RS/6000 7024 E Series

User's Guide

SA38-0501-03

Fourth Edition (April 1997)

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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 manuals.

If Feature Codes 2743, 3615, 6218, 8130 or 8134 are NOT installed, this system complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

Federal Communications Commission (FCC) Statement

Note: The *IBM RS/6000 7024 E Series Server has* been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from authorized dealers. 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.

Responsible Party:

International Business Machines Corporation

Old Orchard Road
Armonk, New York 10504
Telephone: (919) 543-2193

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 B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

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 B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

VCCI Statement

この装置は，第二種情報装置（住宅地域又はその隣接した地域において使用されるべき情報装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。

しかし，本装置をラジオ，テレビジョン受信機に近接してご使用になると，受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

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

This equipment is in the Class 2 category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

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 B.

If Feature Codes 2743, 3615, 6218, 8130 or 8134 are installed, this system complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

Federal Communications Commission (FCC) Statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

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

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

International Electrotechnical Commission (IEC) Statement

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

United Kingdom Telecommunications Safety Requirements

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

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

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

VCCI Statement

電波障害自主規制　届出装置の記述

この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをしてください。

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

This equipment is in the Class 1 category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc.

Read the instructions for correct handling. VCCI-1.

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

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

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

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

Hinweis

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

Safety Notices

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

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

Electrical Safety

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

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

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

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

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

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

DANGER

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

Laser Safety Information

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

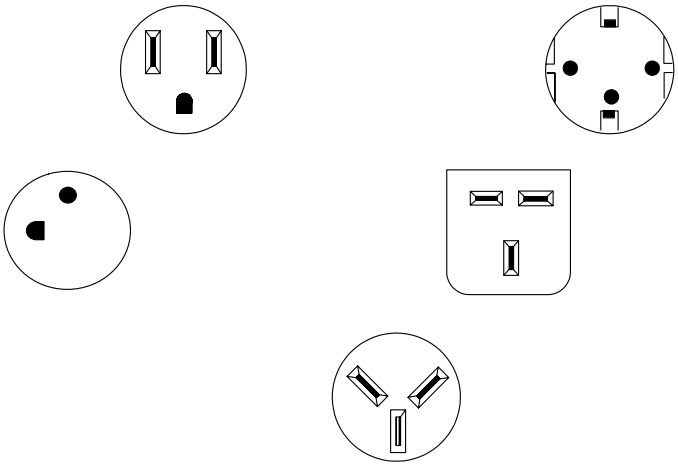
CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL À LASER DE CLASSE 1
IEC 825:1984 CENELEC EN 60 825:1991

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

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

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

Power Cables1234567891011



Index	Part Number	Country
8	14F0051	Liechtenstein, Switzerland
9	14F0069	Chile, Ethiopia, Italy
10	14F0087	Israel
11	6952291	Paraguay, Colombia, Uruguay

About This Book

This book is intended to help intermediate or experienced users set up, install options, configure, modify, and troubleshoot the IBM RS/6000 7024 E Series server.

Notices Used in This Book

This book contains information notices that relate to a specific topic. Following are the notice definitions.

- **Notes**

  These notices provide important tips, guidance, or advice.

- **Attention**

  These notices indicate possible damage to programs, devices, or data. A attention notice is placed just *before* the instruction or situation in which damage could occur.

- **Caution**

  These notices indicate situations which can be potentially hazardous to you. A caution notice is placed just *before* the instruction or situation that could be hazardous.

ISO 9000

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

Related Publications

- The *IBM RS/6000 7024 E Series Service Guide* contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.
- The *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* contains diagnostic information, service request numbers (SRNs), and failing function codes (FFCs).
- The *IBM RS/6000 Adapter, Device, 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 *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

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

Trademarks

- Windows NT is a trademark of the Microsoft Corporation.
- PowerPC is a trademark of the International Business Machines Corporation.

Chapter 1. System Startup

Thank you for selecting the IBM RS/6000 7024 E Series server!

The IBM RS/6000 7024 E Series server combines PowerPC 604 microprocessor performance and system expandability, ensuring that your server adapts to handle ever-changing operating requirements. The IBM RS/6000 7024 E Series server is specifically designed to support the demands of network environments.

