server is in an adequately secure location with only authorized users having access. Such users must still successfully enter a login password to access AIX.

If the error threshold is reached by someone entering passwords remotely, the Service Processor disconnects the modem to prevent potential security attacks on the server by unauthorized remote users.

The following illustrates what you can access with the Privileged Access Password and the General Access Password.

Privileged Access Password	General Access Password	Resulting Menu
None	None	MAIN MENU displayed
None	Set	MAIN MENU displayed
Set	None	User's with password see the MAIN MENU Others users see the GENERAL USER MENU
Set	Set	Users see menus associated with the entered password

- **Change Privileged Access Password**

Set or change the Privileged Access Password. It provides the user with the capability to access all Service Processor functions. This password is usually used by the system administrator or **root** user.

- **Change General Access Password**

Set or change the General Access Password. It provides limited access to Service Processor menus, and is usually available to all users who are allowed to power-on the server.

- **Enable/Disable Console Mirroring**

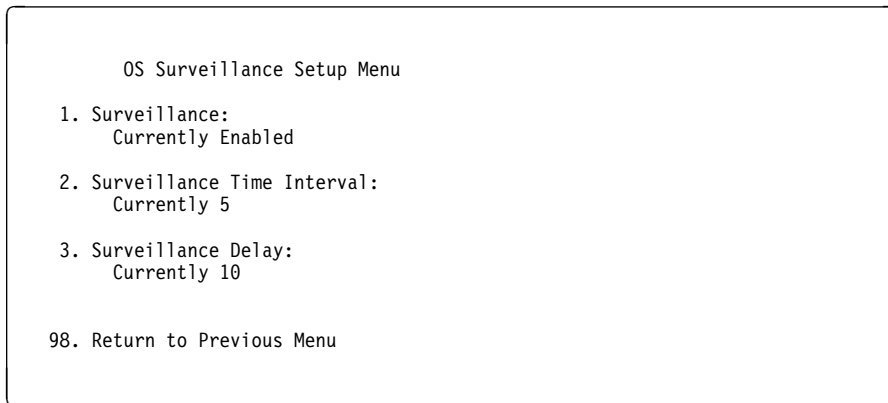
When Console Mirroring is enabled, the Service Processor sends information to both serial ports. This capability may be enabled by local or remote users. This provides local users the capability to monitor remote sessions. Console mirroring may be enabled for the current session only. For more information, see “Console Mirroring” on page 3-32.

- **Start Talk Mode**

In a console mirroring session, it is useful for those that are monitoring the session to be able to communicate with each other. Selecting this menu item activates the keyboards and displays for such communications while console mirroring is established. This is a full duplex link, so message interference is possible. Alternating messages between users works best.

- **Surveillance Setup Menu**

This option may be used to setup operating system surveillance.



- **Surveillance**

May be set to Enabled or Disabled.

- **Surveillance Time Interval:**

May be set to any number from 2 to 255 minutes.

- **Surveillance Delay:**

May be set to any number from 0 to 255 minutes.

Refer to “Service Processor System Monitoring - Surveillance” on page 3-29 for more information about surveillance.

- **Reset Service Processor** - Allows the user to reinitialize the Service Processor.
- **Reprogram Service Processor Flash EPROM** - This is an automatic process.

An update diskette can be acquired from the RS/6000 Support page on the Internet or from your service team. The Internet address is:

<http://www.rs6000.ibm.com/support/micro>

The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort. When this process is selected, you are prompted to place the diskette into the drive and to indicate to the system that the diskette is available and the automatic process starts. If the system has other needs, you are prompted. See “Service Processor Firmware Updates” on page 3-33 for additional information and update methods.

SYSTEM POWER CONTROL MENU

SYSTEM POWER CONTROL MENU

1. Enable/Disable Unattended Start Mode:
Currently Disabled
2. Ring Indicate Power-On Menu
3. Reboot/Restart Policy Setup Menu
4. Power-On System
5. Power-Off System
98. Return to Previous Menu
99. Exit from Menus

- **Enable/Disable Unattended Start Mode**

This option may be used to instruct Service Processor to immediately power-on the server after a power failure, bypassing power-on password verification. Unattended Start Mode can also be set via SMS Menus. It is intended to be used on servers that require automatic power-on after a power failure.

- **Ring Indicator Power-On Menu**

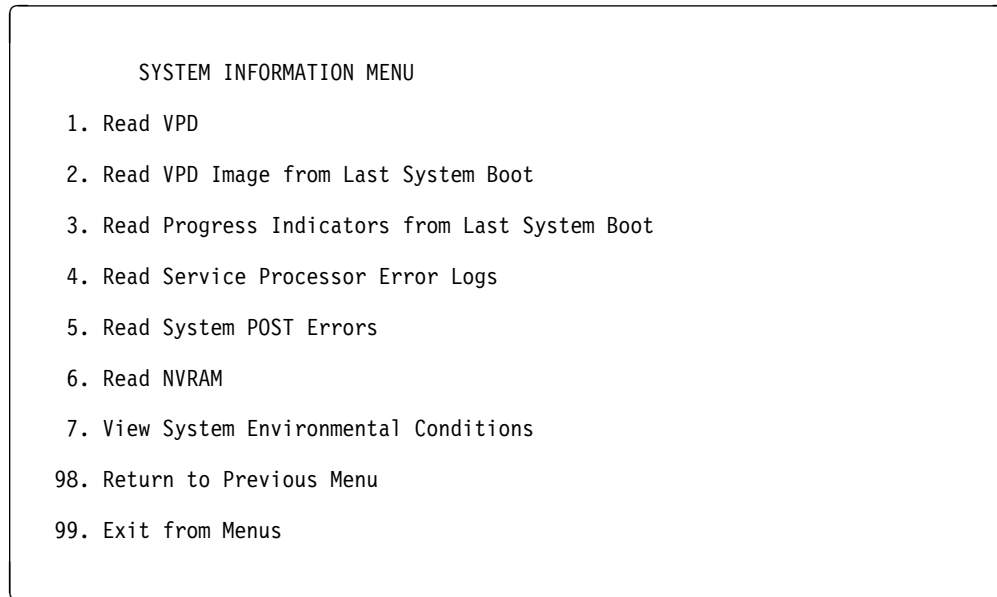
Ring Indicate Power-On is an alternate method of dialing in, without establishing a Service Processor session. If the system is powered off, Ring Indicate Power-On is enabled, the server is powered on at the predetermined number of rings. If the server is already on, no action is taken. In either case, the telephone call is not answered. The caller receives no feedback that the server powered-on. The **Ring Indicator Power-On Menu** and defaults are shown below:

Ring Indicator Power-On Menu

1. Ring Indicate Power-On :
Currently Disabled
2. Number of Rings :
Currently 6
98. Return to Previous Menu

- Ring Indicate Power-On may be set to 'Enabled' or 'Disabled'.
- Number of Rings may be set to any number from 1 to 255.
- **Reboot/Restart Policy Setup Menu**, see “Reboot/Restart Policy Setup Menu” on page 3-23.
- **Power-on System**
Lets you power-on the system immediately. For other power-on methods see “System Power-On Methods” on page 3-26.
- **Power-off System**
Allows the user to power-off the server following a surveillance failure.

SYSTEM INFORMATION MENU



- **Read VPD**
Displays manufacturer's vital product data, such as serial numbers, part numbers, etc.
- **Read VPD Image from Last System Boot**
Displays the VPD information that was in effect after the last system boot. This information will usually be identical with the results from the menu selection "Read VPD," but in the case of configuration updates or certain faults, this historical comparison can be useful to System Administrators and service personnel.

- **Read Progress Indicators from Last System Boot**

Displays the boot progress indicators (check points), up to a maximum of 100, from the system boot prior to the one in progress now. This historical information may be useful to help diagnose system faults.

The progress indicators are displayed in two sections. Above the dashed line are the progress indicators from the boot that produced the current sessions. Below the dashed line are progress indicators from the boot preceding the one that produced the current sessions.

The progress indication codes are chronological from bottom to top. The dashed line merely represents the point where the latest boot started.

- **Read Service Processor Error Logs**

Displays error conditions detected by the Service Processor.

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time. See 3-35 for an example of the error log.

- **Read System POST Errors**

Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults. See 3-36 for an example of the POST error screen.

- **Read NVRAM**

Displays Non-Volatile Random Access Memory (NVRAM) content.

- **View System Environmental Conditions**

The Service Processor reads all environmental sensors and reports the results to the user. This option is most useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

The following is an example of system environment conditions:

System Environmental Conditions
(System Power is currently off.)

Fan 0: A stopped fan detected
Fan 1: A stopped fan detected
Fan 2: A stopped fan detected
Fan 3: A stopped fan detected
MEM Temperature is operating within normal tolerances
I/O Temperature is operating within normal tolerances
CPU Temperature is operating within normal tolerances
5.0 Volts: A low 5.0 Voltage reading detected
3.3 Volts: A low 3.3 Voltage reading detected
5.0 Standby Volts: is operating within normal tolerance
+12.0 Volts: A low +12.0 voltage reading detected
-12.0 Volts: A high -12.0 voltage reading detected
(Press Return to Continue)

LANGUAGE SELECTION MENU

LANGUAGE SELECTION MENU

1. English
2. Francais
3. Deutsch
4. Italiano
5. Espanol
6. Svenska
98. Return to Previous Menu
99. Exit from Menus

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

This menu allows selecting languages into which Service Processor and system firmware menus and messages are displayed.

CALL-IN/CALL-OUT SETUP MENU

CALL-IN/CALL-OUT SETUP MENU

1. Modem Configuration Menu
2. Serial Port Selection Menu
3. Serial Port Speed Setup Menu
4. Telephone Number Setup Menu
5. Call-Out Policy Setup Menu
6. Customer Account Setup Menu
7. Call-Out Test
8. Ring Indicate Power-On Menu
98. Return to Previous Menu
99. Exit from Menus

- **Modem Configuration Menu**, see “Modem Configuration Menu.”
- **Serial Port Selection Menu**, see “Serial Port Selection Menu” on page 3-17.
- **Telephone Number Setup Menu**, see “Telephone Number Setup Menu” on page 3-18.
- **Call-Out Policy Setup Menu**, see “Call-Out Policy Setup Menu” on page 3-20.
- **Customer Account Setup Menu**, see “Customer Account Setup Menu” on page 3-22.
- **Ring Indicate Power-On Menu**, see on page 3-12.

Modem Configuration Menu

The first two lines of the Modem Configuration Menu are status lines showing the current selections. Selections are made in the two section labeled Modem Ports and Modem Configuration File Name. Select the serial port that you that you want to activate and then select the modem configuration file for the modem on the port. If you wish to set up both serial ports with modems, make your selections one port at a time.

For information on choosing a modem configuration file, see “Sample Modem Configuration Files” on page C-1 and “Seamless Transfer of a Modem Session” on page C-6.

Modem Configuration Menu

Port 1 Modem Configuration File Name:

Port 2 Modem Configuration File Name:

To make changes, First select the port and then the configuration file name

Modem Ports:

1. Serial port 1
2. Serial port 2

Modem Configuration File Name:

3. modem_f_sp
4. modem_f0_sp
5. modem_f1_sp
6. modem_z_sp
7. modem_z0_sp
8. none

9. Save configuration to NVRAM and Configure modem

98. Return to Previous Menu

Serial Port Selection Menu

Serial Port Selection Menu

1. Serial Port 1 Call-Out:
Currently Disabled
2. Serial Port 2 Call-Out:
Currently Disabled
3. Serial Port 1 Call-In:
Currently Disabled
4. Serial Port 2 Call-In:
Currently Disabled

98. Return to Previous Menu

You may enable and/or disable the call-in and call-out functions of each serial port in any combination.

Serial Port Speed Setup Menu

Serial Port Speed Setup Menu

1. Serial Port 1 Speed:
 Currently 9600

2. Serial Port 2 Speed:
 Currently 9600

98. Return to Previous Menu

Serial port speed can be set for terminal performance or to accommodate modem capabilities. A speed of 9600 baud or higher is recommended. Valid serial port speeds are shown below:

50	600	4800
75	1200	7200
110	1800	9600
134	2000	19200
150	2400	38000
300	3600	57600
		115200

Telephone Number Setup Menu

This menu may be used to set or change the telephone numbers for reporting a system failure. The Service Processor allows setting or changing telephone numbers for:

- Service Center Telephone Number: - The telephone number of the maintenance provider's computer.
- Customer Administration Center Telephone Number: - The telephone number of the local system support provider's computer.
- Digital Pager Telephone Number: The number for a pager carried by someone who will respond to problem calls from your server.
- Customer Voice Telephone Number: - The telephone number service personnel will use to reach the system user.
- Customer System Telephone Number: - The telephone number to which the server's modem is connected.

Telephone Number Setup Menu

1. Service Center Telephone Number:
Currently Unassigned
2. Customer Administration Center Telephone Number:
Currently Unassigned
3. Digital Pager Telephone Number:
Currently Unassigned
4. Customer Voice Telephone Number:
Currently Unassigned
5. Customer System Telephone Number:
Currently Unassigned
98. Return to Previous Menu

- **Service Center Telephone Number** is the number of the service center computer. The service center usually includes a computer that takes calls from servers with call-out capability. This computer is referred to as "the catcher." The catcher expects messages in a specific format to which Service Processor conforms. For more information about the format and catcher computers, refer to the README file in the AIX /usr/samples/syscatch directory. Contact your service provider for the correct telephone number to enter here. Until you have that number, leave this field blank.
 - **Customer Administration Center Telephone Number** is the number of the System Administration Center computer (catcher) that receives problem calls from servers. Contact your system administrator for the correct telephone number to enter here. Until you have that number, leave this field blank.
 - **Digital Pager Telephone Number** is the number for a pager carried by someone who will respond to problem calls from your server. Contact your administration center representative for the correct telephone number to enter here. For test purposes, enter your telephone number here. You can change it later when testing is complete.
- Note:** Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they will return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message will cause the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out policy Setup Menu. These retries result in redundant pages.

For digital pagers that require a personal Identification Number (PIN) for access, include the PIN in this field as in the following example:

1 800 123 4567,,,87654

where the commas create pauses¹ for the voice response system, and the 87654 represents the PIN.

- **Customer Voice Telephone Number** is the telephone number of a phone near the server or answered by someone responsible for the server. This is the telephone number left on the pager for callback. For test purposes, enter your telephone number here. You can change it after testing is completed.

Customer System Telephone Number is the telephone number to which your server's modem is connected. The service or administration center representatives need this number to make direct contact with your server for problem investigation. This is also referred to as the **call-in** phone number.

Call-Out Policy Setup Menu

```
CALL-OUT POLICY SETUP MENU

1. Call-Out policy (First/All):
   Currently First

2. Remote timeout, (in seconds):
   Currently 120

3. Remote latency, (in seconds):
   Currently 2

4. Number of retries:
   Currently 2

98. Return to Previous Menu
```

- **Call Out policy** may be set to 'first' or 'all'. If call out policy is set to 'first', the Service Processor will stop at the **first successful** call out to one of the following numbers in the order listed:
 1. Service Center
 2. Customer Admin Center
 3. Pager

¹ The length of these pauses is set in modem register S8. The default is usually 1 or 2 seconds each.

If call out policy is set to 'all', the Service Processor will attempt a call out to **all** the following numbers in the order listed:

1. Service Center
2. Customer Admin Center
3. Pager

Remote timeout and **Remote latency** are functions of your service provider's catcher computer. You should take the defaults or contact your service provider for recommended settings.

Number of retries is the number of times you want the server to retry calls that resulted in busy signals or other error messages.

Customer Account Setup Menu

Customer Account Setup Menu

1. Customer Account Number:
Currently Unassigned
2. Customer RETAIN Login UserID:
Currently Unassigned
3. Customer RETAIN Login Password:
Currently Unassigned
98. Return to Previous Menu

- **Customer Account Number** is assigned by your service provider for record keeping and billing. If you have an account number, enter it here. Otherwise, leave this field blank.
- **Customer RETAIN Login UserID** and **Customer RETAIN Login Password** apply to a service function to which your service provider may or may not have access. Leave these fields blank if your service provider does not use RETAIN.

Reboot/Restart Policy Setup Menu

Reboot describes bringing the system hardware back up from scratch, for example, from a system reset or power on. The boot process ends when control passes to the operating system process.

Restart describes activating the operating system after the system hardware reinitialized. Restart must follow a successful reboot.

```
Reboot/Restart Policy Setup Menu

1. Number of reboot attempts:
   Currently 3

2. Use OS-Defined restart policy?
   Currently Yes

3. Enable supplemental restart policy?
   Currently No

4. Call-Out before restart:
   Currently Disabled

98. Return to Previous Menu
```

- **Number of reboot attempts** if the server fails to successfully complete the boot process, it attempts to reboot the number of times specified. Entry values equal to or greater than 0 are valid. Only successive failed reboots attempts count, not reboots that occur after a restart attempt. At restart, the counter is set to 0.
- **Use OS-Defined restart policy** lets the Service Processor react or not react the same as the operating system to major system faults, by reading the setting of the operating system parameter **Automatically Restart/Reboot After a System Crash**. This parameter may, or may not be defined depending on the operating system or its version/level. If the operating system automatic restart setting is defined, then it may be set to respond to a major fault by restarting or by not restarting. See your operating system documentation for details on setting up operating systems automatic restarts. The default value is YES.
- **Enable supplemental restart policy** - The default setting is NO. If set to YES, the Service Processor restarts the system when the system loses control as detected by the Service Processor surveillance, and either:
 1. The **Use OS-Defined restart policy** is set to NO

OR

2. The **Use OS-Defined restart policy** is set to YES and the operating system has NO automatic restart policy.

Refer to “Service Processor Reboot/Restart Recovery” on page 3-27.

- **Call-Out before restart (Enabled/Disabled)** If a restart is necessary due to a system fault, you can enable the Service Processor to call out and report the event. This item is valuable if the number of these events becomes excessive, signalling a bigger problem.

Service Processor Functions and Features

The following section discusses some of the Service Processor functions and features more fully.

The RS/6000 Enterprise Server Model H50 supports the following functions:

Built-in Functions	Initialization and Test	Service Processor Basic Instructions Test (BIST)
		JTAG System Chip Initialization
	Error Data Collection	BIST/POST errors and status
		Checkstop FIR data logout
		Machine check logout
	Configuration	CPU Complex validation
		VPD Collection
	System Management	Reset and Reboot on System Firmware fail
		Reboot on system failure

Local User Function	User Interface	Local async console
		Text based menus with NLS
		Operator Panel messages
	Power and Miscellaneous	Power On/Off
		Configurable Reboot Policy
	Status and Data Access	VPD
		Error data (Service Processor)
		Error data (system)
		Environmental data
	Service Processor Setup Utilities	Passwords
		Phone numbers
		Language (NLS) selection
		Call In/Call Out enable/disable
		Flash (Gold/Recovery block) Update
		Flash (Composite block) Update
System Name		
Modem Configuration		
Remote User Functions	Call Out (Call Home) Reporting	Boot failure
		OS Termination
		Surveillance failure
		Critical EPOW reporting
		Checkstop
		Machine check
	Identify system by name	Call In
		Power-on via ring-indicate
		Password/security check
		Console mirroring/Quick disconnect
Application Interface Functions	Monitor/Sense	Thermal/Voltage/fan speed
		SP Flash Update(Recovery and Composite)

System Power-On Methods

- Power-on Switch - see “Starting the System Unit” on page 2-1.
- SP Menu power-on request

You can request a power-on via the Service Processor menus from either a local or remote terminal.

If a remote terminal is to be used, the modem must be connected to serial port 1, and the operating system set up to enable a TTY login session on that port.

Refer to “Seamless Transfer of a Modem Session” on page C-6 for information on transferring modem sessions from Service Processor to the operating system.

- Unattended start mode - refer to **Enable/Disable Unattended Start Mode** on page 3-12.

The Service Processor can be enabled to recover from the loss of AC power (see Enable/Disable Unattended Power-On Mode in the SYSTEM POWER CONTROL MENU). When AC power is restored, the system returns to the then current power state at the time AC loss occurred. For example, if the system was powered-on when AC loss occurred, it reboots/restarts when power is restored. If the system was powered-off when AC loss occurred, it remains off when power is restored.

- Timed power-on - refer to the shutdown -t command on servers using AIX.

Working in conjunction with AIX, the Service Processor in your server can operate a timer, much like the wake-up timer on your clock radio. You can set the timer so that your server powers on at a certain time after shutting down. The timer is battery operated, so power interruptions occurring while the server is off do not affect its accuracy. Refer to the **shutdown -t** command of AIX for details on setting the timer.

Because of the potential for AC power loss, the Timed Power-On function of AIX can only be assured when Unattended Power-On Mode is enabled. If a Timed Power-On event occurs during an AC power loss, and if Unattended Power-On Mode is enabled, the system starts when AC power is restored.

If Unattended Start Mode is disabled (the default), the system power state remains off when AC power is restored, regardless of the power state of the system when AC loss occurred.

- Ring Indicate Power-On

Enabling ring indicate power-on disables remote call-in. If ring indicate power-on is enabled, the server will power on at a predetermined number of rings. If the server is already on, no action is taken. In either case, the telephone call is not answered. The caller receives no feedback that the server powered on.

- Follow-up to a Failed Boot Attempt

The Service Processor will initiate a power-on sequence upon detection of a failed boot attempt.

Service Processor Reboot/Restart Recovery

Reboot describes bringing the system hardware back up from scratch, for example, from a system reset or power on. The boot process ends when control passes to the operating system process.

Restart describes activating the operating system after the system hardware reinitialized. Restart must follow a successful reboot.

Failure During Boot Process: During the boot process, either initially after system power-on or upon reboot after a system failure, the Service Processor (SP) monitors the boot progress (via surveillance). If progress stops, the Service Processor can reinitiate the boot process (reboot) if enabled to do so. The Service Processor can re-attempt this process according to an entry on the Reboot/Restart Policy Setup Menu.