The IBM RS/6000 7024 E Series server incorporates the new, advanced peripheral component interconnect (PCI) bus, which is faster than the industry standard architecture (ISA) bus. But the IBM RS/6000 7024 E Series also offers ISA as a secondary bus architecture, to accommodate businesses that already have invested in ISA-based devices.

This book helps you set up and use your server, install and remove options, configure your server, 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, “Server Records” on page A-1 provides a section for you to record all the important information about your server.

Before You Begin

- Your server has a voltage-selection switch. Make sure you know the correct voltage setting for your country (the U.S. and Canada use the 115-volt setting). If you are not sure of the voltage setting for your country, contact your authorized reseller or marketing representative.
- Make sure you have an adequate number of properly grounded electrical outlets for your server, display, and any other options you intend to install.
- Place your server in a location that is dry. Rain or spilled liquids might damage your server.
- Leave about 51 mm (2 in.) of space around the front and rear of the server to allow your server's cooling system to work properly.
- Collect the following tools, and keep them handy:
  - Small flat-blade screwdriver
  - Medium flat-blade screwdriver
  - Trays to hold screws.

Unpacking Your Server

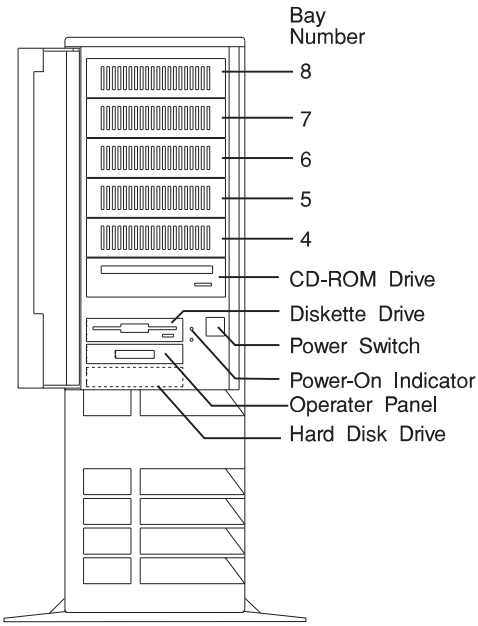
CAUTION:
To avoid possible injury while moving or lifting your server, ask another person to help you.

Preinstallation Checklist: After you unpack your server, display or ASCII terminal, and optional devices, make sure you have the following items:

- ☐ Server and power cord
- ☐ ASCII terminal, or
- ☐ Mouse, display, and keyboard
- ☐ The Diagnostics CD-ROM
- ☐ The operating system and documentation (may not be present if your system is not preinstalled).
- ☐ Options you want to install.

Contact your authorized reseller or marketing representative if any items are missing or damaged.

Front View



Your server contains five drive bays to give you the flexibility to use combinations of disk drives and media drives. For installation instructions and information on the types of drives that you can install in each bay, see “Installing Internal Drives” on page 5-29.

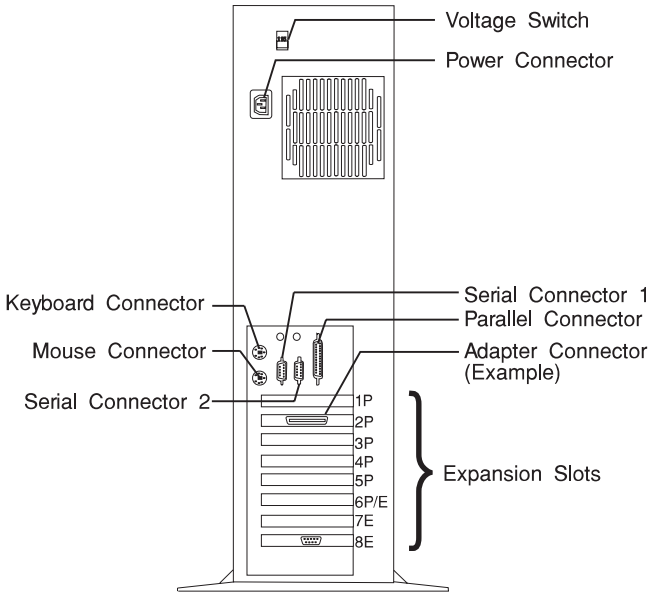
CD-ROM Drive: All models come with a SCSI-2 CD-ROM drive installed in bay 3 that is set to SCSI ID 6.