Failure During Normal System Operation: When the boot process completes and control transfers to the operating system (OS), the Service Processor can monitor operating system activity (see the SERVICE PROCESSOR SETUP MENU item Set Surveillance Parameters). If OS activity stops, the Service Processor can initiate a reboot/restart process based on the settings in the Service Processor Reboot/Restart Policy Setup Menu and the OS automatic restart settings (see OS documentation).

If the operating system is AIX, the menu item under SMIT for setting the restart policy is Automatically Reboot After Crash (True/False), and the default is False. When the setting is True, and if the SP parameter, Use OS-Defined Restart Policy, is Yes (the default), the Service Processor takes over for AIX to reboot/restart after a Check Stop or Surveillance failure.

Service Processor Reboot/Restart Policy Controls: The operating system's automatic restart policy (see operating system documentation) indicates the OS response to a system crash. The SP can be instructed to refer to that policy, or not, by the Use OS-Defined Restart Policy menu item.

If the operating system has no automatic restart policy, or if it is disabled, then the Service Processor restart policy can be controlled from the Service Processor Menus by using the Enable Supplemental Restart Policy selection.

Use OS-Defined restart policy?: The **Use OS-Defined restart policy** default setting is YES. This causes the SP to refer to the OS Automatic Restart Policy setting and take action, the same action the OS would take if it could have responded to the problem causing the restart.

When this setting is NO, or if the OS did not set a policy, the Service Processor refers to Enable supplemental restart policy for its action.

Enable Supplemental Restart Policy?: The default setting is NO. If set to YES, the Service Processor restarts the system when the system loses control as detected by the Service Processor surveillance, and either:

1. The **Use OS-Defined restart policy** is set to NO

OR

2. The **Use OS-Defined restart policy** is set to YES and the operating system has NO automatic restart policy.

Refer to “Service Processor Reboot/Restart Recovery” on page 3-27.

The following provides a more thorough understanding of the relations among the OS and Service Processor restart controls:

OS Automatic reboot/restart after crash setting	SP to use OS-Defined restart policy?	SP Enable supplemental restart policy?	System response
None	No	No ¹	
None	No	Yes	Restarts
None	Yes ¹	No ¹	
None	Yes ¹	Yes	Restarts
False ²	No	No ¹	
False ²	No	Yes	Restarts
False ²	Yes ¹	No ¹	
False ²	Yes ¹	Yes	
True	No	No ¹	
True	No	Yes	Restarts
True	Yes ¹	No ¹	Restarts
True	Yes ¹	Yes	Restarts

¹ Service Processor default

² AIX default

Service Processor System Monitoring - Surveillance

Surveillance is a function in which the Service Processor monitors the system, and the system monitors the Service Processor. This monitoring is accomplished by periodic samplings called heartbeats.

Surveillance is available during two phases:

1. System firmware bringup (automatic) and
2. Operating system runtime (optional).

System Firmware Surveillance: Provides the Service Processor with a means to detect boot failures while the system firmware is running.

System firmware surveillance is automatically enabled during system power-on. It cannot be disabled via a user selectable option.

If the Service Processor detects no heartbeats during system IPL (for 7 minutes), it cycles the system power to attempt a reboot. The maximum number of retries is set from the Service Processor menus. If the fail condition repeats, the Service Processor leaves the machine powered on, logs an error and offers menus to the user. If Call-out is enabled, the Service Processor calls to report the failure and displays the operating system surveillance failure code on the operator panel.

Operating System Surveillance: Provides the Service Processor with a means to detect hang conditions, hardware or software failures while the operating system is running. It also provides the operating system with a means to detect the Service Processor failure by the lack of a return heartbeat.

Operating system surveillance is enabled by default. This is to allow the user to run operating systems that do not support this Service Processor option.

Operating system surveillance can be enabled and disabled via:

- service processor Menus
- service processor Service Aids

Three parameters must be set for operating system surveillance:

1. Surveillance enable/disable
2. Surveillance interval

This is the maximum time in minutes the Service Processor should wait for a heartbeat from the operating system before timeout.

3. Surveillance delay

This is the length of time in minutes for the Service Processor to wait from when the operating system is started to when the first heartbeat is expected.

Surveillance will take effect immediately after setting the parameters from the Service Processor menus.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and the Service Processor does not detect any heartbeats from the operating system, the Service Processor assumes the system is hung. The machine is left powered on and the Service Processor enters standby phase, displaying the operating system surveillance failure code on the operator panel. If Call-out is enabled, the Service Processor calls to report the failure.

Call Out (Call-Home)

The Service Processor can call out (Call-Home) when it detects one of the following conditions:

- System firmware surveillance failure.
- Operating system surveillance failure (if supported by Operating System).
- Critical environmental failures.
- Restarts

To enable the call out feature, you need to do the following:

- Have a modem connected to serial port 1 or 2.
- Set up the following using the Service Processor Menus or Diagnostic Service Aids:
 - Enable call out for the serial port where the modem is connected.
 - Set up serial port line speed.
 - Enter the modem configuration filename.
 - Set up site specific parameters (i.e. phone numbers for call out, call out policy, etc).
- To call out before restart, set “Call-Out before restart” to ENABLED from the Reboot/Restart Policy Setup menu.

Note: Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they will return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message will cause the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out policy Setup Menu. These retries result in redundant pages.

Console Mirroring

Console mirroring allows a person on a local ASCII terminal to monitor the Service Processor activities of a remote user. Console mirroring ends when the Service Processor releases control of the serial ports to the system firmware.

System Configuration:

- Service Processor
- Modem connected to one serial port and enabled for incoming calls
- Local ASCII terminal connected to the other serial port. This local terminal may be connected directly to your server or connected through another modem.

There are two scenarios in which console mirroring can be invoked:

1. Remote session first, then local session added
 - a. Remote session already in progress.
 - b. Remote user uses the Service Processor menus to enable console mirroring, allowing both consoles to be active.
2. Local session first, then remote session added
 - a. Local session is already in progress.
 - b. The Service Processor receives a call from the remote user.
 - c. The local user selects the option to enable console mirroring. The Service Processor immediately begins mirroring Service Processor menus.

Note: A quick disconnect is accomplished by hitting the key sequence Ctrl+D on either console. Both sessions will exit the Service Processor menus.

Service Processor Firmware Updates

The Service Processor EPROM may need to be updated for two different reasons:

1. The UPDATE (composite) portion of the EPROM has become corrupted.
2. The Service Processor firmware upgrades, without any corruption present.

The use of a Flash EPROM allows updates to occur without physically replacing the memory.

The firmware in your server can be updated using one of four available initiation processes:

1. Service Processor initiation
2. SMS Utilities initiation
3. Service Aids initiation
4. AIX initiation.

Each initiation method is described below. In each case, the process prompts you for your authority and shows the contents of the update media. Verify the file with which to perform the update, and follow any other instructions that may appear. After initiation, the processes are identical and automatic.

There are two areas in each firmware module that may need updating:

1. The gold code or base code or EPROM area
2. The custom or main program or FLASH area

Each update file contains matching gold and custom firmware, so it is not possible to update to a conflicting set.

Before the update process begins, the versions of each of the two areas of the target firmware module are compared to the versions on the update diskette. Only the area(s) that need updating are updated. In most cases, only the custom area is updated.

An update diskette can be acquired from the RS/6000 Support page on the Internet or from your service team. The Internet address is:

<http://www.rs6000.ibm.com/support/micro>

The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort.

Refer to the downloaded update instructions, or to the System Management Services “Config” on page 4-4 or “Display Configuration” on page 4-22 or Service Processor menus on page 3-7, to determine the level of the system unit or service processor flash.

Updating Firmware from the Service Processor Menus: The Service Processor Menus are available while the server is powered off. From the Service Processor Main Menu, select Service Processor Setup to bring up a menu containing the item, Reprogram Service Processor Flash EPROM. Selecting that item starts the update process. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested.

Updating Firmware from the SMS Utilities: From a powered down or reset condition, bring up the SMS Utilities and select the menu item for updating firmware. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested.

Updating Firmware from the Service Aids

Note: This service aid is only supported for Online Diagnostics.: This service aid allows you to update the system or service processor flash.

Additional update and recovery instructions may be provided; also you need to know the fully qualified path and file name of the flash update image file. If the flash update image file is on a diskette, you need the AIX DOS utilities package to process the diskette. You can use the **dosdir** command to find out the name of the update image file. This service aid uses the **dosread** command to put the file into the **/var** file system.

Using this service aid to update the system or service processor flash will not save the current contents of the flash.

The flash image file will be copied in the **/var** file system. If there is not enough space in the **/var** file system for the flash update image file, an error is reported. If this occurs, exit the service aid, increase the size of the **/var** file system and retry the service aid. After the file is copied, a warning screen will ask for confirmation to continue the flash update. Continuing the flash update will eventually cause the system to reboot and return to the AIX login prompt. After the system unit reboots, the file **/var/update_flash_image** can be removed to conserve space in the **/var** file system.

Updating Firmware from AIX

You must delete the file `/var/update_flash_image` before proceeding.

The flash update image file must have already been placed in the `/var` file system. This could have been done with a file transfer from another server or with the **dosread** command of the AIX DOS Utilities, for example. With the flash update image in place, issuing the following AIX command

```
shutdown -u /var/*filename*.img
```

initiates the update process. Where `*filename*` is the name of the flash update image. During the process, the server powers down and reboots. You know the process is complete when the login prompt reappears.

Service Processor Logs

Service Processor Error Log: The Service Processor error logs contain error conditions detected by the Service Processor.

```
                                Error Log
19970626223337  0. Loss of Redundant Fan #5
                40210091

Press "C" to clear error log, any other key to continue. >
```

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time.

System POST Errors: If POST (Power-On Self Test) errors occur during start-up, this error log help isolate faults when used with the diagnostics.

Read System POST Errors

```
Version : 0
Severity : 0
Disposition : 0
Initiator : 0
Event being reported : 0
Extended Error Log Data:
0xC2 0x00 0x84 0x09 0x00 0x00 0x00 0x00
0x20 0x00 0x00 0x00 0x00 0x00 0x72 0x74
0x63 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x28 0x03 0x00 0x05 0x00 0x01
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x49 0x42 0x4D 0x00 0x55 0x30 0x2E 0x31
0x2D 0x50 0x31 0x2D 0x58 0x31 0x00
```

(Press Return to Continue)

Chapter 4. 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.

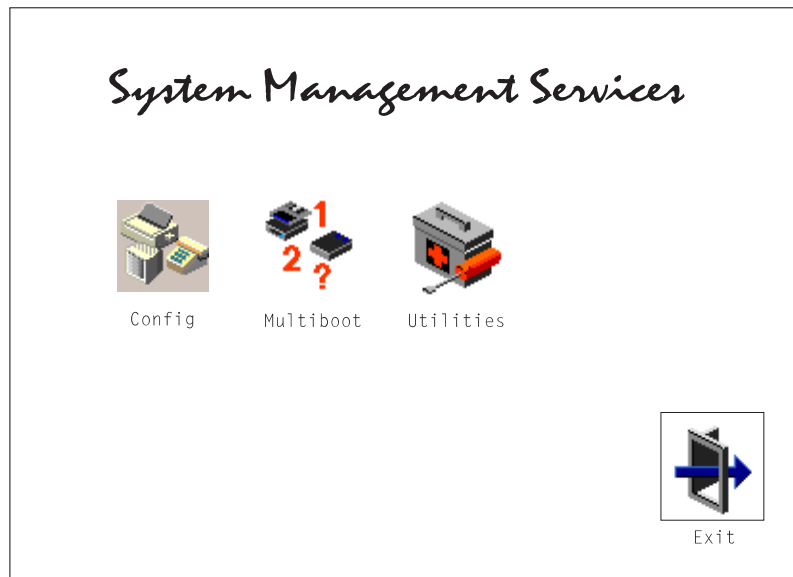
If you have chosen a graphical display as your system console, you can use the graphical System Management Services described below. If you are using an ASCII display as your system console, see “Text-Based System Management Services” on page 4-21.

Graphical System Management Services

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

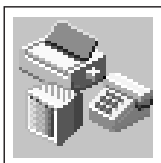
After the logo is displayed, initialization icons appear across the bottom of the screen.

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



You may also press F8 here to enter the 0K> prompt.

The System Management Services screen contains the following choices.



Config: Enables you to view your system configuration.

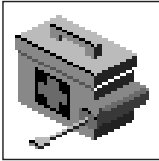


MultiBoot: Invokes the Multiboot menu which provides several functions:

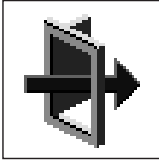
- To Select a Common Hardware Reference Platform (CHRP)compliant operating system to boot.

In the case of AIX this is a supported option, if you receive a an informational icon after making this selection this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value, issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. Please see the explanation of the bootlist command in your AIX documentation.

- To select a CHRP compliant operating system as the default operating system
- To install from the list of possible devices
- To set the sequence in which devices are searched for operating system startup code
- To go to the Open Firmware command prompt
- To set the Multiboot menu so that it comes up immediately as the system powers up



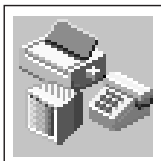
Utilities: Enables you to set and remove passwords, enable the unattended start mode, set and view the addresses of your system's SCSI controllers, select the active console, view or clear the error log, and update your system firmware.



Exit: Returns you to the previous screen.

To select an icon, move the cursor with the arrow keys to choose which icon is highlighted, 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, 0256K

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 key or Page Down key displays the next configuration screen, which lists your computer's firmware version, the date of its development, and the firmware part number.




```
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
xxxxxxx     Serial Number

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

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



Exit

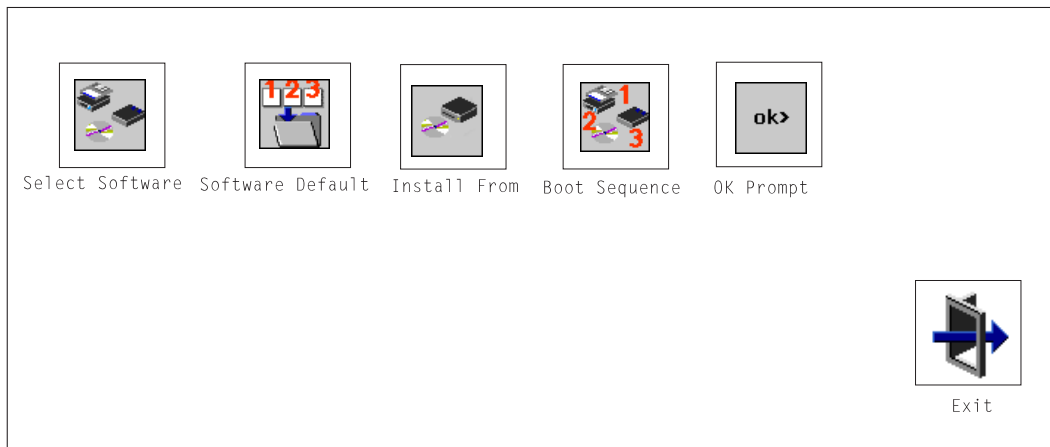
MultiBoot:

This selection invokes the Multiboot menu which provides several functions:

- To Select a CHRP compliant operating system to boot.

In the case of AIX this is a supported option, if you receive a an informational icon after making this selection this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value, issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. Please see the explanation of the bootlist command in your AIX documentation.

- To select a particular operating system as the default operating system
- To install from the list of possible devices
- To set the sequence in which devices are searched for operating system startup code
- To go to the Open Firmware command prompt
- To set the Multiboot menu so that it comes up immediately as the system powers up



The Select Software option, if supported by the operating system, shows the names of the operating system installed. This option may not be supported by all operating systems.

In the case of AIX this is a supported option only for the CHRP compliant version. If you receive a message saying that:

No Operating System Installed

this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular Hard disk. Please see the explanation of the bootlist command in your AIX documentation.

The Software Default option, if supported by the operating system, lets you select the default operating system to start the system. This option may not be supported by all operating systems.

The Install From option produces a list of devices, for example the CD-ROM, where the operating system is installed from. You select one of the devices and the system searches the device for an operating system to install and if supported by the operating system in that device, the name of the operating system displays.

The Select Boot Device option provides a list of devices that can be selected to be stored on the boot list. Up to 5 devices are supported.


The Multiboot Start option toggles between OFF and ON and selects if the Multiboot menu invokes automatically on startup or not.

Boot

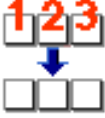


This selection enables you to view and change the custom boot list (the sequence in which devices are searched for operating system startup code).


New		List of Boot Devices
-	[1]	Diskette
1	[2]	SCSI CD-ROM id=3 (slot=1)
	[3]	SCSI Tape Drive id=5 (slot=1)
3	[4]	SCSI 4.5 GB Harddisk id=6 (slot=1)
2	[5]	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.

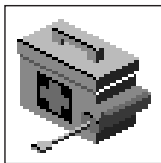
The default boot sequence is:

- The primary diskette drive
- CD-ROM drive (For CD-ROM boot, go to the Install From icon and then select CD-ROM Drive as a boot device.)
- Tape id=5 (slot=1)
- Hard disk drive id=6 (Slot=1)
- Network device.

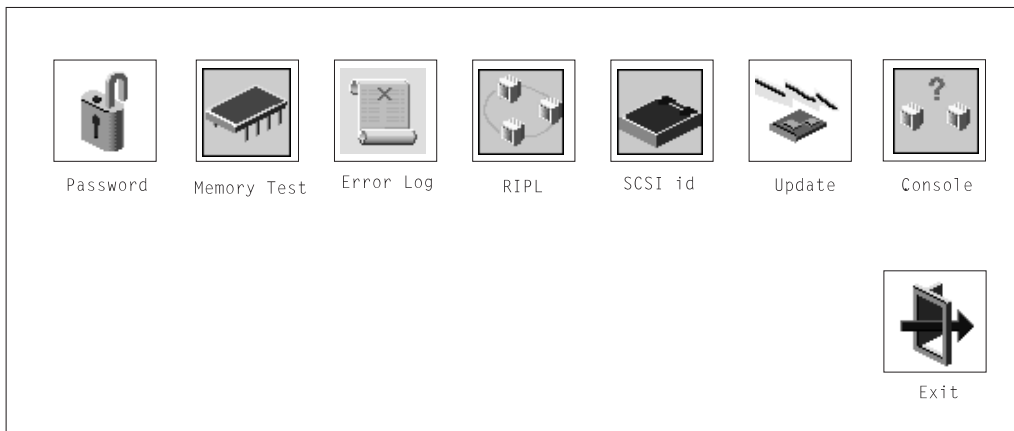
To change the custom boot list, enter a new order in the **New** column, then select **Save**. The List of Boot Devices is updated to reflect the order you have chosen.

You can choose 1 to 5 devices for the custom boot list. To change the boot sequence back to the default values, select **Default**. (The default sequence is automatically saved.)

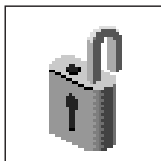
Utilities



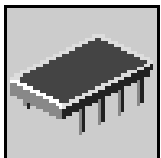
Selecting this icon enables you to perform various tasks and view additional information about your computer.



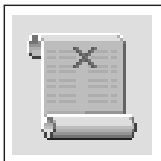
The following describes the choices available on this screen.



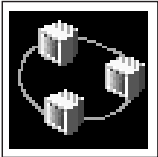
Password: Enables you to set password protection for turning on the computer and for using system administration tools.



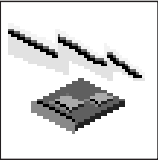
Memory Test: CHRP systems have a memory test option available. The memory test runs patterns thru memory and check the results. This is a pass/fail test. If the test fails, the failure is noted in the error log and displayed on the utilities menu screen.



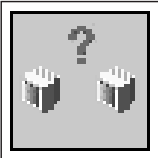
Error Log: Enables you to view and clear error log information for your computer.



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.

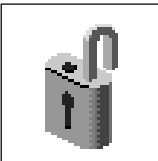


Update: Allows you to update the firmware programs on your computer.

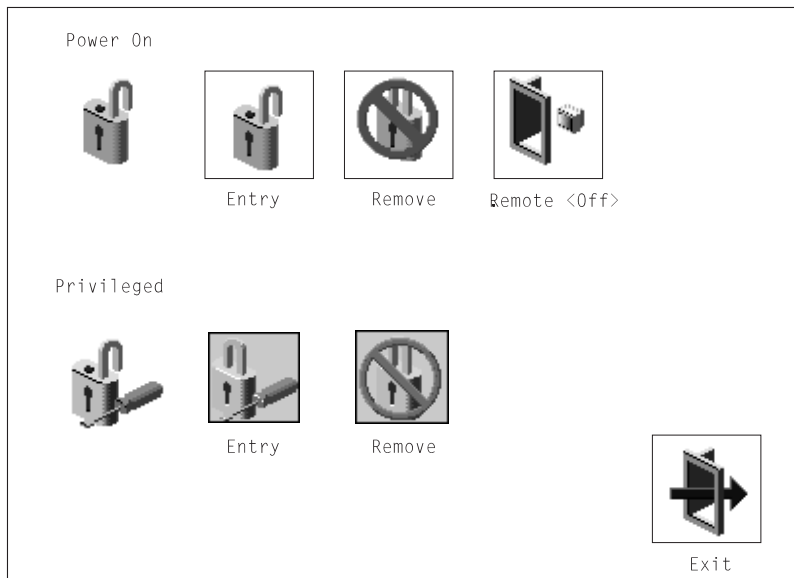


Console: If you have more than one display attached to your system unit, or if you have an ASCII terminal attached to your system unit in addition to a keyboard and display, this tool allows you to define which one is active. If no console is selected within two minutes, the console defaults to Serial Port 2.

Password

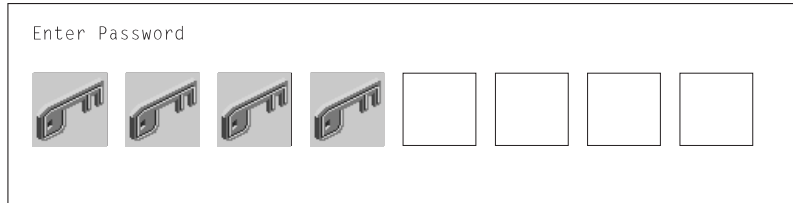


When you select this icon, the following screen is displayed.

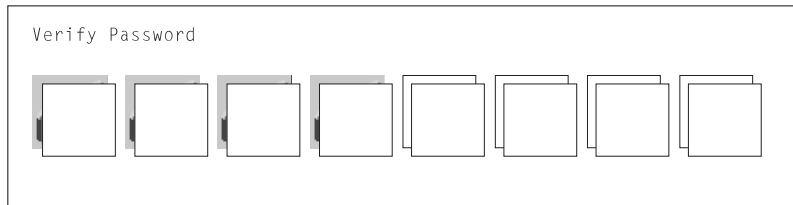


Power-On Password: Setting a power-on password helps protect information stored in your computer. If a power-on password is set for your computer, the Power On icon is shown in the locked position; if a power-on password is not set, then the Power On icon is shown in the unlocked position (as in the 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.



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.

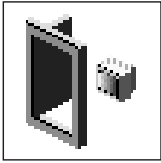
If you previously had set a power-on password and want to remove it, select the Remove icon.



Note: If you *forget* the power-on password, contact your service representative.

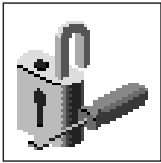
Attention: After you remove the battery, you must reconfigure your system (bootlist, IP parameters, console information, support processor, etc).

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.

Enter Password

							
---	---	---	---	--	--	--	--

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

Verify Password

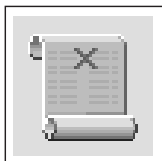
--	--	--	--	--	--	--	--

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

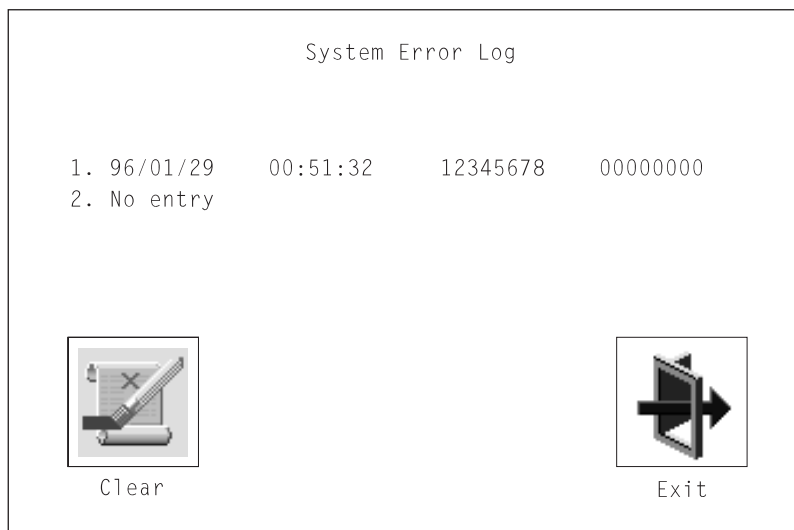
After you have entered and verified the password, the privileged-access password icon flashes and changes to the locked position to indicate that your computer now requires the password you just entered before running system programs.

Note: If you *forget* the power-on password, contact your service representative.

Error Log

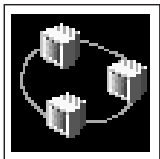


Selecting this icon displays the log of errors your computer has encountered during operations.

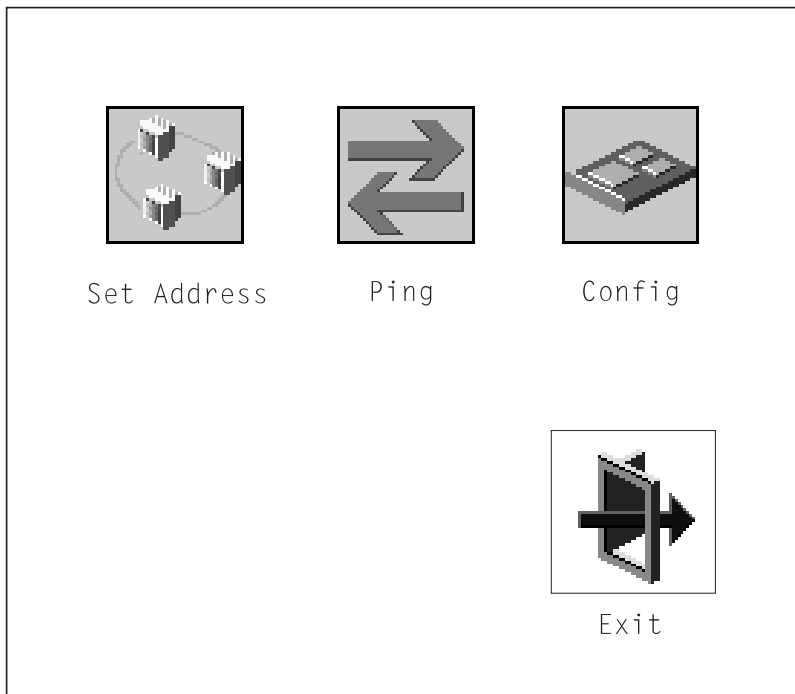


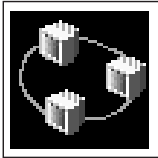
Selecting the Clear icon erases the entries in this log.

RIPL



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







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



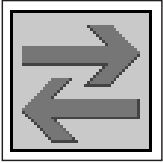
Exit

Notes:

1. 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.

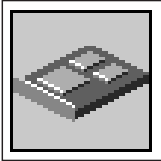
If any of the addresses is incomplete or contains a number other than 0 to 255, an error message is displayed when you select the Save icon. To clear this error, change the improper address and select Save again.

Note: You should save a copy of your changes in case you need to replace your battery.

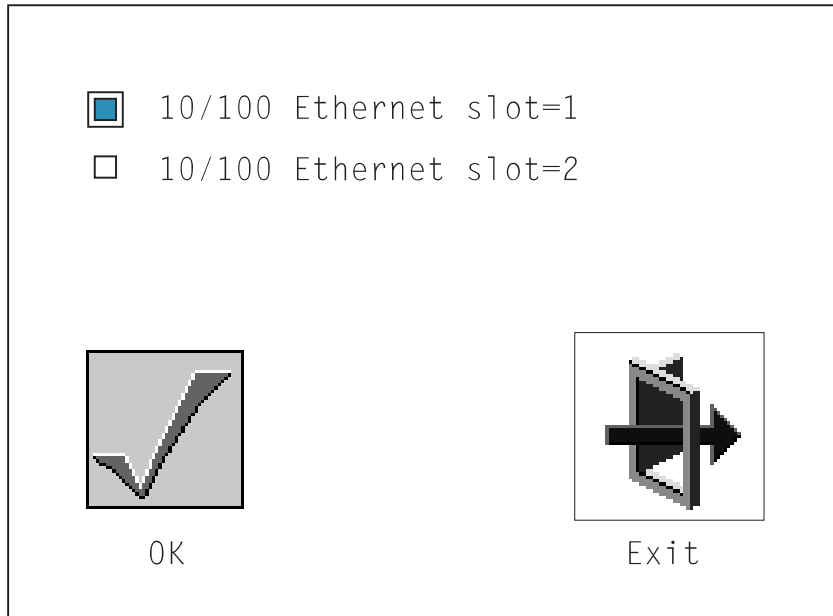


The Ping icon allows you to confirm that a specified address is valid by sending a test transmission to that address.

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.

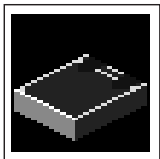


The Config icon allows you to configure network adapters which require setup. Selecting the Config icon presents a list of the adapters requiring configuration. Use the arrow keys to highlight an adapter, press the spacebar to select the adapter, then highlight the OK icon and press the Enter key.



The next screen allows you to select the configuration of the adapter you have just chosen (or allow the system to select the configuration 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.

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, use the arrow keys to highlight the entry, then use the spacebar to scroll through the available IDs. After you have entered the new address, use the arrow keys to highlight the Save icon and press the Enter key.

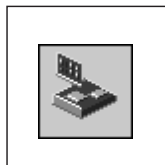
At any time in this process, you can select the Default icon to change the SCSI IDs to the default values.

Change SCSI ID

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

		
Save	Default	Exit

Update



This selection allows you to update the service processor and system firmware in your system unit from an image on a 3.5 inch diskette. After choosing to update the firmware 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 above.

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.

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