Diskette Drive: The 3.5-inch, 1.44MB diskette drive uses 1MB or 2MB diskettes.

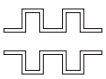
Hard Disk Drive: All models come with a SCSI-2 hard disk drive installed in bay 1 that is set to SCSI ID 0.

Note: For the latest information on available options, contact your authorized reseller or marketing representative.

Rear View

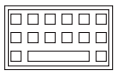


Parallel Connector: One 25-pin parallel port is provided.



Serial Connectors: Two 9-pin serial connectors (1 and 2) are provided. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

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



Keyboard Connector: The cable from your keyboard connects here.

1P - 5P **PCI Adapter Slots:** These five slots accept PCI adapters that expand your system's capabilities.

6P/E **PCI or ISA Adapter Slot:** This adapter slot can accept either one PCI adapter or one ISA adapter.

7E - 8E **ISA Adapter Slots:** These three slots accept ISA adapters that expand your system's capabilities.

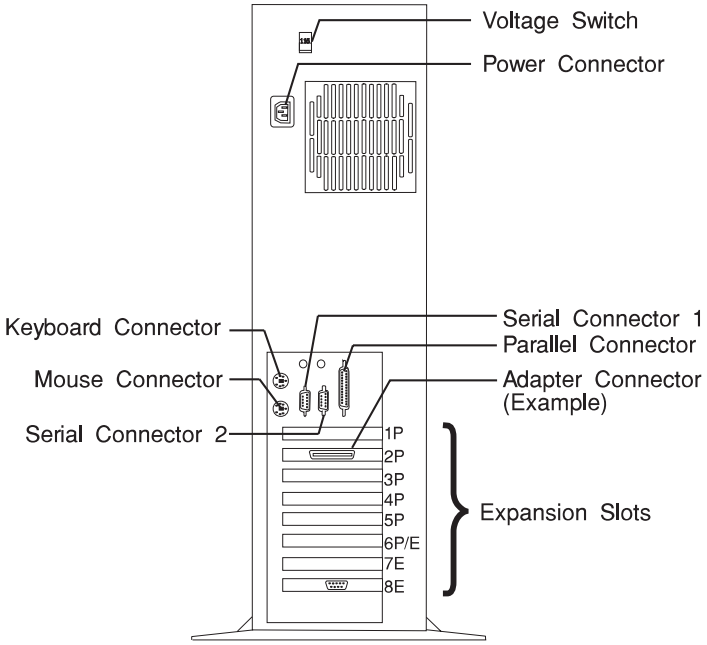
Installing Options

If you have options (such as adapters, diskette drives, hard disk drives, or memory-module kits) to install, go to Chapter 5, “Installing Options” on page 5-1 to install them now.

After you complete option installation and have updated your configuration, return to this chapter and complete “Finishing the Installation” on page 1-9.

Connecting the Cables

1. If you are using a keyboard and display, attach the keyboard cable to the keyboard connector and the display to the display connector on the back of the display adapter in one of the expansion slots.
2. If you are installing a mouse or other pointing device, connect that cable.
3. Connect the display or ASCII terminal power cord to the display or ASCII terminal.
4. Attach adapter cables to any adapters installed in the expansion slots. For more instructions on adapter cabling, please refer to the documentation that came with your adapter, or to the *IBM RS/6000 Adapter, Device, and Cable Information for Multiple Bus Systems*.
5. Make sure the server's power switch is in the Off position.
6. Connect the server connector power cord to the power connector. *Secure all these connections,* then plug the display power cord and the server power cord into properly grounded electrical outlets.



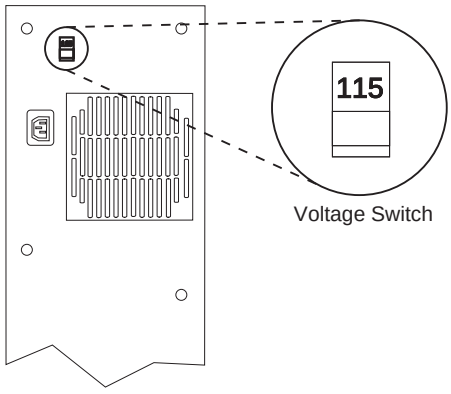
Checking the Voltage Setting

Attention: A label covers the power connector, which is located at the rear of your server. Remove the label and then check the voltage-selection switch to verify that it is in the correct position. If you set this voltage switch to the wrong position, you might permanently damage your server when you turn it on.