```
System Management Services

1. Display Configuration
2. Multiboot
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 is displayed.

```
Device
PowerPC 604
L2-Cache, 0512K
Memory
  slotA=8MB
  slotB=8MB
LPT
  addr=3BC
COM
  addr=3F8
COM
  addr=2F8
Audio
Keyboard
Mouse
Diskette
  addr=3F0
Integrated Ethernet
  addr=80005AF67BD
SCSI cntlr id=7

PCI Adapters

|P=prev-page| |N=next-page|           |x=Exit|
```


MultiBoot Menu

```
Multiboot Menu

1. Select Software
2. Software Default
3. Install From
4. Select Boot Devices
5. OK Prompt
6. Multiboot Startup <OFF> (or <ON>)

                                     |X=Exit|
                                     -----

===>
```

The Select Software option, if supported by the operating system, shows the names of the operating system installed. This option may not be supported by all operating systems.

In the case of AIX this is a supported option, if you receive a message saying that:
No Operating System Installed

this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular Hard disk. Please see the explanation of the bootlist command in your AIX documentation.

The Software Default option, if supported by the operating system, lets you select the default operating system to start the system. This option may not be supported by all operating systems.

The Install From option produces a list of devices, for example the CD-ROM, where the operating system is installed from. You select one of the devices and the system searches the device for an operating system to install and if supported by the operating system in that device, the name of the operating system displays.

The Select Boot Device option provides a list of devices that can be selected to be stored on the boot list. Up to 5 devices are supported.

The OK Prompt provides access to the Open Firmware command prompt. The Open Firmware command prompt is used for debug purposes, and device driver development. Information about the commands that are available in the IEEE Standard 1275.

The Multiboot Start option toggles between OFF and ON and selects if the Multiboot menu invokes automatically on startup or not.

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
7. Configure 5th 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. For CD-ROM boot, go to the Install From icon and then select CD-ROM Drive as a boot device.

```
Current Boot Sequence

1. Diskette
2. Ethernet (Integrated)
3. SCSI CD-ROM      id=3   (slot=1)
4. SCSI 500MB Hard Disk id=6   (slot=1)
5. SCSI 500MB Hard Disk id=5   (slot=5)

                                     |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 4.5GB 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.

```
Utilities

1. Set Password and Unattended Start Mode
2. Memory Test
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* the power-on password, contact your service representative.

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* the power-on password, contact your service representative.

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  000.000.000.000
2. Server IP Address 000.000.000.000
3. Gateway IP Address 000.000.000.000
4. Subnet Mask       000.000.000.000

                                     |X=Exit|
                                     -----

===>
```

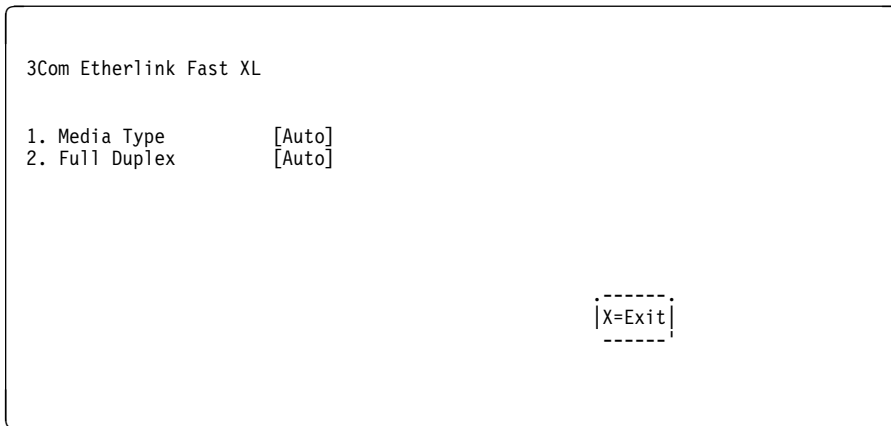
Selecting the Adapter Parameters option allows you to view an adapter's hardware address as well as configure network adapters that require setup.

```
Adapter Parameters

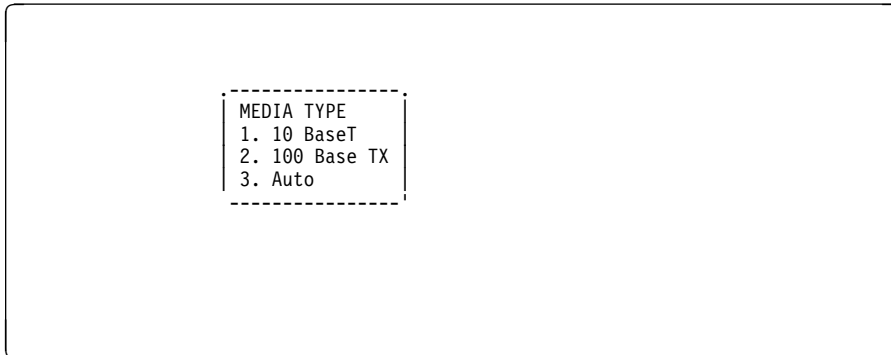
   Device           HW Address
1. 3Com,3C905       80005AFC67BD
2. Token-Ring       800032E54A12

                                     |X=Exit|
                                     -----
```

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



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



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   129.132.4.20
2. Server IP Address  129.132.4.10
3. Gateway IP Address 129.132.4.30
4. Subnet Mask        255.255.255.0

|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.

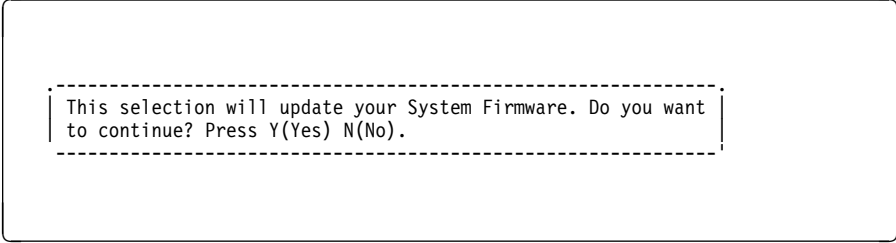
```

|-----|
|              Error Log              |
|-----|
| Date      Time      ErrorCode      Location |
| Entry 1. 96/04/01  12:13:22  25A80011  00-00  |
| 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 your computer.

Update System Firmware: This option allows you to update your system firmware. Note that you must insert a diskette containing the firmware update image after you see the following confirmation screen.



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.

If no console is selected within two minutes, the console defaults to Serial Port 2.

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.

Open Firmware Command Prompt

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

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

The OK Prompt provides access to the Open Firmware command prompt. The Open Firmware command prompt is used for debug purposes, and device driver development. Information about the commands that are available in the IEEE Standard 1275.

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 exit from the Open Firmware command enter `reset-all` or power the system down and reboot.

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.

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

Chapter 5. 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 5-2, and “Handling Static-Sensitive Devices” on page 5-3. 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.

CAUTION:

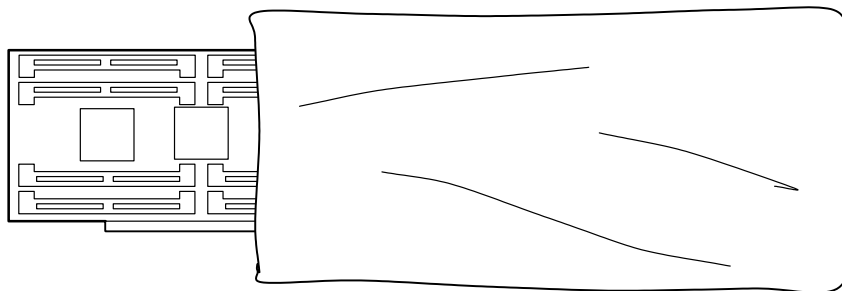
This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect two power supply cords before servicing.

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.

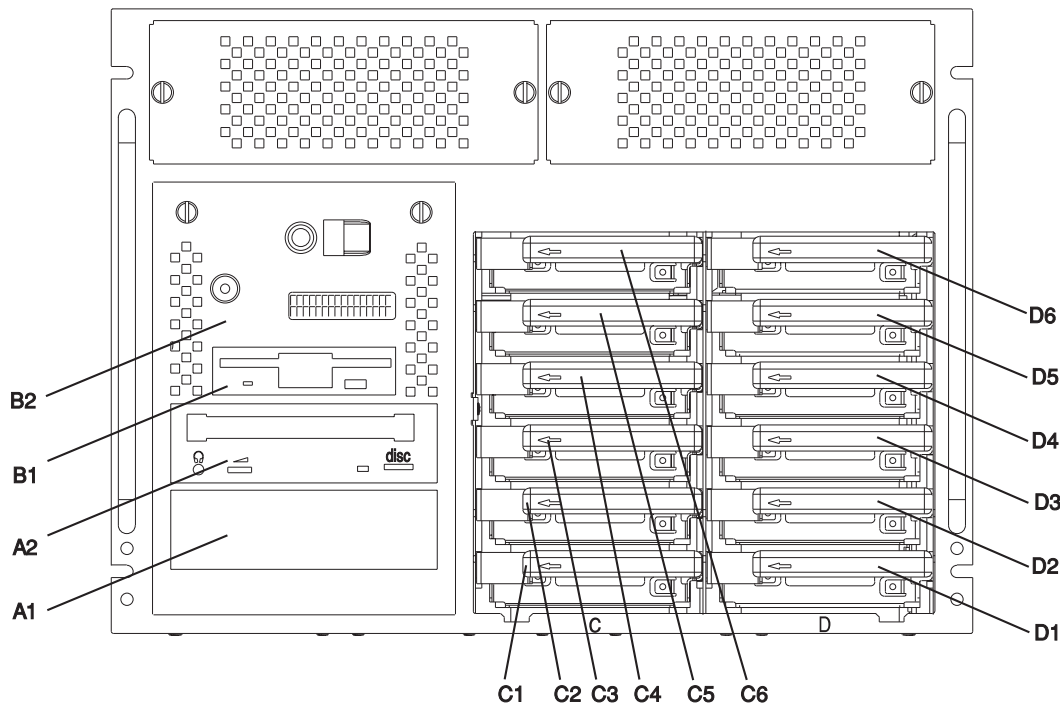
Take the following precautions:

- 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. All models come with one or more SCSI-2 disk drives. The capacity of the disk drives varies, depending on your configuration. The number of additional preinstalled disk drives in banks C and D of your CPU Drawer varies according to the quantity you ordered.



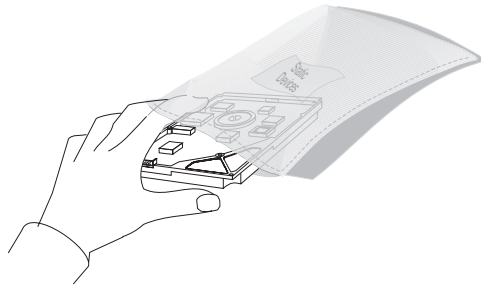
Your system's special design gives you the flexibility to use up to twelve 3.5-inch disk drives (either SCSI or SSA) in banks C and D. To install SSA drives in banks C and D, however, a SCSI disk drive must be installed on a media tray in bay B2, (behind the operator panel display) to serve as a boot drive. There is an additional open bay, A1, for an additional media device or a non-hot-swappable SCSI hard disk drive. For installation instructions and information on the types of drives that you can install in each bay, see "Installing Disk Drives into the Hot Swap Bays" on page 5-6 and

Preinstallation Steps (All Bays)

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

Attention: Caution should be used when handling all hard drives. Drives are more likely to be damaged during installation and service. Bumping or handling drives roughly causes latent failures. Don't stack drives and always use appropriate ESD practices. A drop of as little as 1/4 inch can cause latent failures. Media can take 30 seconds to spin down, so ensure at least a 30 second delay after switching off the hot-swappable drives for removal.

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 C or D, go to page 5-6.
 - To install an SSA disk drive in bank C or D, go to page 5-6.
 - To remove a SCSI disk drive from bank C or D, go to page 5-12.
 - To remove an SSA Disk Drive from bank C or D, go to page 5-12.

Installing Disk Drives into the Hot Swap Bays

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

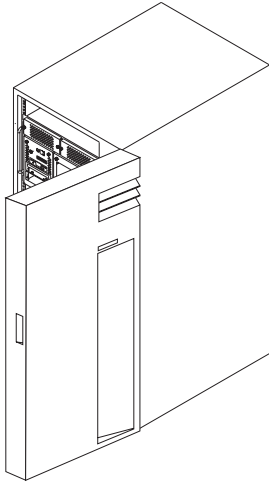
Attention: Do not open the drive; no user adjustments or serviceable parts are inside.

Note:

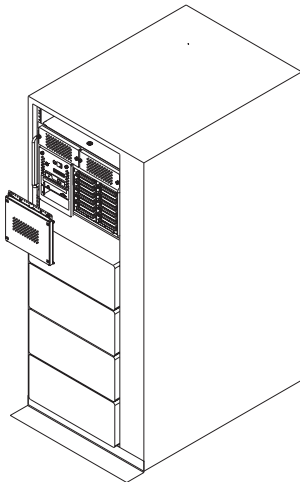
- Banks C and D support hot-swappable disk drives only.
- This procedure is similar for any hot-swappable disk drive that is supported by this drawer.
- SCSI disk drives and SSA disk drives are not interchangeable.
- SCSI disk drive carriers and SSA disk drive carriers are not interchangeable.
- For additional information regarding the operation of the hot swap disk drives see the installation and users guide that came with the drives.
- Remember that each 1.6 inch disk drive takes two bays.
- To run SSA drives in banks C and D, a SCSI disk drive must be installed on a media tray in bank B2, to serve as a boot drive.
- Before installing SSA disk drives in banks C and D, you must also order and have installed an SSA disk drive backplane at the rear of banks C and D. You must also order and have installed an SSA adapter. To order, contact your authorized reseller or marketing representative.)
- After the backplanes are completely installed, you do not have to turn off the server to install additional hot-swappable disk drives.