Check the setting of the voltage-selection switch at the rear of your server.

- If the voltage range in your country is between 100 and 125 volts, check to see that 115 is visible. (Use the 115-volt setting in the U.S. and Canada.)
- If the voltage range in your country is between 200 and 240 volts, check to see that 230 is visible.

If you need to adjust the voltage setting, slide the switch to the correct position.



Finishing the Installation

Important

- Be sure to maintain at least 51 mm (2 in.) of space at the rear of the server to allow the server's cooling system to work properly. Blocking the air vents can cause overheating, which might result in a malfunction or permanent damage.

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

☐ **Record your identification numbers**

Your server has important identification information that you might need if you have it serviced.

Appendix A, “Server Records” on page A-1 shows where to find these numbers, and provides space to record and retain this information.

☐ **Install the Operating System**

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

If Windows NT (PowerPC Edition) is preinstalled in you system unit, of if you plan to install Windows NT (PowerPC Edition) yourself, refer to the Windows NT (PowerPC Edition) documentation for instructions.

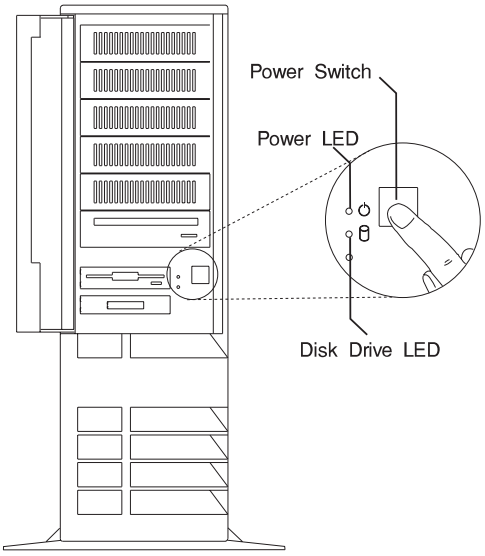
☐ **Install application programs**

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

Chapter 2. Using the System Unit

Starting the System Unit

1. Turn on all attached devices.
2. Turn on the system unit.



3. If power does not come on when you turn on the system unit, ensure that the power cord, located at the back of the system unit, is plugged into a grounded electrical wall outlet. If this does not solve the problem, go to Chapter 9, “Hardware Problem Determination” on page 9-1.

When you turn on the system unit, the Power LED comes on and the system starts a POST (power-on self test). During this test, the disk activity LED flashes intermittently. The system beeps a short beep.

- Progress checkpoints are displayed on the operator panel.
- If you are using an ASCII terminal (attached to serial port 1), a series of POST indicators appear on the screen as each subsystem is initialized:

```
dskt  -  OK
mem   -  OK
scsi  -  OK
boot  -  OK
```

- If you are using a directly-attached keyboard and a graphical display attached to a display adapter, then the POST progress indicators will appear as icons across the bottom of the display as follows:
  1. The keyboard
  2. The diskette
  3. The memory module
  4. SCSI
  5. The disk boot (boot process)

If the POST process stops and indicates an error in any one of these subsystems, record the error number and refer to Chapter 9, “Hardware Problem Determination” on page 9-1.

The last indicator to appear is the boot disk indicator, which is accompanied with a long beep. This indicator shows that the system unit hardware is working and preparing to load and start the operating system.

At this point, the system prompts you for the power-on password or the privileged-access password, if they have been set. If three incorrect responses are given to the password prompt, the system locks up and must be turned off and turned on again to be reset. If the passwords have been lost, then the system unit battery must be removed in order to reset the non-volatile random access memory (NVRAM).

Attention: Removing the battery also erases system configuration information such as the custom boot list. See Appendix B, “Removing the Battery” on page B-1 for removal considerations.

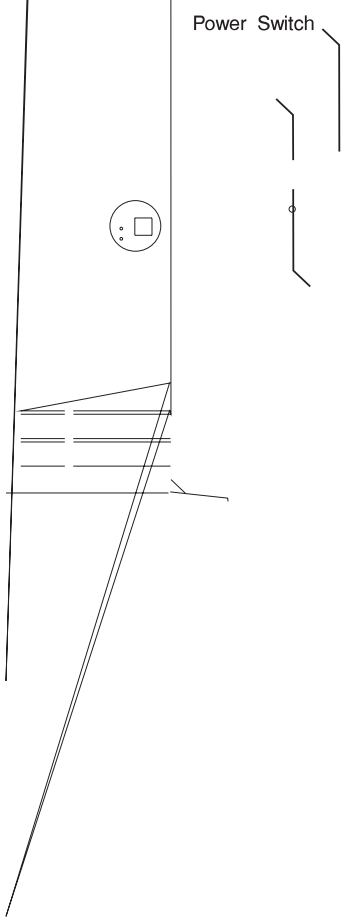
If no bootable operating system image is found on any of the storage devices listed in the system firmware, then the System Management Services (SMS) program begins. The SMS is described in Chapter 3, “System Management Services” on page 3-1.

Stopping the System Unit

Attention: When using the shutdown procedure for your system, enter the correct shutdown 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 information.

1. Verify with your system administrator and users that the system may be shut down before stopping the programs and operating system.
2. After you shut down the operating system, set the power switches of the attached devices to Off.
3. Turn off the system unit.

Power Switch and Indicator LEDs



- As soon as the system unit is connected to a power source, the power LED begins blinking slowly (about 2 flashes per second) to indicate that Standby Power is on, even though the system unit is **not** powered on or running.
- When the system unit is turned on by pressing the power switch, the power LED lights steadily.

If the operating system is loaded and running, a memory dump of system information can be requested.

- To enable this function, the **sysdumpdev -K** command must be executed before an error condition exists.
- To request the memory dump, press and hold the power switch for longer than two seconds. Requesting a memory dump directs the operating system to save system information to a predefined file before turning off the system. This feature can be used to assist in recovery from system problems.
- When a memory dump has been requested the power LED blinks quickly (about 10 flashes per second) to indicate that the dump has been started. This blinking ceases after about a minute whether or not the dump is complete, and the LED returns to its steady, lit state until the system turns off or reboots when the dump is complete.
- The memory dump file can be viewed by entering the AIX command: **sysdumpdev -L**

The disk drive LED lights whenever the hard disk drives within the server are being used.

The disk drive LED also provides basic system diagnostic information:

- If no memory can be found as the system boots, the disk drive LED lights and the system stops the boot process.
- If an error is detected in the firmware boot program, this LED lights and the system stops, and the diskette activity LED begins blinking. This condition indicates that the system is requesting a Firmware Recovery Diskette, which should be made to facilitate resolution of system problems. For instructions on creating a Firmware Recovery Diskette, see Chapter 3, “System Management Services” on page 3-1.

Booting the System in Service Mode

Your system unit can be booted in normal mode or service mode.

Your system boots in normal mode if left undisturbed after the power is turned on (if a bootable image is stored on one of the devices in the boot list, as defined below). To boot your system in service mode, you must press a key during the system's power-on self test (POST) sequence after the power is turned on. Booting the system unit in service mode enables diagnostic functions and programs.

The system unit can be booted in service mode from either the default boot list or from the custom boot list. (See Chapter 3, “System Management Services” on page 3-1 for instructions on defining the custom boot list.)

To boot in service mode and load **Standalone** diagnostics from the default boot list, perform the following procedure:

1. Verify with the system administrator and users that all programs may be stopped, then do so.
2. Turn off the system.
3. Wait 30 seconds, and turn on the system.
4. Immediately insert the diagnostic CD-ROM into the CD-ROM drive.
5. When the keyboard indicator appears during startup, press the F5 key on a directly-attached keyboard (or the number 5 key on an ASCII terminal).
6. Enter any requested passwords.

To boot in service mode and load **Online** diagnostics from the custom boot list, perform the following procedure:

1. Verify with the system administrator and users that all programs may be stopped, then do so.
2. Turn off the system.
3. Wait 30 seconds, and turn on the system.
4. When the keyboard indicator appears during startup, press the F6 key on a directly-attached keyboard (or the number 6 key on an ASCII terminal).
5. Enter any requested passwords.