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

1. If the rack unit has a front door, open it.



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.



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

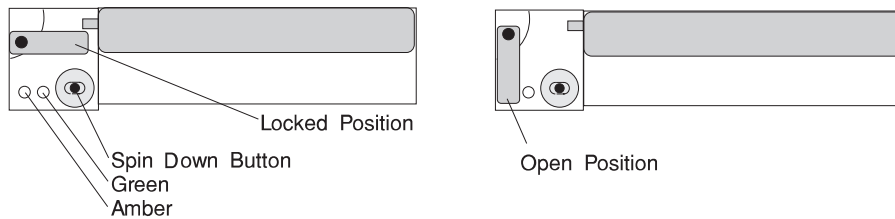
Attention: Handle the hot swap disk drive with care as it is very fragile and can be easily damaged if exposed to shock, electrostatic discharge, or rough handling.

4. If you are installing drives in bank D for the first time, you must install a backplane in bank D before you can install drives. Contact your hardware support center to install the backplane.
5. It is recommended that you install the hot swap disk drive in the next unused position of bank C or D, going from bottom to top.

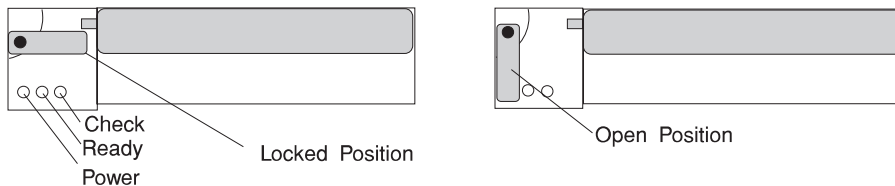
Attention: Attaching SCSI address jumpers on the hot swap disk drive rather than using the automatic ID furnished by the backplane is not advised. Attaching jumpers can cause service problems, multiple drives at the same address, or confusion locating the correct drive.

- a. Rotate the carrier latch to the open position.

SCSI Disk Drives

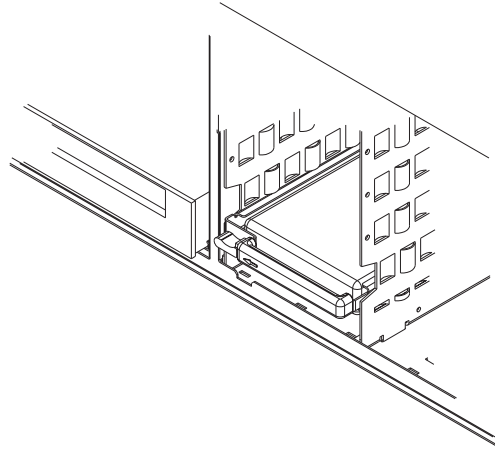
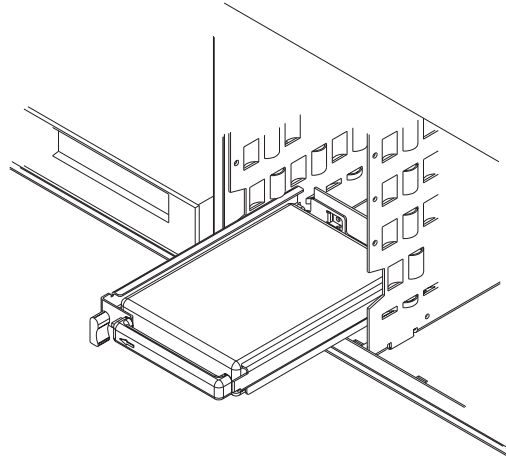


SSA Disk Drives



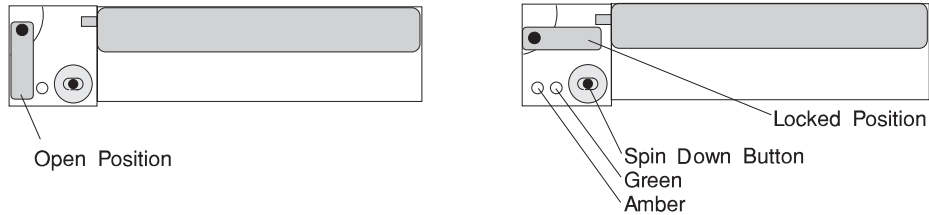
- b. Position the drive carrier assembly horizontally, with the connector facing into the bay.

- 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, the green LED on the drive carrier illuminates.

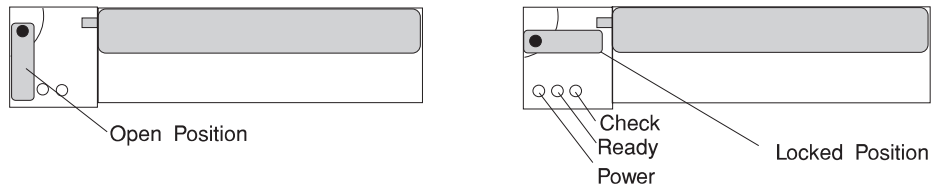
SCSI Disk Drives



The following table explains the meaning of the green and amber status LEDs and spin down button on a SCSI disk drive.

Status LEDs		
LED 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 on an 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

6. Go to Appendix A on page A-1 to record the drive location and the 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 5-8.
8. If you do not have any other procedures to perform, replace the cover that you removed in step 2 on page 5-7.

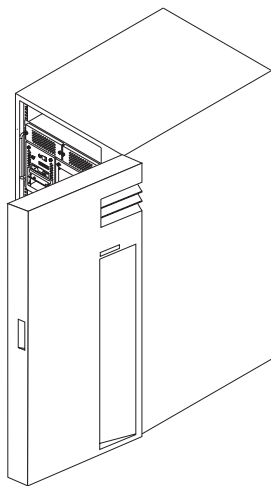
Removing Disk Drives from the Hot Swap Bays

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

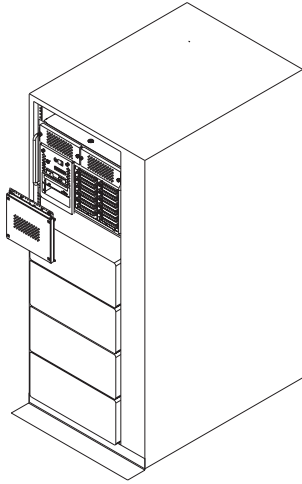
If you remove a hot swap disk drive when the CPU Drawer power is off, steps 3 on page 5-13 and 4 on page 5-14 do not apply.

Attention: Follow all procedures for ESD-sensitive parts while performing these procedures. For ESD information, see “Handling Static-Sensitive Devices” on page 5-3.

1. If the rack unit has a front door, open it.



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.

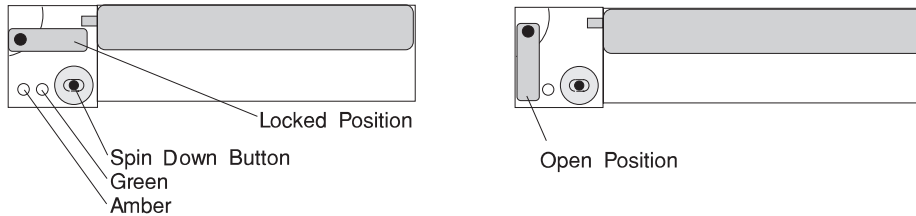


Attention: Physically removing a hot swap drive from the CPU Drawer before it has been removed from the system configuration, may cause unrecoverable data corruption.

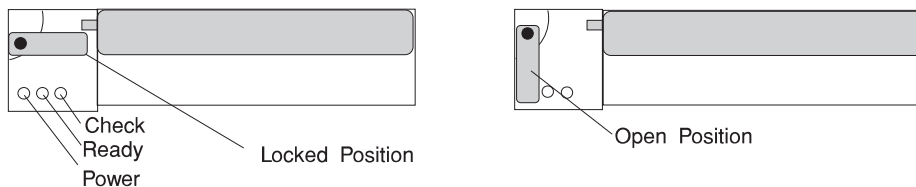
3. Verify that the device has been removed from the system configuration; the yellow LED on the hot swap disk drive should be off.

- For SCSI disk drives, press the spin down button on the hot swap disk drive; observe the green flashing LED.
- Unlock the drive by turning the carrier latch 90 degrees clockwise to the open position.

SCSI Disk Drives



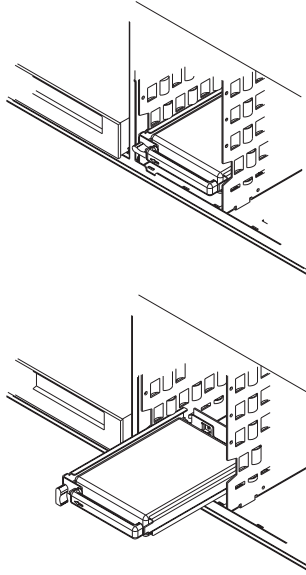
SSA Disk Drives



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.

6. 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.



7. If you are removing another disk drive, return to step “Installing Disk Drives into the Hot Swap Bays” on page 5-6.
8. If you are installing another disk drive or carrier blank in bank C or D, go to “Removing Disk Drives from the Hot Swap Bays” on page 5-12.
9. Go to Table A-2 on page A-4 and update the drive information; then return here to determine your next step.
10. If you do not have any other procedures to perform, replace the disk drive cover that you removed earlier.

Chapter 6. Using the Online and Standalone Diagnostics

Sources for the Diagnostics

The diagnostics consist of Standalone Diagnostics and Online Diagnostics. Standalone Diagnostics are packaged 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, reside with AIX in the file system. 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 concurrent mode) with other applications. They have access to the AIX Error Log and the AIX Configuration Data.

Standalone and Online Diagnostics Operating Considerations

Note: When possible, run Online Diagnostics in Service Mode. Online Diagnostics perform additional functions, compared to Standalone Diagnostics.

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

1. When diagnostics are installed, the device support for some devices may not get installed. If this is the case, that device does not appear in the diagnostic test list when running disk based diagnostics.
2. Support for some TTY terminals is optionally installed. If you attach a TTY terminal to a system to run diagnostics be aware 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 Diagnostics, you need to select the console display. The diagnostics display instructions on any graphics display and the terminal attached to the Serial 1 port.

Identifying the Terminal Type to Diagnostics

Note: This is not the same as 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 graphical displays.

Undefined Terminal Types

If an undefined terminal type from the DEFINE TERMINAL option menu is entered, the menu prompts the user to enter a valid terminal type, and the menu is redisplayed until either a valid type is entered or the user exits the DEFINE TERMINAL 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 is reset to "dumb", the Diagnostic Operating Instruction panel is displayed, and the user is 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 cannot be ejected from the CD-ROM drive once the diagnostics have loaded. The disc can only be ejected after the system has been turned off and then turned on (standalone mode) or after the diagnostics program has terminated (Online concurrent mode).
- The CD-ROM drive from which diagnostics were loaded cannot be tested.
- The SCSI adapter (or circuitry) controlling the CD-ROM drive from which diagnostics 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 AIX operating system has been installed, 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 boot from a server over a network. When the system is

set up to boot from a server, the diagnostics are run in the same manner as they are from disk.

- If the diagnostics are loaded from disk or a server, you must shutdown the AIX operating system before turning the system unit off to prevent possible damage to disk data. This is done in one of two ways:
 - If the diagnostics were loaded in standalone mode, press the F3 key until DIAGNOSTIC OPERATING INSTRUCTIONS displays; then press the F3 key once again to shutdown the AIX operating system.
 - If the diagnostics 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 Serial 1 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 Serial 1 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 Settings	3151 /51/61 Settings	3161/3164 Settings	Description
Machine mode	3151	3151 PC	3161 or 3164	The diagnostics are set to emulate use of the 3161 ASCII Display Terminal. If your terminal can emulate a 5085, 3161 or 3164 terminal, use the following attribute settings. Otherwise, refer to your operator's manual, compare the following attribute descriptions with those of your terminal, and set your attributes accordingly.
Generated Code Set		ASCII		
Screen	Normal	Normal		Uses the EIA-232 interface protocol.
Row and filemn	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.
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.

General Setup Attributes	3151 /11/31/41 Settings	3151 /51/61 Settings	3161/3164 Settings	Description
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.
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 Settings	3151/51/61 Settings	3161/3164 Settings	Description
Line speed	9600	9600	9600	Uses 19200 or 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	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 Modes of Operation

The Online Diagnostics can be run in three modes:

- Service Mode
- Concurrent Mode
- Maintenance Mode

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 the memory and 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

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. Turn the power off.
3. Remove all tapes, diskettes, and CD-ROMs.
4. Turn the power on.
 - a. When or after the diskette indicator appears, press F6 on the directly-attached keyboard or 6 on the ASCII terminal keyboard to indicate that diagnostics are to be loaded.
 - b. Enter any requested passwords.
 - c. Follow any instructions to select a console.
5. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.
6. Follow the displayed instructions to checkout the desired resources.
7. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.
8. 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 produces 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 OPERATING INSTRUCTIONS. Then press the F3 key again to return to the AIX operating 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 OPERATING INSTRUCTIONS. Then press the F3 key again to return to the AIX operating 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 that cannot be tested by the Online Diagnostics.

No Error Log Analysis is done by the Standalone Diagnostics.

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. Verify with the system administrator and system users that the system unit may be shut down, then stop all programs including the AIX operating system. (Refer to the AIX operating system documentation shutdown command information.)
2. Remove all tapes, diskettes, and CD-ROMs.
3. Insert the Diagnostic CD-ROM into the CD-ROM drive.
4. Turn off the system unit.
5. Turn the power on.
 - a. When or after the diskette indicator appears, press F5 on the direct attached keyboard or 5 on the tty keyboard to indicate that diagnostics are to be loaded.
 - b. Enter any requested passwords.
 - c. Follow any instructions to select a console.
6. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.

7. Follow the displayed instructions to checkout the desired resources.
8. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.

Location Codes

This system unit uses Physical Location Codes in conjunction with AIX Location Codes to provide mapping of the failing field replaceable units. The location codes are produced by the system unit's firmware and AIX.

Physical Location Codes

Physical location codes provide a mapping of logical functions in a platform (or expansion sites for logical functions, such as connectors or ports) to their specific locations within the physical structure of the platform.

Location Code Format

The format for the location code is an alphanumeric string of variable length, consisting of a series of location identifiers, separated by the standard dash (-) or slash (/) character. The series is hierarchical; that is, each location identifier in the string is a physical child of the one preceding it.

- The - (dash) separator character represents a normal structural relationship where the child is a separate physical package and it plugs into (or is connected to) the parent. For example, P1-C1 is a CPU card (C1) plugged into a planar (P1), or P1-M1 is a memory card (M1) plugged into a planar (P1).
- The / (slash) separator character separates the base location code of a function from any extended location information. A group of logical devices can have the same base location code because they are all on the same physical package, but may require extended location information to describe the connectors they support. For example, P2/S1 describes the location of the serial port 1 controller and its connector (S1), which is located on planar P2 (its base location code), but the / indicates that further devices can be connected to it at the external S1 serial connector. The keyboard controller and its connector likewise have location code P2/K1, which means they have the same base location code (P1) as serial port 1, but a different external connector. In contrast, the location code P2-K1 actually points to the device connected to connector K1; that is, the keyboard. The location code P2/Z1 indicates an integrated SCSI controller which drives connector Z1, while location codes of P2-Z1-... point to the actual SCSI bus and devices.

Each location identifier consists of one alpha prefix character that identifies a location type, and a decimal integer number (typically one or two digits) that identifies a specific instance of this location type. Certain location types may also support secondary sub-locations, which are indicated by appending a period (".") character and a sub-location instance number.

Specifically, the format of a location code is defined as follows:

pn[.n][- or /]pn[.n][- or /]...

Where p is a defined alpha location type prefix, n is a location instance number, and [.n] is a sub-location instance number (where applicable). Sub-location notation is used only for location types which have clearly defined and limited expansion sites; for example, memory SIMMs slots on a memory card. Primarily, the [.n] sub-location notation is intended for use as an abbreviation of the location code in cases where:

1. Based on the device structure, the abbreviated sub-location code conveys the same information in a more concise form than an additional level of location identifier -- for example:
 - P1-M1.4 (pluggable DIMM 4 on Memory Card 1 on Planar 1), rather than P1-M1-M4
 - P1-C1.1 (pluggable CPU 1 on CPU Card 1 on Planar 1), rather than P1-C1-C1
 - P2-Z1-A3.1 (LUN 1 at SCSI ID 3 on integrated SCSI bus 1 from Planar 2), rather than P2-Z1-A3-A1
2. The sub-location is either a basic physical extension or sub-enclosure of the base location, but does not represent additional function or connectivity; for example, a drawer in a rack (U1.2) or a riser card on an I/O planar (P2.1).

AIX and Physical Location Code Reference Table

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Central Electronics Complex (CEC)				
System Planar	00-00	P1		
Processor Card 1	00-00	P1-C1	Processor Connectors J8 and J5	CPU ID 0x00 and 0x01 (if 2-way card)
Processor Card 2	00-00	P1-C2	Processor Connector J9 and J6	CPU ID 0x04 and 0x05 (if 2-way card)
Memory Card 1	00-00	P1-M1	Processor Connector J12	
Memory Card 1 DIMMS 1 thru 16	00-00	P1-M1.1 through P1-M1.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Memory Card 2	00-00	P1-M2	Processor Connector J13	
Memory Card 2 DIMMS 1 thru 16	00-00	P1-M2.1 through P1-M2.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
I/O Planar	00-00	P2		
Integrated Devices				
Diskette Drive	01-D1-00-00	P2-D1	I/O Planar Connector J13	Base Address 0x0310
Keyboard	01-K1-00-00	P2-K1	I/O Planar Connector J23	Base Address 0x0060
Mouse	01-K1-01-00	P2-O1	I/O Planar Connector J27	0x0060
Diskette Port	01-D1	P2/D1	I/O Planar Connector J13	0x03f0
Keyboard Port	01-K1-00	P2/K1	I/O Planar Connector J23	0x0060
Mouse Port	01-K1-01	P2/O1	I/O Planar Connector J27	0x0060
Serial Port 1	01-S1	P2/S1	I/O Planar Connector J41	0x0318
Serial Port 2	01-S2	P2/S2	I/O Planar Connector J41	0x0218
Serial Port 3	01-S3	P2/S3	I/O Planar Connector J50	0x0898
Parallel Port	01-R1	P2/R1	I/O Planar Connector J47	0x0378
Ethernet Port	10-80	P2/E1	I/O Planar Connector J18(TH) or J21(TP)	Host Bridge ID00, Device 06
SCSI Port 1	10-60	P2/Z1	I/O Planar Connector J25	Host Bridge ID00, Device 04
SCSI Port 2	30-58	P2/Z2	I/O Planar Connector J11 and J30	Host Bridge ID02, Device 06
Pluggable Adapters				
Card in PCI Slot 1P	20-58 to 20-5F	P2-11	I/O Planar Connector J1	Host Bridge ID01, Device 01

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Card in PCI Slot 2P	20-60 to 20-67	P2-I2	I/O Planar Connector J2	Host Bridge ID01, Device 02
Card in PCI Slot 3P	10-68 to 10-6F	P2-I3	I/O Planar Connector J3	Host Bridge ID00, Device 03
Card in PCI Slot 4P	10-70 to 10-77	P2-I4	I/O Planar Connector J4	Host Bridge ID00, Device 04
Card in PCI Slot 5P	10-78 to 10-7F	P2-I5	I/O Planar Connector J5	Host Bridge ID00, Device 05
Card in PCI Slot 6P	30-60 to 30-67	P2-I6	I/O Planar Connector J6	Host Bridge ID02, Device 02
Card in PCI Slot 7P	30-68 to 30-6F	P2-I7	I/O Planar Connector J7	Host Bridge ID02, Device 03
Card in PCI Slot 8P	30-70 to 30-77	P2-I8	I/O Planar Connector J8P	Host Bridge ID02, Device 04
Card in PCI Slot 9P	30-78 to 30-7F	P2-I9	I/O Planar Connector J9P	Host Bridge ID02, Device 05
Card in ISA Slot 8I	01-01 or 01-02	P2-I8	I/O Planar Connector J81	
Card in ISA Slot 9I	01-01 or 01-02	P2-I9	I/O Planar Connector J91	
SCSI Devices				
Base CD-ROM (Bay A1)	10-60-00-6, 0	P2-Z1-A6		Primary SCSI Bus ID 6 (refer to the note at the end of this table)
Media Device in Bay B1	10-60-00-4, 0	P2-Z1-A4		Primary SCSI Bus ID 4 (refer to the note at the end of this table)
Media Device in Bay B2	10-60-00-5, 0	P2-Z1-A5		Primary SCSI Bus ID 5 (refer to the note at the end of this table)
SCSI Backplane C When connected to SCSI Port 1 (P2/Z1)	10-60-00-15, 0	P2-Z1-B2		Primary SCSI Bus ID 15

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
SCSI Backplane C When connected to SCSI Port 2 (P2/Z2)	30-58-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15
DASD in Bays C1 through C6 When connected to SCSI Port 1 (P2/Z1)	10-60-00-G, 0 Where G identifies Primary SCSI Bus ID 8 through 13	P2-Z1-B2.1 through B2.6		Primary SCSI Bus ID 8 through 13
DASD in Bays C1 through C6 When connected to SCSI Port 2 (P2/Z2)	30-58-00-G, 0 Where G identifies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6		Secondary SCSI Bus ID 8 through 13
SCSI Backplane D When connected to SCSI Port 2 (P2/Z2)	30-58-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15
SCSI Backplane D When connected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15
DASD in Bays D1 through D6 When connected to SCSI Port 2 (P2/Z2)	30-58-00-G, 0 Where G identifies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6	Backplane connector J6 through J11 Slots A through F	Secondary SCSI Bus ID 8 through 13
DASD in Bays D1 through D6 When connected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6	Backplane connector J6 through J11 Slots A through F	Bus ID 8 through 13
SCSI Backplane E When connected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
DASD in Bays E1 through E6 When connected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6	Backplane connector J6 through J11 Slots A through F	Bus ID 8 through 13
Fans				
Fan 1		F1	Fan connector J12 at I/O Planar	
Fan 2		F2	Fan connector J17 at I/O Planar	
Fan 3		F3	Fan connector J15 at I/O Planar	
Fan 4		F4	Fan connector J19 at I/O Planar	
Fan 1 Connector		P2/F1	Fan connector J12 at I/O Planar	
Fan 2 Connector		P2/F2	Fan connector J17 at I/O Planar	
Fan 3 Connector		P2/F3	Fan connector J15 at I/O Planar	
Fan 4 Connector		P2/F4	Fan connector J19 at I/O Planar	
Service Processor				
Service Processor		P2-X1	I/O Planar Connector J10	
Operator Panel				
Operator Panel		L1	I/O Planar Connector J22A	
Operator Panel Connector		P2/L1	I/O Planar Connector J22A	

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Power Supply				
Power Supply		V1		I2C Ad 92, Ch2; RTAS=9002-0
Note: The SCSI bus ID's are the recommended values. Features installed at the manufacturing site will correspond to these IDs. Field installations may not comply with these recommendations.				