The system attempts to boot from the first device of each type found on the list. If no bootable image is found on the first device of each type on the list, the system does not search through the other devices of that type for a bootable image; instead, it polls the first device of the next type.

If all types of devices in the boot list have been polled without finding a bootable image, the system starts the System Management Services.

Custom Boot List and Default Boot List

The default boot list is:

1. Diskette
2. CD-ROM
3. Hard File
4. Network
    - Token-Ring
    - Ethernet

Pressing the F5 key on a directly-attached keyboard (or the number 5 key on an ASCII terminal) causes the system to boot in service mode from this list.

Pressing the F6 key on a directly-attached keyboard (or number 6 key on an ASCII terminal) selects a service mode boot from the custom boot list, which is the boot list defined using the System Management Services described in Chapter 3, “System Management Services” on page 3-1. Like the default boot list, the custom boot list can contain four entries. The F6 or 6 keys work like the F5 or 5 keys, with the following exceptions:

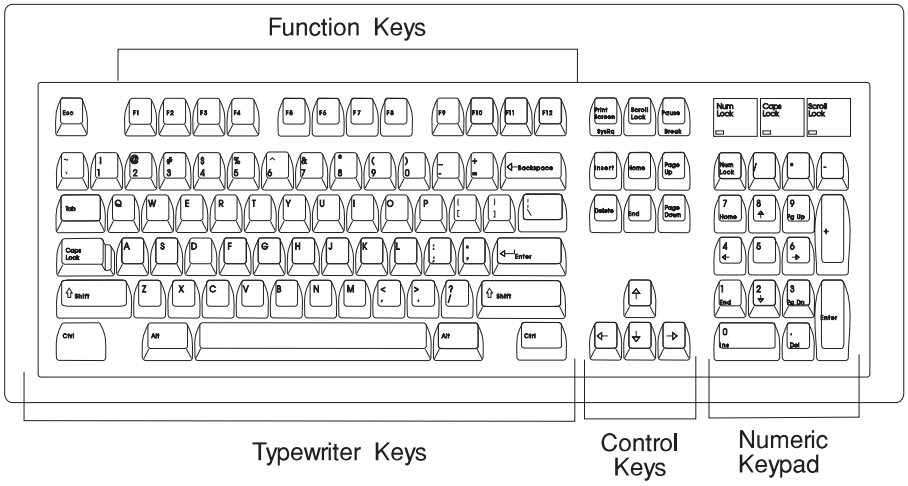
- The system searches for a boot record according to the custom boot list.
- If the custom boot list is discovered by a cyclical redundancy check to be corrupted, the system rebuilds the custom boot list according to the default boot list. (The default boot list contains four entries, and for each matching device type found in the system unit, the system makes an entry in the custom boot list.)
- If no custom boot list is present, the system enters "none" in the corresponding location within the custom boot list.

Using the Keyboards

You can use a keyboard with your server if you also have installed an optional display adapter and graphical display.

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

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.

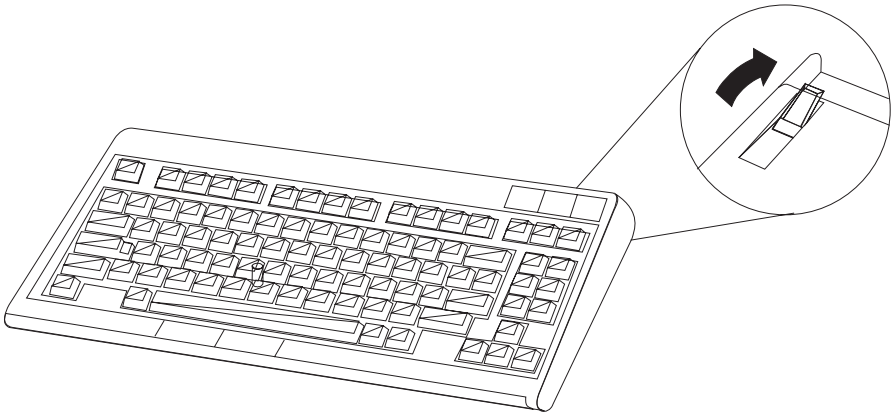


The keyboard is divided into four sections:

- 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 connector at the rear of the system unit.