AIX Location Codes

The basic formats of the AIX location codes are:

- For non-SCSI devices/drives
AB-CD-EF-GH
- For SCSI devices/drives
AB-CD-EF-G,H

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

```

AB-CD-EF-GH
|  |  |  |
|  |  |  | Device/FRU/Port ID
|  |  |  | Connector ID
|  |  |  | devfunc Number, Adapter Number or Physical Location
|  |  |  | Bus Type or PCI Parent Bus

```

- The AB value identifies a bus type or PCI parent bus as assigned by the firmware.
- The CD value identifies adapter number, adapter's devfunc number, or physical location. The devfunc number is defined as the PCI device number times 8, plus the function number.
- The EF value identifies a connector.
- The GH value identifies a port, address, device, or FRU.

Adapters and cards are identified with just AB-CD.

The possible values for AB are:

00	Processor bus
01	ISA bus
02	EISA bus
03	MCA bus
04	PCI bus used in the case where the PCI bus cannot be identified
05	PCMCIA buses
xy	For PCI adapters where x is equal to or greater than 1. The x and y are characters in the range of 0-9, A-H, J-N, P-Z (O, I, and lower case are omitted) and are equal to the parent bus's ibm, aix-loc Open Firmware Property.

The possible values for CD depend on the adapter/card.

For pluggable PCI adapters/cards, CD is the device's devfunc number (PCI device number times 8, plus the function number). The C and D are characters in the range of 0-9, and A-F (hex numbers). This allows the location code to uniquely identify multiple adapters on individual PCI cards.

For pluggable ISA adapters, CD is equal to the order the ISA cards defined/configured either by SMIT or the ISA Adapter Configuration Service Aid.

For integrated ISA adapters, CD is equal to a unique code identifying the ISA adapter. In most cases this is equal to the adapter's physical location code. In cases where a physical location code is not available, CD will be FF.

EF is the connector ID. It is used to identify the adapter's connector that a resource is attached to.

GH is used to identify a port, device, or FRU. For example:

- For async devices GH defines the port on the fanout box. The 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 adapter, EF-GH is the same as the definition for a pluggable adapter. For example, the location code for a diskette drive is 01-D1-00-00. A second diskette drive is 01-D1-00-01.

For SCSI the location code is defined as:

```

AB-CD-EF-G,H
|   |   |   |   |
|   |   |   |   |
|   |   |   |   | Logical Unit address of the SCSI Device
|   |   |   |   | Control Unit Address of the SCSI Device
|   |   |   |   | Connector ID
|   |   |   |   | devfunc Number, Adapter Number or Physical Location
|   |   |   |   | Bus Type or PCI Parent Bus

```

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.

There is also a bus location code that is generated as '00-XXXXXXXX' where XXXXXXXX is equivalent to the node's unit address.

Examples of physical location codes displayed by AIX are:

Processor Card in slot 1 of planar 1

P1-C1

Memory DIMM in system planar slot 2

P1-M2

Memory DIMM 12 in card in slot 2 of system planar

U1-P1-M2.12

Examples of AIX location codes displayed are:

Integrated PCI adapter

10-80	Ethernet
10-60	Integrated SCSI Port 1
30-58	Integrated SCSI Port 2

Pluggable PCI adapters

20-58 to 20-5F	Any PCI card in slot 1
20-60 to 20-67	Any PCI card in slot 2
10-68 to 10-6F	Any PCI card in slot 3
10-70 to 10-77	Any PCI card in slot 4
10-78 to 10-7F	Any PCI card in slot 5
30-60 to 30-67	Any PCI card in slot 6
30-68 to 30-6F	Any PCI card in slot 7
30-70 to 30-77	Any PCI card in slot 8
30-78 to 30-7F	Any PCI card in slot 9

Integrated ISA adapters

01-D1	Diskette adapter
01-R1	Parallel port adapter
01-S1	Serial port 1 adapter
01-S2	Serial port 2 adapter
01-S3	Serial port 3 adapter
01-K1	Keyboard adapter

Non-integrated ISA adapters

01-01	First ISA card defined/configured
01-02	Second ISA card defined/configured

Device attached to SCSI controller

10-60-00-4,0	Device attached to Integrated SCSI Port 1
--------------	---

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Introduction to Service Aids

Service Aids

The diagnostics contain programs called service aids. The service aids are used to display data and do additional testing.

Options for the service aids are available when the software package for that option is installed.

The service aids are selected via the Task Selection Menu.

Refer to the table on the previous pages for a listing of service aids which are provided.

The following are descriptions of the service aids:

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 Remote Maintenance Policy Service Aid

The Remote Maintenance Policy includes modem configurations and phone numbers to use for remote maintenance support.

Use this service aid to display and change the following settings for the Remote Maintenance Policy.

- Configuration File for Modem on S1
Configuration File for Modem on S2

Enter the name of a modem configuration file to load on either serial port 1 (S1) or serial port 2 (S2). The modem configuration files are located in the directory /usr/share/modems. If a modem file is already loaded, it is indicated by 'Modem file currently loaded'.

- Modem file currently loaded on S1
Modem file currently loaded on S2

This is the name of the file that is currently loaded on serial port 1 or serial port 2.

Note: These settings are only shown when a modem file is loaded for a serial port.

- Call In Authorized on S1 (on/off)
Call In Authorized on S2 (on/off)

Call In allows the Service Processor to receive a call from a remote terminal.

- Call Out Authorized on S1 (on/off)
Call Out Authorized on S2 (on/off)

Call Out allows the Service Processor to place calls for maintenance.

- S1 Line Speed
S2 Line Speed

A list of line speeds is available by using 'List' on the screen.

- Service Center Phone Number

This is the number of the service center computer. The service center usually includes a computer that takes calls from systems with call-out capability. This computer is referred to as "the catcher". The catcher expects messages in a specific format to which the Service Processor conforms. For more information about the format and catcher computers, refer to the README file in the AIX /usr/samples/syscatch directory. Contact the service provider for the correct telephone number to enter here.

- Customer Administration Center Phone Number

This is the number of the System Administration Center computer (catcher) that receives problem calls from systems. Contact the system administrator for the correct telephone number to enter here.

- Digital Pager Phone Number In Event of Emergency

This is the number for a pager carried by someone who will respond to problem calls from your system.

- Customer Voice Phone Number

This is the number for a telephone near the system, or answered by someone responsible for the system. This is the telephone number left on the pager for callback.

- Customer System Phone Number

This is the number to which your system's modem is connected. The service or administration center representatives need this number to make direct contact with your system for problem investigation. This is also referred to as the Call In phone number.

- Customer Account Number

This number could be used by a service provider for record keeping and billing.

- Call Out Policy Numbers to call if failure

This is set to either 'first' or 'all'. If the call out policy is set to 'first', call out will stop at the first successful call to one of the following numbers in the order listed:

1. Service Center
2. Customer Admin Center
3. Pager

If Call Out Policy is set to 'all', call out will attempt to call all or the following numbers in the order listed:

1. Service Center
2. Customer Admin Center
3. Pager

- Customer RETAIN Login ID
Customer RETAIN Login Password

These settings apply to the RETAIN service function.

- Remote Timeout, in seconds
Remote Latency, in seconds

These settings are functions of the service provider's catcher computer.

- Number of Retries While Busy

This is the number of times the system should retry calls that resulted in busy signals.

- System Name (System Administrator Aid)

This is the name given to the system and is used when reporting problem messages.

Note: Knowing the system name aids the support team to quickly identify the location, configuration, history, etc. of your system.

This service aid may be accessed directly from the AIX command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -m
```

Configure Ring Indicate Power On Policy Service Aid

This service aid allows the user to power on a system by telephone from a remote location. If the system is powered off, and Ring Indicate Power On is enabled, the system will power on at a predetermined number of rings. If the system is already on, no action is taken. In either case, the telephone call is not answered and the caller receives no feedback that the system has powered on.

Use this service aid to display and change the following settings for the Ring Indicate Power On Policy.

- Power On Via Ring Indicate (on/off)
- Number of Rings Before Power On

This service aid may be accessed directly from the AIX command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -r
```

Configure Surveillance Policy Service Aid

This service aid monitors the system for hang conditions, that is, hardware or software failures that cause operating system inactivity. When enabled, and surveillance detects operating system inactivity, a call is placed to report the failure.

Use this service aid to display and change the following settings for the Surveillance Policy.

- Surveillance (on/off)
- Surveillance Time Interval

This is the maximum time, in minutes, between heartbeats from the operating system.

- Surveillance Time Delay

This is the time to delay, in minutes between when the operating system is in control and when to begin operating system surveillance.

- Changes are to take affect immediately

Set this to Yes if the changes made to the settings in this menu are to take place immediately. Otherwise the changes will take place beginning with the next system boot.

This service aid may be accessed directly from the AIX command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -s
```

Configure Reboot Policy Service Aid

This service aid controls how the system will try to recover from a system crash.

Use this service aid to display and change the following settings for the Reboot Policy.

- Maximum Number of Reboot Attempts

Enter a number that is 0 or greater.

Note: A value of 0 indicates 'do not attempt to reboot' to a crashed system.

This number is the maximum number of consecutive attempts to reboot the system. The term "reboot", in the context of this service aid, is used to describe bringing system hardware back up from scratch, for example from a system reset or power on.

Once the Maximum Number of Reboot Attempts is exceeded, the system will call out if that function has been enabled.

When the reboot process completes successfully, the reboot attempts count is reset to 0, and a "restart" begins. The term "restart", in the context of this service aid, is used to describe the operating system activation process. Restart always follows a successful reboot.

When a restart fails, and a restart policy is enabled, the system will attempt to reboot for the maximum number of attempts.

- Use the O/S Defined Restart Policy (1=Yes, 0=No)

When 'Use the O/S Defined Restart Policy' is set to Yes, the system will attempt to reboot from a crash if the operating system has an enabled Defined Restart or Reboot Policy.

When 'Use the O/S Defined Restart Policy' is set to No, or the operating system restart policy is undefined, then the restart policy is determined by the 'Supplemental Restart Policy'.

- Enable Supplemental Restart Policy (1=Yes, 0=No)

The 'Supplemental Restart Policy', if enabled, is used when the O/S Defined Restart Policy is undefined, or is set to False.

When surveillance detects operating system inactivity during restart, an enabled 'Supplemental Restart Policy' causes a system reset and the reboot process begins.

- Call-Out Before Restart (on/off)

When enabled, Call-Out Before Restart will allow the system to call out (on a serial port that is enabled for call out) when an operating system restart is initiated. Such calls can be valuable if the number of these events becomes excessive, thus signalling bigger problems.

- Enable Unattended Start Mode (1=Yes, 0=No)

When enabled, 'Unattended Start Mode' will allow the system to recover from the loss of AC power.

If the system was powered-on when the AC loss occurred, the system will reboot when power is restored. If the system was powered-off when the AC loss occurred, the system will remain off when power is restored.

This service aid may be accessed directly from the AIX command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -b
```

Save or Restore Hardware Management Policies Service Aid

Ring Indicate Power On Policy, Surveillance Policy, Remote Maintenance Policy and Reboot Policy.

- Save Hardware Management Policies

This selection will write all of the settings for the hardware management policies to the file:

```
/etc/lpp/diagnostics/data/hmpolicies
```

- Restore Hardware Management Policies

This selection will restore all of the settings for the hardware management policies from the contents of the file:

```
/etc/lpp/diagnostics/data/hmpolicies
```

This service aid may be accessed directly from the AIX command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -a
```

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
- 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.

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.

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 will reassign 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 will be 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 overwritten. The new bad blocks will not be overwritten.

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

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 will 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.

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).

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.

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

Change Hardware Vital Product Data Task

Use this service aid to display the Display/Alter VPD Selection Menu. The menu will list 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

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 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 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.

Enhanced SCSI Display Configuration Service Aid

This service aid allows the user to choose a SCSI device or location from a menu and to identify a device.

The service aid also does the following:

- Generate a menu which displays all SCSI devices.
- Lists the device and all of its sibling devices.
- List all SCSI adapters and their ports.
- List all SCSI devices on a port.

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 will do 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.

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".

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 `sysplnar0` diagnostics in Problem Determination Mode.

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.

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 will not improve the availability of spare sectors.

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

SCSI Bus Analyzer Task

This service aid provides a means to diagnose a SCSI Bus problem in a free-lance mode.

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 will work 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 will display a timeout message. If an error occurs or a response is received, the service aid will then display 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 will display 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 menu allows the user to transmit the SCSI Inquiry Command by pressing the Enter key. The Service Aid will then indicate 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 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 will also be 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 will be 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 will 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.

Update System or Service Processor Flash Service Aid

Note: This service aid is only supported for Online Diagnostics

This service aid allows you to update the system or service processor flash.

Additional update and recovery instructions may be provided; also you need to know the fully qualified path and file name of the flash update image file. If the flash update image file is on a diskette, you need the AIX DOS utilities package to process the diskette. You can use the **dosdir** command to find out the name of the update image file. This service aid uses the **dosread** command to put the file into the **/var** file system.

Refer to the update instructions, or to the System Management Services "Config" on page 4-4 or "Display Configuration" on page 4-22 or Service Processor menus on page 3-7, to determine the level of the system unit or service processor flash. Using this service aid to update the system or service processor flash will not save the current contents of the flash.

The flash image file will be copied in the **/var** file system. If there is not enough space in the **/var** file system for the flash update image file, an error is reported. If this occurs, exit the service aid, increase the size of the **/var** file system and retry the service aid. After the file is copied, a warning screen will ask for confirmation to continue the flash update. Continuing the flash update will eventually cause the system to reboot and return to the AIX login prompt. After the system unit reboots,

the file `/var/update_flash_image` can be removed to conserve space in the `/var` file system.

Display Firmware Device Node

Note: Runs on CHRP systems units only.

This task displays the firmware device node information that appears on CHRP platforms. The format of the output data will not necessarily be the same between different levels of AIX. It is intended to be used to gather more information about individual or particular devices on the system.

Display Resource Attributes

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

7135 RAIDant Array Service Aid

The 7135 RAIDant 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 will be 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 controller.
- **Replace Controller**
Use this selection when it is necessary to replace a controller in the array.

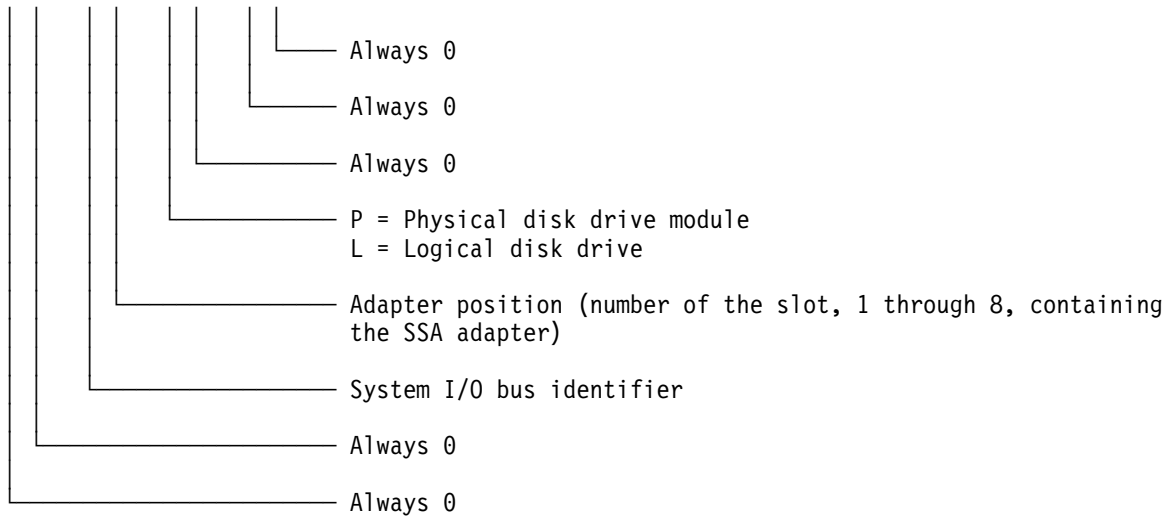
PCI RAID Physical Disk Identify

This selection will identify physical disks connected to a PCI SCSI-2 F/W RAID adapter.

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



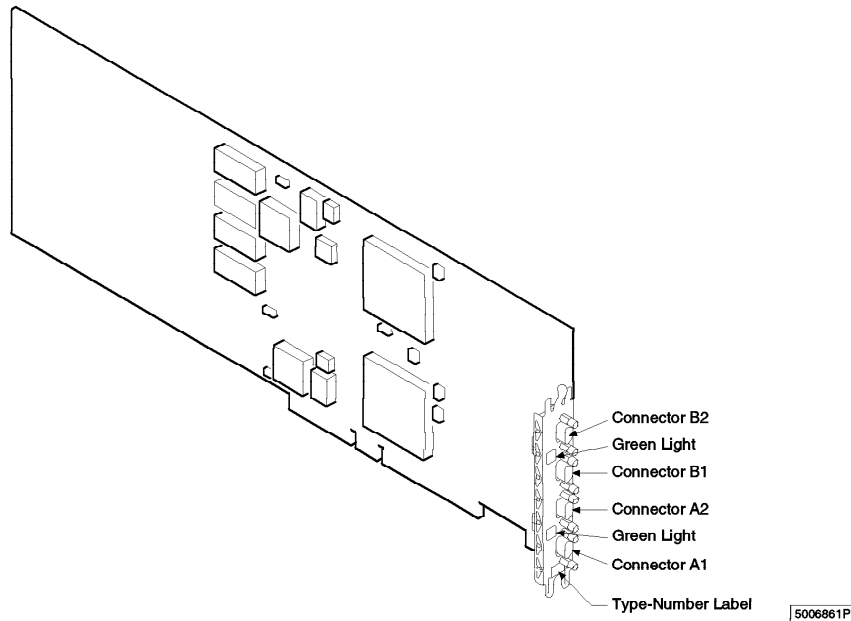
The location code shows only the position of the SSA adapter in the using system and the type of device that is attached. Use a service aid to find the location of the device (disk drive module). For more information, see "SSA Service Aids" on page 7-32.

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.



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.

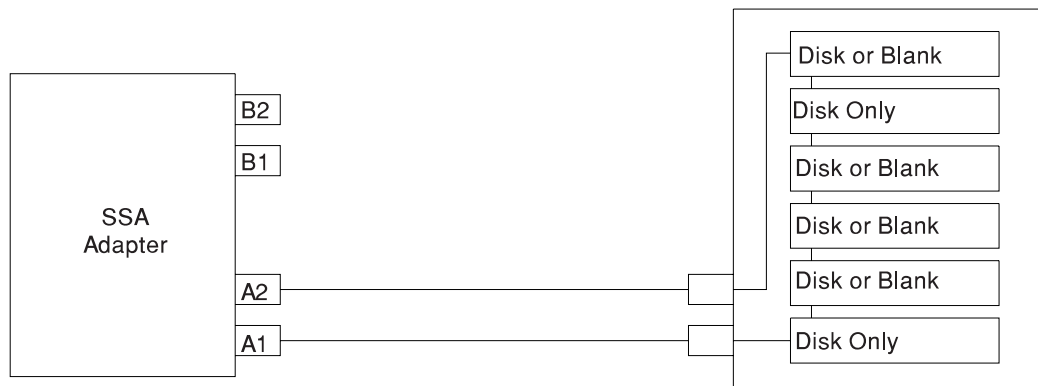
Each pair of connectors has a green light that indicates the operational status of its related loop:

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 pdisk or several 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 drives electronics card.

Rules for SSA Loops

The following are rules for 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.

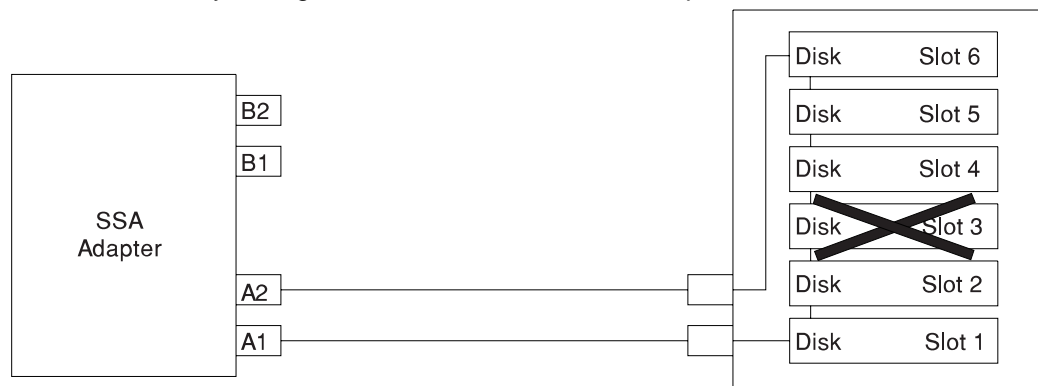
Loops and Data Paths

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.

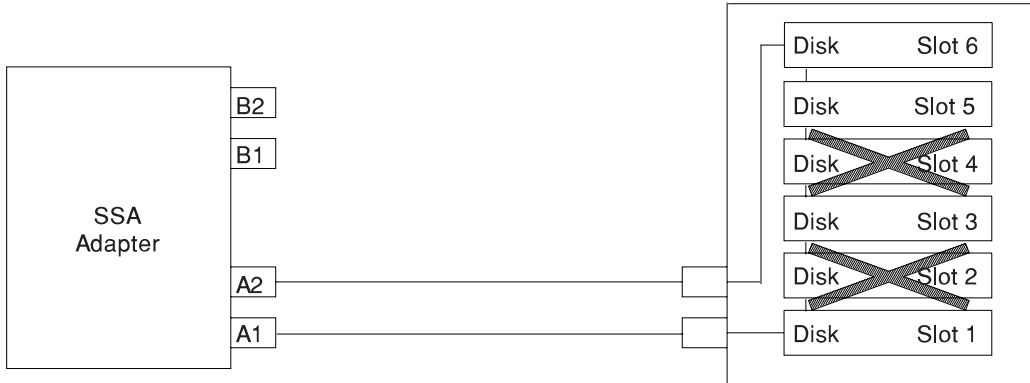
If a disk drive module fails, or is turned off, the loop is broken, and one of the data paths to a particular module is no longer available. The disk drive modules on the loop continue to work, but an error is reported to the using system.

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 SP. This section describes those service aids, and tells how to use them.

Attention: Do not run the service aids from more than one using 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 7-27.

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 using-system diagnostics (see the *Common Diagnostics Information Manual*), and go to DIAGNOSTIC OPERATING INSTRUCTIONS.
2. Follow the instructions to select FUNCTION SELECTION.
3. Select SERVICE AIDS from the Function Select menu.
4. Select SSA SERVICE AIDS from the Service Aids menu.

The SSA Service Aids menu is displayed.

```
SSA SERVICE AIDS                                     802380
Move cursor onto selection, then press Enter.

      Set Service Mode
      Link Verification
      Configuration Verification
      Format Disk
      Certify Disk

F3=Cancel      F10=Exit
```

Note: In some configurations of the using-system console:

Esc and **0** = Exit

Esc and **3** = Cancel

In such configurations, however, the displayed instructions for the function keys remain the same as those shown in the screen above.

5. Select the service aid that you require, then go to the relevant instructions in this chapter:

“Set Service Mode Service Aid” on page 7-35

“Link Verification Service Aid” on page 7-41

“Configuration Verification Service Aid” on page 7-44

“Format Disk Service Aid” on page 7-46

“Certify Disk Service Aid” on page 7-48

Set Service Mode Service Aid

The Set Service Mode service aid enables you to determine the location of a particular 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 unavailable 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 leave 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 7-33). A list of physical disk drives (pdisks) is displayed:

```
SSA SERVICE AIDS                                     802380

SET SERVICE MODE                                     802381

Move cursor onto selection, then press Enter.

{TOP}

pdisk0  11111111  00-04-P      2 GB SSA F Physical Disk Drive
pdisk1  22222222  00-04-P      2 GB SSA F Physical Disk Drive
pdisk2  33333333  00-04-P      2 GB SSA F Physical Disk Drive
pdisk3  44444444  00-04-P      2 GB SSA F Physical Disk Drive
pdisk4  55555555  00-04-P      2 GB SSA F Physical Disk Drive
pdisk5  66666666  00-04-P      2 GB SSA F Physical Disk Drive
pdisk6  77777777  00-04-P      2 GB SSA F Physical Disk Drive
pdisk7  88888888  00-04-P      2 GB SSA F Physical Disk Drive
pdisk8  99999999  00-04-P      2 GB SSA F Physical Disk Drive

{BOTTOM}

F3=Cancel      F10=Exit
```

The columns of information displayed on the screen 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 7-25.

2 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                                802380
SET SERVICE MODE                                802381
SET SERVICE MODE                                802382
pdisk3    44444444    00-04-P    2 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    F10=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                                     802380

SET SERVICE MODE                                     802381

SET SERVICE MODE                                     802382

SET SERVICE MODE                                     802381

Move cursor onto selection, then press Enter.

{TOP}

pdisk0  11111111  00-04-P      2 GB SSA F Physical Disk Drive
pdisk1  22222222  00-04-P      2 GB SSA F Physical Disk Drive
pdisk2  33333333  00-04-P      2 GB SSA F Physical Disk Drive
> pdisk3  44444444  00-04-P      2 GB SSA F Physical Disk Drive
pdisk4  55555555  00-04-P      2 GB SSA F Physical Disk Drive
pdisk5  66666666  00-04-P      2 GB SSA F Physical Disk Drive
pdisk6  77777777  00-04-P      2 GB SSA F Physical Disk Drive
pdisk7  88888888  00-04-P      2 GB SSA F Physical Disk Drive
pdisk8  99999999  00-04-P      2 GB SSA F Physical Disk Drive

{BOTTOM}

F3=Cancel      F10=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 7-27), 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 7-33).

4. Select a second disk drive module, if required (for example, pdisk5). The following display appears:

```
SSA SERVICE AIDS                                802380
SET SERVICE MODE                                802381
SET SERVICE MODE                                802382
SET SERVICE MODE                                802381
SET SERVICE MODE                                802382
> pdisk5   66666666   00-04-P   2 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      F10=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                                802380
SET SERVICE MODE                                802381
SET SERVICE MODE                                802382
SET SERVICE MODE                                802381
SET SERVICE MODE                                802382
SET SERVICE MODE                                802381
Move cursor onto selection, then press Enter.
{TOP}
pdisk0  11111111  00-04-P  2 GB SSA F Physical Disk Drive
pdisk1  22222222  00-04-P  2 GB SSA F Physical Disk Drive
pdisk2  33333333  00-04-P  2 GB SSA F Physical Disk Drive
> pdisk3  44444444  00-04-P  2 GB SSA F Physical Disk Drive
pdisk4  55555555  00-04-P  2 GB SSA F Physical Disk Drive
+ pdisk5  66666666  00-04-P  2 GB SSA F Physical Disk Drive
pdisk6  77777777  00-04-P  2 GB SSA F Physical Disk Drive
pdisk7  88888888  00-04-P  2 GB SSA F Physical Disk Drive
pdisk8  99999999  00-04-P  2 GB SSA F Physical Disk Drive

{BOTTOM}
F3=Cancel      F10=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 7-33). The Link Verification adapter menu is displayed:

```
SSA SERVICE AIDS                                802380
LINK VERIFICATION                                802385
Move cursor onto selection, then press Enter.
ssa0  00-03  SSA Adapter
ssa1  00-05  SSA Adapter
ssa2  00-06  SSA Adapter
ssa3  00-07  SSA Adapter
F3=Cancel      F10=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                                     802380

LINK VERIFICATION                                   802385

LINK VERIFICATION                                   802386
SSA Link Verification for:
  ssa1  00-05  SSA Adapter

To set or reset Identify, move cursor onto selection, then press Enter.

Physical  Serial#      Adapter Port      Status
          Serial#      A1  A2  B1  B2
{TOP}
pdisk0    11111111      0   7
pdisk1    22222222      1   6
pdisk2    33333333      2   5
pdisk3    44444444      3   4
pdisk4    55555555      4   3
pdisk5    66666666      5   2
pdisk6    77777777      6   1
pdisk7    88888888      7   0
pdisk8    99999999          0  10
pdisk9    nnnnnnnn          1   9
{MORE}

F3=Cancel      F10=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 7-27).

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 7-33).

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 information 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 802386
SSA Link Verification for:
  ssa1 00-05 SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

Physical  Serial#      Adapter Port          Status
          A1  A2  B1  B2
{TOP}
pdisk0    11111111      0                      Good
pdisk1    22222222      1                      Good
?????
pdisk3    44444444          4                      Good
pdisk4    55555555          3                      Good
pdisk5    66666666          2                      Good
pdisk6    77777777          1                      Good
pdisk7    88888888          0                      Good
pdisk8    99999999          0  3                   Good
pdisk9    10000000          1  2                   Good
{MORE}

F3=Cancel      F10=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 7-33).

```

SSA SERVICE AIDS                                     802380

CONFIGURATION VERIFICATION                           802390

Move cursor onto selection, then press Enter.

{TOP}
pdisk0  22222222  00-03-P    2 GB SSA F Physical Disk Drive
pdisk1  33333333  00-05-P    2 GB SSA F Physical Disk Drive
pdisk2  44444444  00-07-P    2 GB SSA F Physical Disk Drive
hdisk3  22222222  00-03-L    SSA Logical Disk Drive
hdisk4  33333333  00-05-L    SSA Logical Disk Drive
hdisk5  44444444  00-07-L    SSA Logical Disk Drive

{BOTTOM}
F3=Cancel      F10=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                                     802380

CONFIGURATION VERIFICATION                           802390

CONFIGURATION VERIFICATION                           802391
  hdisk3  22222222  00-03-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}
pdisk0     22222222   00-02    A1     5          Good
           00-02    A2     5          Good
           00-03    A1    10          Good
           00-03    A2     0          Good

{BOTTOM}
F3=Cancel   F10=Exit

```

If you select a pdisk, a list of hdisks is displayed:

```

SSA SERVICE AIDS                                     802380

CONFIGURATION VERIFICATION                           802390

CONFIGURATION VERIFICATION                           802392
  pdisk0  22222222  00-03-P  2 GB SSA F Physical Disk Drive
Move cursor onto selection, then press Enter.

  hdisk3  22222222  00-03-L  SSA Logical Disk Drive

{BOTTOM}
F3=Cancel   F10=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 7-33). A list of pdisks is displayed:

```
SSA SERVICE AIDS                                802380

FORMAT DISK                                     802395

Move cursor onto selection, then press Enter.

{TOP}
pdisk0  11111111  00-04-P      2 GB SSA F Physical Disk Drive
pdisk1  22222222  00-04-P      2 GB SSA F Physical Disk Drive
pdisk2  33333333  00-04-P      2 GB SSA F Physical Disk Drive
pdisk3  44444444  00-04-P      2 GB SSA F Physical Disk Drive
pdisk4  55555555  00-04-P      2 GB SSA F Physical Disk Drive
pdisk5  66666666  00-04-P      2 GB SSA F Physical Disk Drive
pdisk6  77777777  00-04-P      2 GB SSA F Physical Disk Drive
pdisk7  88888888  00-04-P      2 GB SSA F Physical Disk Drive
pdisk8  99999999  00-04-P      2 GB SSA F Physical Disk Drive

{BOTTOM}

F3=Cancel      F10=Exit
```

2. Select the pdisk that you want to format. The following instructions are displayed:

```
SSA SERVICE AIDS                                802380
FORMAT DISK                                     802395
FORMAT DISK                                     802396
pdisk1  22222222  00-04-P      2 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      F10=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 7-33). 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 7-33). A list of pdisks is displayed:

```
SSA SERVICE AIDS                                802380

CERTIFY DISK                                    802404

Move cursor onto selection, then press Enter.

{TOP}
pdisk0  11111111  00-04-P      2 GB SSA F Physical Disk Drive
pdisk1  22222222  00-04-P      2 GB SSA F Physical Disk Drive
pdisk2  33333333  00-04-P      2 GB SSA F Physical Disk Drive
pdisk3  44444444  00-04-P      2 GB SSA F Physical Disk Drive
pdisk4  55555555  00-04-P      2 GB SSA F Physical Disk Drive
pdisk5  66666666  00-04-P      2 GB SSA F Physical Disk Drive
pdisk6  77777777  00-04-P      2 GB SSA F Physical Disk Drive
pdisk7  88888888  00-04-P      2 GB SSA F Physical Disk Drive
pdisk8  99999999  00-04-P      2 GB SSA F Physical Disk Drive

{BOTTOM}

F3=Cancel      F10=Exit
```

2. Select the pdisk that you want to certify. The following instructions are displayed:

```
SSA SERVICE AIDS                                802380
CERTIFY DISK                                    802404
CERTIFY DISK                                    802405
pdisk1  22222222  00-04-P      2 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      F10=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 7-33). 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.

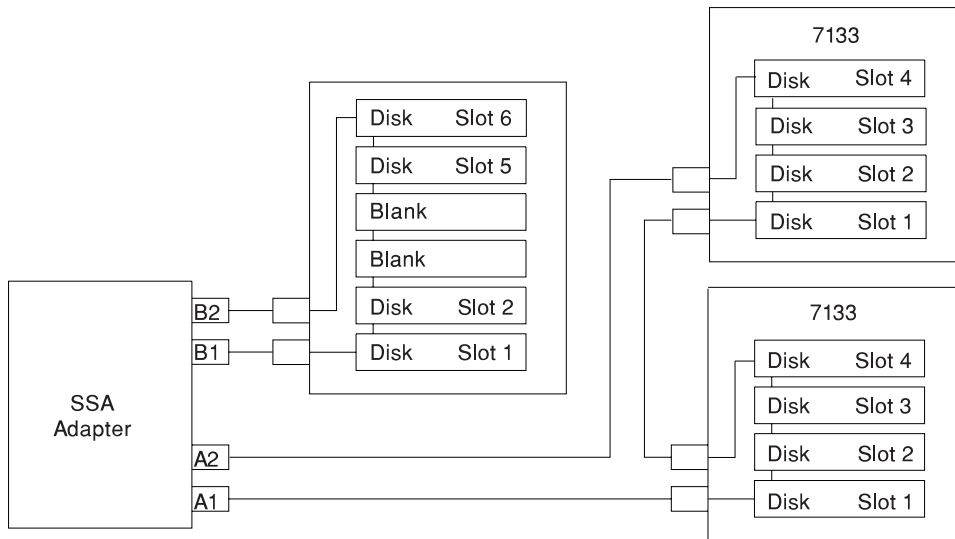
SSA03 The service aid was unable to open an hdisk. This problem might have occurred because a disk drive module has failed or has been removed from the system. Take the actions described here:

1. Use the Configuration Verification service aid (see “Configuration Verification Service Aid” on page 7-44) 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 7-41) to the SSA adapter.
3. If a link failure is indicated by the service aid, go to “SSA Maintenance Analysis Procedures (MAPS)” in *RS/6000 Enterprise Server Model H50 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 7-41). 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:

SSA Link Verification for:
ssa1 00-05 SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

Physical	Serial#	Adapter Port				Status
		A1	A2	B1	B2	
{TOP}						
pdisk0	nnnnnnnn	0	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	0			Good
pdisk8	nnnnnnnn			0	3	Good
pdisk9	nnnnnnnn			1	2	Good
{MORE}						

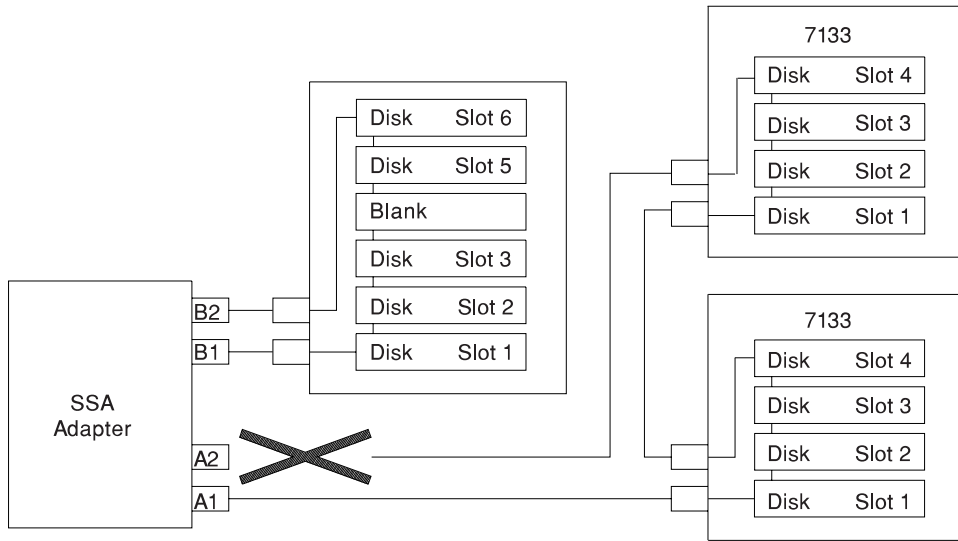
F3=Cancel F10=Exit

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 VERIFICATION802386
SSA Link Verification for:
  ssa1  00-05  SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

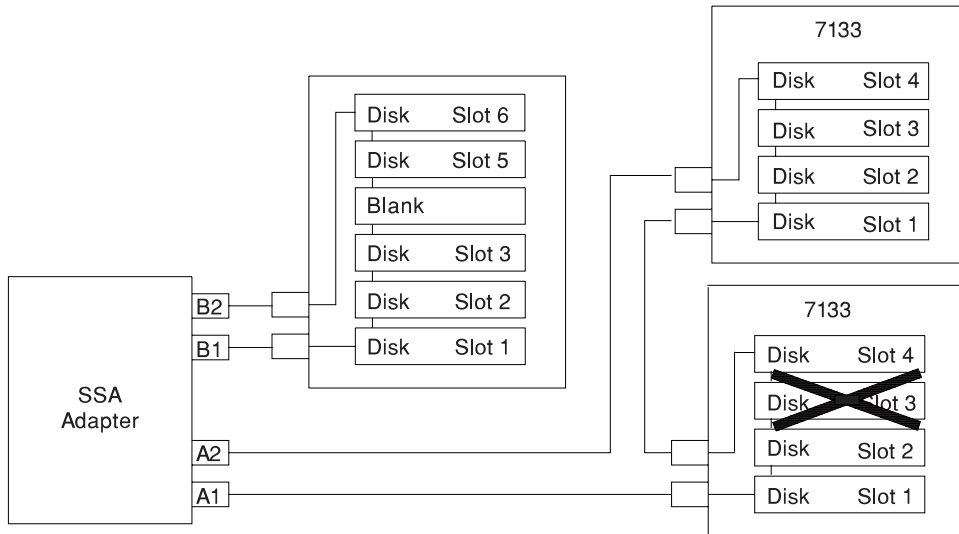
Physical  Serial#  Adapter Port                Status
          A1  A2  B1  B2
{TOP}
pdisk0   nnnnnnnn   0                               Good
pdisk1   nnnnnnnn   1                               Good
pdisk2   nnnnnnnn   2                               Good
pdisk3   nnnnnnnn   3                               Good
pdisk4   nnnnnnnn   4                               Good
pdisk5   nnnnnnnn   5                               Good
pdisk6   nnnnnnnn   6                               Good
pdisk7   nnnnnnnn   7                               Good
pdisk8   nnnnnnnn           0   3   Good
pdisk9   nnnnnnnn           1   2   Good
{MORE}

F3=Cancel      F10=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 802386
SSA Link Verification for:
  ssa1  00-05  SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

Physical  Serial#      Adapter Port              Status
          A1  A2  B1  B2
{TOP}
pdisk0    nnnnnnnn      0                      Good
pdisk1    nnnnnnnn      1                      Good
?????
pdisk3    nnnnnnnn      4                      Good
pdisk4    nnnnnnnn      3                      Good
pdisk5    nnnnnnnn      2                      Good
pdisk6    nnnnnnnn      1                      Good
pdisk7    nnnnnnnn      0                      Good
pdisk8    nnnnnnnn      0  3                  Good
pdisk9    nnnnnnnn      1  2                  Good
{MORE}

F3=Cancel      F10=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 7-32.

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 8F97.00.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

4.5 GB, and 9.1 GB SSA Disk Drives

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

SSA Adapter

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 8. 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 9 on page 9-1.

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 6 on page 6-1.
 - 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 6-3.
 - 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 9-10.

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 `All Resource` 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 9. 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 9-10. 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 6-1.
 - 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 9-10

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 All Resources option checks most of the configured adapters and devices.

Notes:

1. 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 select the All Resources option 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.
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 6-3 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 MOPS0000 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 MOCPU000.
The system appears to be stopped and NO beep was heard from the system unit. E122, E123, or E124 is displayed on the operator panel display.	No good memory could be found. Report error code MOMEM000.
The system appears to be stopped a beep WAS heard from the system unit.	No good memory could be found. Report error code MOMEM001.
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 E1EA or E1EB 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.	<p>If the indicator (text or icon) represents:</p> <ul style="list-style-type: none"> • 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.	<p>The device or media you are attempting to boot from may be faulty.</p> <ol style="list-style-type: none"> 1. Check the SMS error log for any errors. To check the error log: <ul style="list-style-type: none"> • 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 9-1.

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 10. 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 “Service Aids” on page 7-3.

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 5-3.

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 communicate 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 programmable 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.

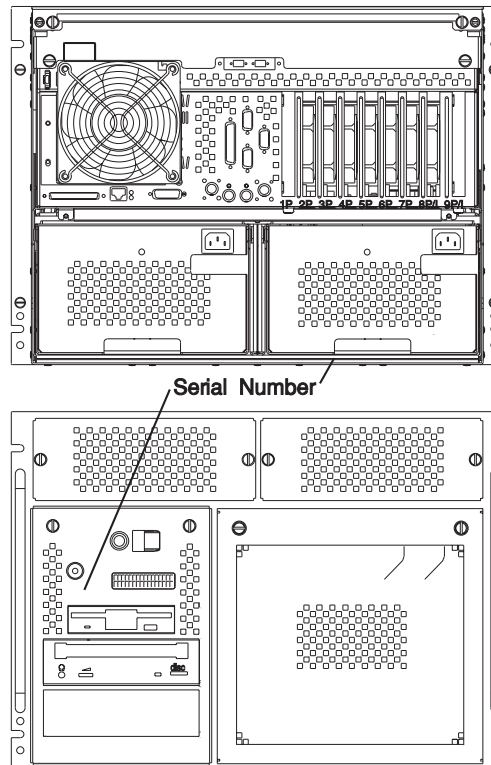
Appendix A. System Records

Record the Identification Numbers

Record and retain the following information.

Product Name	RS/6000 Enterprise Server Model H50
CPU Type/Speed	_____
Serial Number	_____
Key Serial Number	_____

The server's identification numbers are located on the front cover and on the rear of the server.

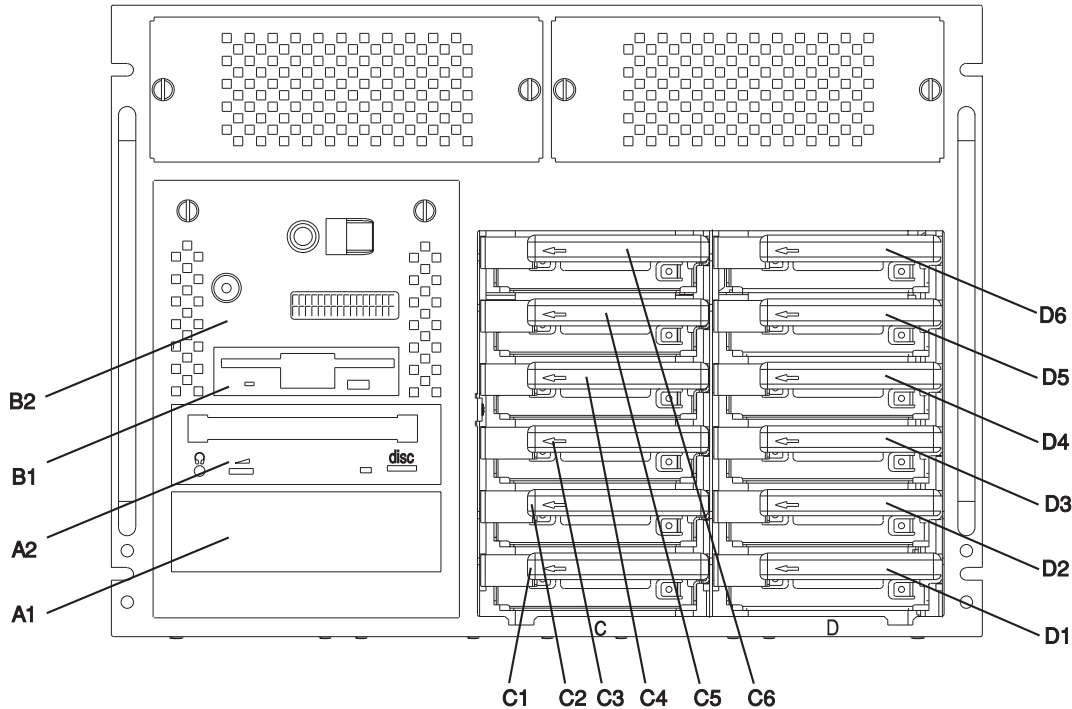


Device Records

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.

Location	Option Description
Memory (J1/J2)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J3/J4)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J5/J6)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J7/J8)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J9/J10)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J11/J12)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J13/J14)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Memory (J15/J16)	<u>32MB</u> <input type="checkbox"/> <u>128MB</u> <input type="checkbox"/>
Mouse Connector	<u>IBM Mouse</u> <input type="checkbox"/> Other: _____
Keyboard Connector	<u>Space Saving</u> <input type="checkbox"/> <u>Enhanced</u> <input type="checkbox"/> 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	_____
Serial Port 3	_____

Refer to the following diagram of your server's bays when completing Table A-2 on page A-4.



B2	Optional SCSI Boot Disk Drive (behind Op Panel Display)	C2	hot-swappable Disk Drive
B1	Diskette Drive	C3	hot-swappable Disk Drive
A2	CD-ROM Drive	D6	hot-swappable Disk Drive
A1	Media Bay (can be CD-ROM, Tape, or non-hot-swappable hard disk drive)	D5	hot-swappable Disk Drive
C6	hot-swappable Disk Drive	D4	hot-swappable Disk Drive
C5	hot-swappable Disk Drive	D1	hot-swappable Disk Drive
C4	hot-swappable Disk Drive	D2	hot-swappable Disk Drive
C1	hot-swappable Disk Drive	D3	hot-swappable Disk Drive

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.
- The SCSI bus ID's in Bays A1, B1 and B2 are the recommended values. Features installed at the manufacturing site correspond to these IDs. Field installations may not comply with these recommendations.

Table A-2. Internal Files and Devices

Adapter	Location	SCSI ID	Drive Description
Integrated	Bay A1	5	<u>Optional Media</u>
Integrated	Bay A2	4	<u>CD-ROM Drive</u>
Integrated	Bay B1	Non-SCSI	<u>. 3.5-Inch 1.44MB Diskette Drive</u>
Integrated	Bay B2	6	<u>Optional Disk Drive (non-hot-swappableBoot Drive)</u>
_____	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	_____
_____	Bank D Bay 1	8	_____
	Bank D Bay 2	9	_____
	Bank D Bay 3	10	_____
	Bank D Bay 4	11	_____
	Bank D Bay 5	12	_____
	Bank D Bay 6	13	_____
_____	_____	_____	_____
_____	_____	_____	_____

Appendix B. Service Processor Setup and Test

For your convenience, here is an example Service Processor setup checklist. It is basic. Your setup may include more or less of the available features, so you may wish to adjust this checklist for your own application. This checklist will at least provide you with a starting place.

Service Processor Setup Checklist

1. **Unplug** the power cord from the server.
2. Attach a local terminal for this setup procedure.
3. Plug in the server and power on the local terminal.
Attention: Server power should remain off.
4. Bring up the Service Processor Menus, see Chapter 3 on page 3-1.
5. Set the System Name, “Privileged User Menus” on page 3-6.
6. Enable Surveillance, see 3-8, and “Service Processor Functions and Features” on page 3-24
7. Configure Call-In/Call-Out, see “CALL-IN/CALL-OUT SETUP MENU” on page 3-16 and “Modem Configuration Menu” on page 3-16.
8. Exit the Service Processor menus
9. **Unplug** the power cord from the server.
10. Attach modem(s) (if needed), page 3-3
11. Plug in the server
Attention: Server power should remain off.
12. Test
 Call-In, page B-2
 Call-Out, page B-2
13. Backup the service processor settings, as described in “Save or Restore Hardware Management Policies Service Aid” on page 7-9.
Note: This is strongly recommended to protect the usefulness of the service processor and the availability of the server.

Your Service Processor is ready to go to work.

Testing the Setup

The following is a sample procedure to assure your setup is working.

These tests include communicating with the server operating system. Be sure the necessary serial port(s) is configured. If you need assistance, refer to "Serial Port Configuration" on page B-3.

The server should be powered off as a result of the "Service Processor Setup Checklist" on page B-1.

Call-In:

1. Go to your remote terminal and call-in to your server. Your server should answer and offer you the Service Processor Main Menu after requesting your privileged access password.
2. Enter item 2, **System Power Control Menu**.
3. Enter item 4, **Power-On System**.
Answer "y" when asked if you wish to continue powering on the system.
4. After the system firmware and operating system have initialized the server, the login prompt should appear at your remote terminal if you set up seamless modem transfer (refer to page C-6 for more information). This may take several minutes. When this occurs, you have successfully called into the Service Processor.
5. Type `logout` to disconnect from the operating system. The message "No Carrier" displays on your remote terminal.
6. Call your server again. The operating system should answer and offer you the login prompt.

If these tests are successful, call-in is working.

7. Login in and command your server to shutdown and power off. (The AIX command `shutdown -F` will do this.)
8. The message "No Carrier" displays on your remote terminal.

Call-Out:

During the setup, you entered your phone number for the Pager (on page 3-19) and Customer Voice (on page 3-20) phone numbers. These numbers are used for this test.

1. Your remote terminal should be disconnected as a result of the Call-In test.

2. Call your server again.
3. At the **Service Processor Main Menu**, select Call-In/Call-Out Setup menu, then select Call-Out test. This causes a simulated error condition for the purposes of this test.
4. After a few moments, a message appears regarding an illegal entry. Press Enter to clear the message and return to the main menu.
5. When your telephone rings, answer the call. You should hear the sound of a telephone being dialed. This is your computer trying to page you.

If this test is successful, call-out is working.

You now need to go back through the "Telephone Number Setup Menu" on page 3-18 to enter the actual telephone numbers your server will use for reporting problems.

Serial Port Configuration

To configure the serial port on an AIX system, enter the following commands from an AIX console:

1. Log in as root.
2. To find if you have any serial ports already configured, enter:

```
lsdev -Cc tty
```

If no serial ports are configured, none are listed. If you wish to configure serial ports that are not listed, continue with the remaining steps.
3. Identify the serial port(s) with the modem(s).
4. Enter

```
smit tty
```
5. Select add tty
6. Select RS232
7. Select Baud rate 9600 or higher.
8. Select login enable and set the flow control to RTS.
9. Commit the selections and set up any other needed serial ports.
10. Exit SMIT.

Appendix C. Modem Configurations

Sample Modem Configuration Files

With nearly 1000 modems to choose from, and various programming standards, configuring a modem for use with the Service Processor can be challenging. The Service Processor is designed to place little demand on an attached modem, thereby increasing the setup and connection success rates. Several sample modem configuration files are supplied that will either work directly with your modem, or provide a good starting point for a custom setup, if required. These files are included on the Sample Modem Configuration Files diskette and in your Service Processor firmware with the following names:

Diskette File Name	Service Processor Firmware File Name
modem_z.cfg	modem_z.sp
modem_z0.cfg	modem_z0.sp
modem_f.cfg	modem_f.sp
modem_f0.cfg	modem_f0.sp
modem_f1.cfg	modem_f1.sp

The sample modem configuration files can be found in the `/usr/share/modems` subdirectory, if your server is using AIX. A listing of each file is included at the end of this appendix.

With the following selection procedures and your modem manual, one of these configuration files should be suitable for your use.

Configuration File Selection

1. Does your modem respond to the extended command set (prefixed with &)?

If yes, go to 3

If not, continue with 2 below.

2. Does your modem respond to:

a. ATZ reset command, or

b. ATZn reset commands, where n can be 0, 1, etc.?

If ATZ, configuration file modem_z.cfg is recommended.

If ATZn, configuration file modem_z0.cfg is recommended.

If yes, go to 5 on page C-3

If not, continue with 3 below.

3. Does your modem command set include a test for v.42 error correction at the remote modem (often called "Auto-Reliable Mode")?

If yes, and enabled is the default, this test must be disabled. See "Customizing the Modem Configuration Files" on page C-3 for more information.

If not, continue with 4 on page C-3.

4. Does your modem respond to:
 - a. AT&F reset command, or
 - b. AT&Fn reset commands, where n can be 0, 1, etc.?

If AT&F, configuration file modem_f.cfg is recommended.

If AT&Fn, configuration file modem_f0.cfg or modem_f1.cfg is recommended, depending on which provides the hardware flow control profile.

5. Selection is complete. If you find it necessary to adjust any of these configuration files, do so with reference to the manual that came with your modem.¹ Choose settings that enable hardware flow control and respond to DTR.

Examples

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 [*]				X	
Bocamodem 1440E			X		
Hayes Smart Modem 300	X				
IBM 5841	X				
IBM 5843	X				
IBM 7851				X	
IBM 7852-010				X	
IBM 7855					X
USRobotics 33.6K Sportster					X
Zoom V.32			X		

^{*}Ring interrupt only on first ring.

Customizing the Modem Configuration Files

You can create your own modem configuration file(s) or modify the samples provided. After you customize your modem configuration files, you **MUST** access them via the Configure Remote Maintenance Policy Service Aid rather than from the Service Processor menus.

¹ Some older modems do not respond to the commands X0 or &R1. You should edit out these commands from the modem configuration file if yours is such a modem. See your modem manual for more information.

Note: If you have already set up your serial ports, line speeds, authorizations and telephone numbers from the Service Processor menus, specify your customized modem configuration files from the service aid.

If you have not already set up your serial ports, line speeds, authorizations and telephone numbers from the Service Processor menus, you may set them up with the service aids while you specify your customized modem configuration files.

To disable Auto-Reliable Mode testing of the remote modem, use the sample modem configuration file `/usr/share/modems/modem_f.cfg` as a model to modify.

1. Find the necessary command in your modem manual.
2. Copy `/usr/share/modems/modem_f.cfg` to make a new file with the name (for example) **modem_fx.cfg**.
3. In **modem_fx.cfg**, change the line `Send "ATE0T\r"` to `Send "ATcccE0T\r"` where `ccc` is the added command found in your modem manual.

Make this change to the third line of each of the following stanzas:

- `condout`
- `condin`
- `ripo`

4. Save the changes.

Use this new modem configuration file as described at the top of this section.

Xon/Xoff Modems

Some modems of the mid-80's vintage assume software flow control (Xon/Xoff) between the computer and the modem. Modems with this design send extra characters during and after the transmitted data. The Service Processor cannot tolerate these extra characters. If your configuration includes such a modem, your functional results may be unpredictable.

The sample modem configuration files included in this package do not support these modems, so custom configuration files would be necessary. Anchor Automation 2400E is an example of such a modem.

Most newer modems do not use this design. It is recommended you use modems of newer vintage if you experience unexplainable performance problems that may be due to Xon/Xoff characters.

Ring Detection

Most modems produce an interrupt request each time they detect a ring signal. Some modems generate an interrupt only on the first ring signal they receive. AT&T DataPort 2001 is an example of such a modem.

The Service Processor uses the ring interrupt request to count the number of rings when Ring Indicate Power-On (RIPO) is enabled. If your modem produces an interrupt on only the first ring, set Ring Indicate Power-On to start on the first ring. Otherwise, you may choose to start Ring Indicate Power-On on any ring count that makes your operation convenient.

Terminal Emulators

The Service Processor is compatible with simple ASCII terminals, and therefore compatible with most emulators. It is for the cases when a remote session is handed off from the Service Processor to the operating system that agreeing terminal emulators becomes important.

The server's operating system will have some built-in terminal emulators. You may also have a commercially available terminal emulation. It is important that the local and host computers select the same or compatible terminal emulators so the key assignments and responses will match. This will assure successful communications and control.

For best formatting, choose line wrap in your terminal emulator setup.

Recovery Procedures

Line noises, power surges, etc., can sometimes cause your modem to enter an undefined state. When it is being used for dial in, dial out or Ring Indicate Power-On, your modem is initialized each time one of these actions is expected. If one of these environmental conditions occur after your modem has been initialized, it may be necessary to recover your modem to a known state.

If your modem communicates properly with remote users, it is probably in control. It may be wise to occasionally change some of the functional settings and then change them back, just for the sense of security that the modem is communicating, and to assure it has been initialized recently.

Another strategy, particularly if your system is difficult to access physically, is to protect it with an Uninterruptable Power Source (UPS) and a phone-line surge protector.

In case recovery becomes necessary, your system should be shut down as gracefully as possible. Disconnect the power cable and press the power button to drain capacitance while power is disconnected. Disconnect and reconnect modem power, then reconnect system power to allow complete reinitialization of your system.

Seamless Transfer of a Modem Session

There are about as many modem command variations as there are modems. The sample modem configuration files have been written to capture the largest number of workable modem settings.

The modem command `&Dn` (where 'n' is a number) generally sets the modem response to the Data Terminal Ready (DTR) signal from the server's serial port. The desired response is that the modem will hold a connection while DTR is enabled, and drop the connection when DTR is released. This is the mechanism by which the server "hangs up" on a connection under normal conditions.

Usually the command `&D2` will work, but not always. The sample modem configuration files² take this high percentage position. You should consult your modem's manual for its specific response scheme for the `&Dn` command.

There are two methods for dealing with the modem's response to DTR:

1. Recovery
2. Prevention

Before proceeding with one of these strategies, you need to determine if your server's modem is set up properly to respond to DTR.

With the remote terminal connected to serial port 1 and defined as the **primary** console device, there are two tests you can perform:

1. Will the modem **drop** the connection after the "System initialization complete" message appears at the remote terminal?

If yes, this is the correct response. The modem is set up correctly.

If no, try another &Dn setting for your server's modem. See your modem manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files².

2. Will the server's modem **disconnect** when the power drops? You can make this observation at the remote terminal by commanding your server to shutdown and power off. (The AIX command `shutdown -F` will do this.) Watch for the message `NO CARRIER` on your remote terminal.

If yes, this is the correct response. The modem is set up correctly.

If no, try another &Dn setting for your server's modem. See your model manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files².

Recovery Strategy

The recovery strategy consists of making **two** calls to establish a remote session. This is the easiest solution to implement, and allows more freedom for configuring your server's serial ports.

To set up a remote terminal session, dial into the Service Processor and start the system. After the operating system is loaded and initialized, the connection will be dropped. At this point, you call the server back and the operating system will answer and offer you the login prompt.

² Only the following sample modem configuration files contain the &Dn command (in three places each):

- `modem_f.cfg`
- `modem_f0.cfg`
- `modem_f1.cfg`

If you are using `modem_z.cfg` or `modem_z0.cfg`, you cannot control DTR response. If your remote terminal does not disconnect after logging off, you must command the remote terminal emulator to hang up. This then breaks the connection.

Prevention Strategy

The disconnect is caused by the operating system when it initializes the **primary** console. The tests listed above are conducted with the remote terminal selected as the primary console to manifest the modem's response to DTR transitions.

If a local ASCII terminal or a graphics console is to be a permanent part of your server, then make one of them the primary console. Your remote terminal will no longer experience the connection loss.

If a local console is not a permanent part of your server, you can still assign either the unused graphics console or the unused serial port as the primary console. This gives you the desired seamless connection at your remote terminal.

If you choose to use the unused serial port as the primary console, some initialization traffic will be sent to any serial device attached to that port. As a result, that serial device's connection and function could be affected. These impacts may make that port unattractive for devices other than a temporary local ASCII terminal.

Modem Configuration Samples

Sample File modem_z.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP Z
#
# FUNCTIONS: Modem configuration file for many early Hayes* compatible modems.
# This example uses the ATZ reset command to choose the factory defaults.
# This setup will work for many modems, but it is required for early vintage
# modems which respond to neither the ATZ0 reset command nor the extended (&)
# commands. Refer to your modem manual.
#
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# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
#
# If the modem has configuration switches, they should be set to the
# factory default settings.

ICDelay 1
DefaultT0 10
CallDelay 120
# AT Attention Code           , Inserts delay in dialing commands
# Z Reset to factory defaults Q0 Turn on responses
# E0 Turn echo off           Q1 Turn off responses
# V0 Use numeric responses    S0=0 Automatic answer inhibit
# +++ Escape to command mode S0=2 Answer on second ring
# H0 Hang-up                 T = Tone mode. When used as T\r, it is a
#                               no op to maintain program synchronization
#                               when modem may/will echo the commands.
#
# %N Call-Out phone number    %P Paging phone number
# %S Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

condout:  send "ATZQ0T\r"           # Reset to factory defaults.
          ignore "\0\r" or "OK\r\n" timeout 2 # Ignore modem response.
          send "ATE0T\r"           # Initialize modem: Echo OFF,
          expect "\0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
          send "ATQ0V0T\r"         # Limit response codes.
          expect "\0\r" timeout 2   # Confirm commands successful.
          send "ATS0=0\r"          # Set AutoAnswer OFF
          expect "\0\r" timeout 2   # Confirm command successful.
          done

connect:  send "ATDT%N\r"          # Tone dialing command.
          # %N from Call Home setup.

          # Expect a connection response.
          expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
          timeout 60
          done
```

```

retry:      send "A/"                      # Repeat the previous command.

expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
done

disconnect:
delay 2     # Separate from previous data.
send "+++"  # Assure command mode.
delay 2     # Allow mode switching delay.
send "ATH0T\r" # Set modem switch-hook down
              # (i.e., hang up).
ignore "0\r" or "OK\r" timeout 2 # Ignore modem response.
send "ATE0Q1\r" # Initialize modem: Echo OFF,
                # Disable responses.

ignore "0\r" timeout 1
done

condin:    send "ATZQ0T\r"                # Reset to factory defaults.
            ignore "0\r" or "OK\r\n" timeout 2 # Ignore modem response.
            send "ATE0T\r"                # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0T\r"              # Limit response codes.
            expect "0\r" timeout 2        # Confirm commands successful.
            send "ATS0=2\r"               # Set AutoAnswer ON
            expect "0\r" timeout 2        # Confirm command successful.
            done

waitcall:  ignore "2\r" timeout 1          # Ignore first ring.
            expect "2\r" timeout 10       # Pick up second ring
                                           # or timeout.
                                           # Expect a connection response.

            expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
            timeout 60
            done

page:      send "ATDT%N,,,%R;\r"          # %N = pager call center number
                                           # Add enough commas to wait for
                                           # time to enter paging number.
                                           # %R = paging number

            # Confirm successful command.

            expect "0\r" timeout 60
            delay 2                         # Wait before hanging up.
            send "ATH0T\r"                 # Hang up.
            expect "0\r" timeout 2         # Confirm successful command.
            done

ripo:     send "ATZQ0T\r"                # Reset to factory defaults.
            ignore "0\r" or "OK\r\n" timeout 2 # Ignore modem response.
            send "ATE0T\r"                # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0T\r"              # Limit response codes.
            expect "0\r" timeout 2        # Confirm commands successful.
            send "ATS0=0\r"               # Set AutoAnswer OFF
            expect "0\r" timeout 2        # Confirm command successful.
            done                           # RI Power On enabled.

error:    # Handle unexpected modem
          # responses.

            expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
            delay 2
            done

```

Sample File modem_z0.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP Z0
#
# FUNCTIONS: Modem configuration file for some early Hayes* compatible modems.
# This example uses the ATZ0 reset command to choose the factory defaults.
# This setup is recommended for modems that will respond to the ATZ0 command
# and which do not respond to the extended (&) commands. Refer to your modem
# manual.
#
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#
#
# If the modem has configuration switches, they should be set to the
# factory default settings.

ICDelay 1
DefaultTO 10
CallDelay 120
# AT Attention Code          , Inserts delay in dialing commands
# Z0 Reset. Restore Profile 0 Q0 Turn on responses
# E0 Turn echo off          Q1 Turn off responses
# V0 Use numeric responses   S0=0 Automatic answer inhibit
# +++ Escape to command mode S0=2 Answer on second ring
# H0 Hang-up                X0=0 Limit modem response codes
#
#                               T = Tone mode. When used as T\r, it is a
#                               no op to maintain program synchronization
#                               when modem may/will echo the commands.
#
# %N Call-Out phone number   %P Paging phone number
# %S Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

condout:  send "ATZ000\r"          # Reset modem. Select profile 0
          ignore "\0\r" or "\0K\r\n" timeout 2 # Ignore modem response.
          send "ATE0\r"          # Initialize modem: Echo OFF,
          expect "\0\r" or "\0K\r\n" timeout 2 # Enable responses (Numeric),
          send "ATQ0V0X0T\r"      # Limit response codes.
          expect "\0\r" timeout 2   # Confirm commands successful.
          send "ATS0=0\r"         # Set AutoAnswer OFF
          expect "\0\r" timeout 2   # Confirm command successful.
          done

connect:  send "ATDT%N\r"        # Tone dialing command.
          # %N from Call Home setup.

          # Expect a connection response.
          expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
          timeout 60
          done

retry:    send "A/"             # Repeat the previous command.
          # Expect a connection response.
```

```

expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
done

disconnect:
delay 2 # Separate from previous data.
send "+++" # Assure command mode.
delay 2 # Allow mode switching delay.
send "ATH0T\r" # Set modem switch-hook down
# (i.e., hang up).

ignore "0\r" or "OK\r" timeout 2 # Ignore modem response.
send "ATE0Q1\r" # Initialize modem: Echo OFF,
# Disable responses.

ignore "0\r" timeout 1
done

condin: send "ATZ0Q0T\r" # Reset modem. Select profile 0
ignore "0\r" or "OK\r\n" timeout 2 # Ignore modem response.
send "ATE0T\r" # Initialize modem: Echo OFF,
expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
send "ATQ0V0X0T\r" # Limit response codes.
expect "0\r" timeout 2 # Confirm commands successful.
send "ATS0=2\r" # Set AutoAnswer ON
expect "0\r" timeout 2 # Confirm command successful.
done

waitcall: ignore "2\r" timeout 1 # Ignore first ring.
expect "2\r" timeout 10 # Pick up second ring
# or timeout.
# Expect a connection response.

expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
done

page: send "ATDT%N,,,%R;\r" # %N = pager call center number
# Add enough commas to wait for
# time to enter paging number.
# %R = paging number

# Confirm successful command.

expect "0\r" timeout 60
delay 2 # Wait before hanging up.
send "ATH0T\r" # Hang up.
expect "0\r" timeout 2 # Confirm successful command.
done

ripo: send "ATZ0Q0T\r" # Reset modem. Select profile 0
ignore "0\r" or "OK\r\n" timeout 2 # Ignore modem response.
send "ATE0T\r" # Initialize modem: Echo OFF,
expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
send "ATQ0V0X0T\r" # Limit response codes.
expect "0\r" timeout 2 # Confirm commands successful.
send "ATS0=0\r" # Set AutoAnswer OFF
expect "0\r" timeout 2 # Confirm command successful.
done # RI Power On enabled.

error: # Handle unexpected modem
# responses.
expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
delay 2
done

```


Sample File modem_f.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP F
#
# FUNCTIONS: Modem configuration file for many recent Hayes* compatible modems.
# This example uses the AT&F reset command to choose the factory defaults.
# This set up is preferred for modems with extended (&) commands. For early
# vintage modems, setup Z or Z0 is recommended. If your modem responds to
# the extended (&) commands and to factory default choices (&Fn), setup file
# F0 or F1 is recommended.
#
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#
# If the modem has configuration switches, they should be set to the
# factory default settings.

ICDelay 1
DefaultT0 10
CallDelay 120
# AT Attention Code          , Inserts delay in dialing commands
# &F Reset to default profile Q0 Turn on responses
# E0 Turn echo off          Q1 Turn off responses
# V0 Use numeric responses   S0=0 Automatic answer inhibit
# +++ Escape to command mode S0=2 Answer on second ring
# H0 Hang-up                X0=0 Limit modem response codes
#                               T = Tone mode. When used as T\r, it is a
#                               no op to maintain program synchronization
#                               when modem may/will echo the commands.
#
# &C1 Detect CD              &D2 Respond to DTR (often the default)
#
# %N Call-Out phone number  %P Paging phone number
# %S Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

connect: send "AT&F00T\r"          # Reset to factory defaults.
         ignore "0\r" or "OK\r\n" timeout 2 # Ignore modem response.
         send "ATE0T\r"           # Initialize modem: Echo OFF,
         expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
         send "ATQ0V0X0T\r"       # Limit response codes.
         expect "0\r" timeout 2    # Confirm commands successful.
         send "ATS0=0\r"          # Set AutoAnswer OFF
         expect "0\r" timeout 2    # Confirm command successful.
         send "AT&C1&D2\r"        # Detect carrier and DTR.
         expect "0\r" timeout 2    # Confirm command successful.
         done

connect: send "ATDT%N\r"          # Tone dialing command.
         # %N from Call Home setup.

         # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
```

```

done

retry:    send "A/"                # Repeat the previous command.
                                                # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
done

disconnect:
delay 2          # Separate from previous data.
send "+++"      # Assure command mode.
delay 2          # Allow mode switching delay.
send "ATH0T\r"  # Set modem switch-hook down
                                                # (i.e., hang up).
ignore "\r" or "OK\r\n" timeout 2          # Ignore modem response.
send "ATE0Q1\r" # Initialize modem: Echo OFF,
                                                # Disable responses.

ignore "\r" timeout 1
done

condin:  send "AT&FQ0T\r"          # Reset to factory defaults.
ignore "\r" or "OK\r\n" timeout 2          # Ignore modem response.
send "ATE0T\r"                          # Initialize modem: Echo OFF,
expect "\r" or "OK\r\n" timeout 2          # Enable responses (Numeric),
send "ATQ0V0X0T\r"                      # Limit response codes.
expect "\r" timeout 2                    # Confirm commands successful.
send "ATS0=2\r"                          # Set AutoAnswer ON
expect "\r" timeout 2                    # Confirm command successful.
send "AT&C1&D2\r"                      # Detect carrier and DTR.
expect "\r" timeout 2                    # Confirm command successful.
done

waitcall: ignore "2\r" timeout 1           # Ignore first ring.
expect "2\r" timeout 10                  # Pick up second ring
                                                # or timeout.
                                                # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
done

page:    send "ATDT%N,,,,%R;\r"          # %N = pager call center number
                                                # Add enough commas to wait for
                                                # time to enter paging number.
                                                # %R = paging number
                                                # Confirm successful command.
expect "\r" timeout 60
delay 2          # Wait before hanging up.
send "ATH0T\r"  # Hang up.
expect "\r" timeout 2          # Confirm successful command.
done

ripo:    send "AT&FQ0T\r"          # Reset to factory defaults.
ignore "\r" or "OK\r\n" timeout 2          # Ignore modem response.
send "ATE0T\r"                          # Initialize modem: Echo OFF,
expect "\r" or "OK\r\n" timeout 2          # Enable responses (Numeric),
send "ATQ0V0X0T\r"                      # Limit response codes.
expect "\r" timeout 2                    # Confirm commands successful.
send "ATS0=0\r"                          # Set AutoAnswer OFF
expect "\r" timeout 2                    # Confirm command successful.
send "AT&C1&D2\r"                      # Detect carrier and DTR.
expect "\r" timeout 2                    # Confirm command successful.
done                                         # RI Power On enabled.

error:                                       # Handle unexpected modem
                                                # responses.

```

```
expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"  
delay 2  
done
```

Sample File modem_f0.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP F0
#
# FUNCTIONS: Modem configuration file for many recent Hayes* compatible modems.
# This example uses the AT&F0 reset command to choose the factory defaults.
# This set up is preferred for modems with extended (&) commands. For early
# vintage modems, setup Z or Z0 is recommended. If your modem responds to
# the extended (&) commands and to factory default choices (&Fn), but doesn't
# work properly with this setup file, setup F1 is recommended.
#
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#
#
# If the modem has configuration switches, they should be set to the
# factory default settings.

ICDelay 1
DefaultT0 10
CallDelay 120
# AT Attention Code           , Inserts delay in dialing commands
# &F0 Reset. Restore profile 0 Q0 Turn on responses
# E0 Turn echo off           Q1 Turn off responses
# V0 Use numeric responses    S0=0 Automatic answer inhibit
# +++ Escape to command mode S0=2 Answer on second ring
# H0 Hang-up                 X0=0 Limit modem response codes
#                             T = Tone mode. When used as T\r, it is a
#                             no op to maintain program synchronization
#                             when modem may/will echo the commands.
#
#
# &C1 Detect CD               &D2 Respond to DTR (often the default)
# &R1 Ignore RTS (CTS)
#
# %N Call-Out phone number   %P Paging phone number
# %S Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

condout:  send "AT&F0Q0T\r"           # Reset modem. Select profile 0
          ignore "\r" or "OK\r\n" timeout 2 # Ignore modem response.
          send "ATE0T\r"             # Initialize modem: Echo OFF,
          expect "\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
          send "ATQ0V0X0T\r"         # Limit response codes.
          expect "\r" timeout 2       # Confirm commands successful.
          send "ATS0=0\r"             # Set AutoAnswer OFF
          expect "\r" timeout 2       # Confirm command successful.
          send "AT&C1&D2&R1\r"       # Detect carrier and DTR,
          # Ignore RTS.
          expect "\r" timeout 2       # Confirm command successful.
          done

connect:  send "ATDT%N\r"            # Tone dialing command.
          # %N from Call Home setup.

          # Expect a connection response.
```

```

expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
done

retry:    send "A/"                                # Repeat the previous command.

                                                # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
done

disconnect:
delay 2                                         # Separate from previous data.
send "+++"                                     # Assure command mode.
delay 2                                         # Allow mode switching delay.
send "ATH0T\r"                                  # Set modem switch-hook down
                                                # (i.e., hang up).

ignore "\0\r" or "OK\r" timeout 2              # Ignore modem response.
send "ATE0Q1\r"                                # Initialize modem: Echo OFF,
                                                # Disable responses.

ignore "\0\r" timeout 1
done

condin:   send "AT&F0Q0T\r"                      # Reset modem. Select profile 0
ignore "\0\r" or "OK\r\n" timeout 2            # Ignore modem response.
send "ATE0T\r"                                  # Initialize modem: Echo OFF,
expect "\0\r" or "OK\r\n" timeout 2            # Enable responses (Numeric),
send "ATQ0V0X0T\r"                             # Limit response codes.
expect "\0\r" timeout 2                        # Confirm commands successful.
send "ATS0=2\r"                                  # Set AutoAnswer ON
expect "\0\r" timeout 2                        # Confirm command successful.
send "AT&C1&D2&R1\r"                           # Detect carrier and DTR,
                                                # Ignore RTS.

expect "\0\r" timeout 2                        # Confirm command successful.
done

waitcall: ignore "2\r" timeout 1                 # Ignore first ring.
           expect "2\r" timeout 10              # Pick up second ring
                                                # or timeout.
                                                # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
done

page:     send "ATDT%N,,,%R;\r"                 # %N = pager call center number
                                                # Add enough commas to wait for
                                                # time to enter paging number.
                                                # %R = paging number

                                                # Confirm successful command.
expect "\0\r" timeout 60
delay 2                                         # Wait before hanging up.
send "ATH0T\r"                                  # Hang up.
expect "\0\r" timeout 2                        # Confirm successful command.
done

ripo:    send "AT&F0Q0T\r"                      # Reset modem. Select profile 0
ignore "\0\r" or "OK\r\n" timeout 2            # Ignore modem response.
send "ATE0T\r"                                  # Initialize modem: Echo OFF,
expect "\0\r" or "OK\r\n" timeout 2            # Enable responses (Numeric),
send "ATQ0V0X0T\r"                             # Limit response codes.
expect "\0\r" timeout 2                        # Confirm commands successful.
send "ATS0=0\r"                                  # Set AutoAnswer OFF
expect "\0\r" timeout 2                        # Confirm command successful.
send "AT&C1&D2&R1\r"                           # Detect carrier and DTR,
                                                # Ignore RTS.

expect "\0\r" timeout 2                        # Confirm command successful.

```

```
done                                # RI Power On enabled.
error:                               # Handle unexpected modem
                                     # responses.
expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
delay 2
done
```

Sample File modem_f1.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP F1
#
# FUNCTIONS: Modem configuration file for many recent Hayes* compatible modems.
# This example uses the AT&F1 reset command to choose the factory defaults.
# This set up is for modems with extended (&) commands and which do not work
# properly with setup F0. For early vintage modems, setup Z or Z0 is
# recommended.
#
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#
#
# If the modem has configuration switches, they should be set to the
# factory default settings.

ICDelay 1
DefaultTO 10
CallDelay 120
# AT Attention Code           , Inserts delay in dialing commands
# &F1 Reset. Restore profile 1 Q0 Turn on responses
# E0 Turn echo off           Q1 Turn off responses
# V0 Use numeric responses   S0=0 Automatic answer inhibit
# +++ Escape to command mode S0=2 Answer on second ring
# H0 Hang-up                 X0=0 Limit modem response codes
#
#                               T = Tone mode. When used as T\r, it is a
#                               no op to maintain program synchronization
#                               when modem may/will echo the commands.
#
#
# &C1 Detect CD               &D2 Respond to DTR (often the default)
# &R1 Ignore RTS (CTS)
#
# %N Call-Out phone number   %P Paging phone number
# %S Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

connect: send "AT&F1Q0T\r"           # Reset modem. Select profile 1
         ignore "\0\r" or "\0K\r\n" timeout 2 # Ignore modem response.
         send "ATE0T\r"               # Initialize modem: Echo OFF,
         expect "\0\r" or "\0K\r\n" timeout 2 # Enable responses (Numeric),
         send "ATQ0V0X0T\r"          # Limit response codes.
         expect "\0\r" timeout 2      # Confirm commands successful.
         send "ATS0=0\r"              # Set AutoAnswer OFF
         expect "\0\r" timeout 2      # Confirm command successful.
         send "AT&C1&D2&R1\r"        # Detect carrier and DTR,
         # Ignore RTS.
         expect "\0\r" timeout 2      # Confirm command successful.
         done

connect: send "ATDT%N\r"              # Tone dialing command.
         # %N from Call Home setup.

         # Expect a connection response.
         expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
```

```

timeout 60
done

retry:    send "A/"                      # Repeat the previous command.

                                                # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
done

disconnect:
delay 2          # Separate from previous data.
send "+++"      # Assure command mode.
delay 2          # Allow mode switching delay.
send "ATH0T\r"  # Set modem switch-hook down
                                                # (i.e., hang up).
ignore "0\r" or "OK\r" timeout 2          # Ignore modem response.
send "ATE0Q1\r" # Initialize modem: Echo OFF,
                                                # Disable responses.

ignore "0\r" timeout 1
done

condin:  send "AT&F1Q0T\r"                # Reset modem. Select profile 1
ignore "0\r" or "OK\r\n" timeout 2        # Ignore modem response.
send "ATE0T\r"                            # Initialize modem: Echo OFF,
expect "0\r" or "OK\r\n" timeout 2        # Enable responses (Numeric),
send "ATQ0V0X0T\r"                        # Limit response codes.
expect "0\r" timeout 2                    # Confirm commands successful.
send "ATS0=2\r"                            # Set AutoAnswer ON
expect "0\r" timeout 2                    # Confirm command successful.
send "AT&C1&D2&R1\r"                    # Detect carrier and DTR,
                                                # Ignore RTS.
expect "0\r" timeout 2                    # Confirm command successful.
done

waitcall: ignore "2\r" timeout 1           # Ignore first ring.
expect "2\r" timeout 10                   # Pick up second ring
                                                # or timeout.
                                                # Expect a connection response.
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
done

page:    send "ATDT%N,,,,%R;\r"          # %N = pager call center number
                                                # Add enough commas to wait for
                                                # time to enter paging number.
                                                # %R = paging number

                                                # Confirm successful command.
expect "0\r" timeout 60
delay 2
send "ATH0T\r"                            # Hang up.
expect "0\r" timeout 2                    # Confirm successful command.
done

ripo:   send "AT&F1Q0T\r"                # Reset modem. Select profile 1
ignore "0\r" or "OK\r\n" timeout 2        # Ignore modem response.
send "ATE0T\r"                            # Initialize modem: Echo OFF,
expect "0\r" or "OK\r\n" timeout 2        # Enable responses (Numeric),
send "ATQ0V0X0T\r"                        # Limit response codes.
expect "0\r" timeout 2                    # Confirm commands successful.
send "ATS0=0\r"                            # Set AutoAnswer OFF
expect "0\r" timeout 2                    # Confirm command successful.
send "AT&C1&D2&R1\r"                    # Detect carrier and DTR,
                                                # Ignore RTS.
expect "0\r" timeout 2                    # Confirm command successful.
done                                       # RI Power On enabled.

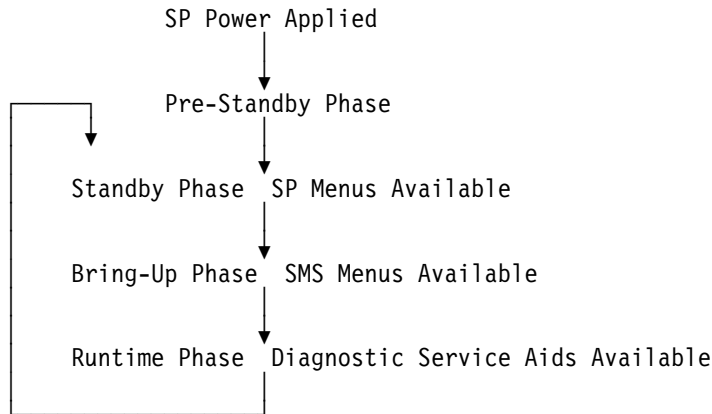
```



```
error:                                     # Handle unexpected modem
                                           # responses.
expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
delay 2
done
```

Appendix D. Service Processor Operational Phases

This section provides a high-level flow of the phases of the Service Processor (SP).



Pre-Standby Phase

This phase is entered when the server is connected to a power source. The server may or may not be fully powered on. This phase is exited when the Power-On Self Tests (POSTS) and configurations tasks are completed.

The Pre-Standby phase components are:

- SP Initialization
SP performs any necessary hardware and software initializations.
- SP POST
SP conducts Power-On Self Tests on its various work and code areas.
- SP Unattended Start Mode Checks

To assist fault recovery. If unattended start mode is set, the SP automatically reboots the server. SP will not wait for a user-input or power-on command, but will move straight through the phase and into the Bringup Phase. The unattended start mode can be reset by accessing SMS menus, or SP menus.

Standby Phase

The standby phase can be reached in two ways:

1. With the server OFF and power connected (the normal path), recognized by 0K in the LCD display.
2. With the server ON after an operating system fault, recognized by STBY or an 8-digit code in the LCD display.

In the Standby phase, the SP takes care of some automatic duties and is available for menu operation. The SP remains in the standby phase until a power-on request is detected.

The Standby phase components are:

- Modem Configuration
SP will configure the modem (if installed) so that incoming calls may be received, or outgoing calls may be placed.
- Dial In
Monitor incoming phone line to answer calls, prompt for a password, verify the password and remotely display the standby menu. The remote session can be mirrored on the local ASCII console if the server is so equipped and the user enables this function.
- Menus
The SP menus are password protected. Before you can access them you need to know either General User (Power-On Password or POP) or Privileged User (Privileged Access Password or PAP).

Bring-Up Phase

This phase is entered upon power-on, and exited upon loading of the operating system.

The Bring-up phase components are:

- Retry Request Check
The SP will check to see if the previous IPL attempt failed. If two consecutive fails are detected, the SP displays an error code and places an outgoing call to notify an external party if the user has enabled this option.
- Dial Out

The SP can dial a pre-programmed telephone number in the event of an IPL failure. The SP issues an error report with the last reported IPL status indicated and any other available error information.

- Update Operator Panel

The SP displays Operator Panel data on the ASCII terminal if a remote connection is active.

- Environmental Monitoring

Environmental Monitoring is now controlled by the SP instead of the base system, with expanded error recording and reporting.

- System Firmware Surveillance (Heartbeat Monitoring)

The SP will monitor and time the interval between system firmware heartbeats.

- Responding to System Processor Commands

The SP will respond to any command issued by the system processor.

Runtime Phase

This phase includes the tasks that the SP performs during steady-state execution of the operating system.

- Environmental Monitoring

The SP monitors voltages, temperatures and fan speeds (on some servers).

- Responding to System Processor Commands

The SP will respond to any command issued by the system processor.

- Run-Time Surveillance (Heartbeat Monitoring)

If the device driver is installed and surveillance enabled, the SP will monitor the system heartbeat. If the heartbeat times out, the SP places an outgoing call. This is different from the Bringup Phase scenario where two reboot attempts are made before placing an outgoing call.

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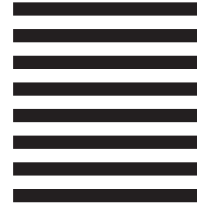
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