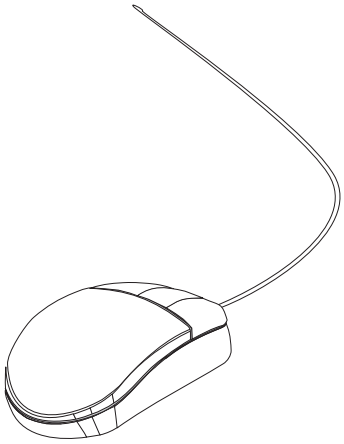


Using the Three–Button Mouse

You can use a mouse with your server if you have installed an optional display adapter and graphical display.

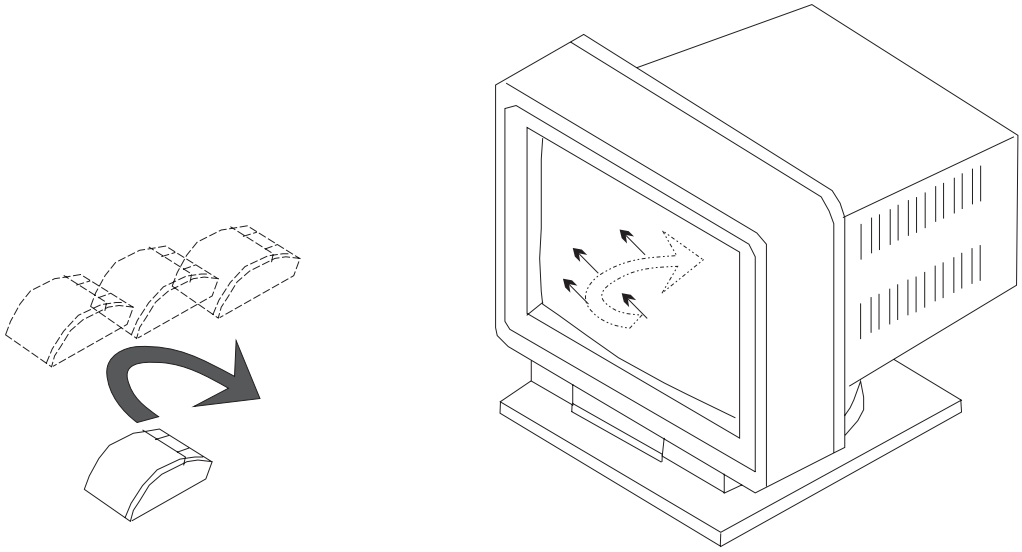
The mouse is a hand–operated locating device. A three–button mouse is available for use with the system unit.

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 a 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:

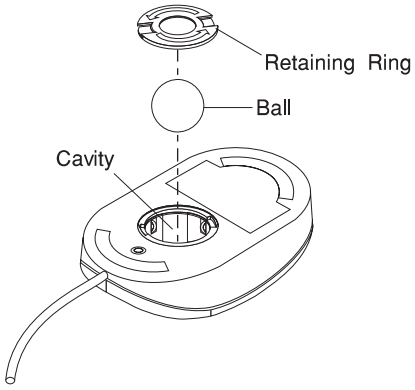
- Finished wood
- Glass
- Enamel
- Plastic
- Paper (except newspaper)
- Metal

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.

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

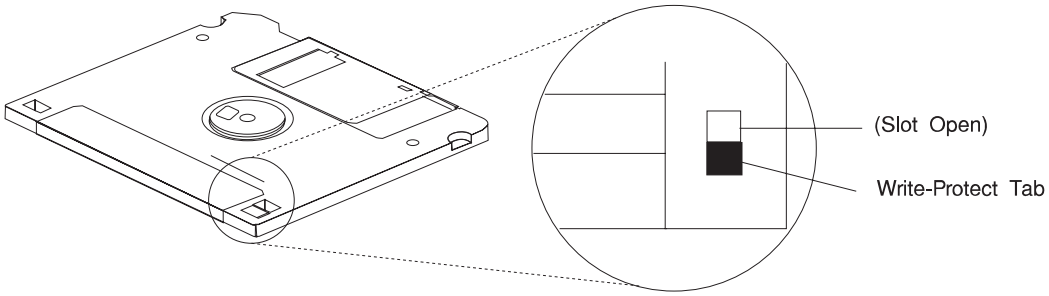
Write–protecting diskettes is necessary so that important information is not accidentally lost.

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

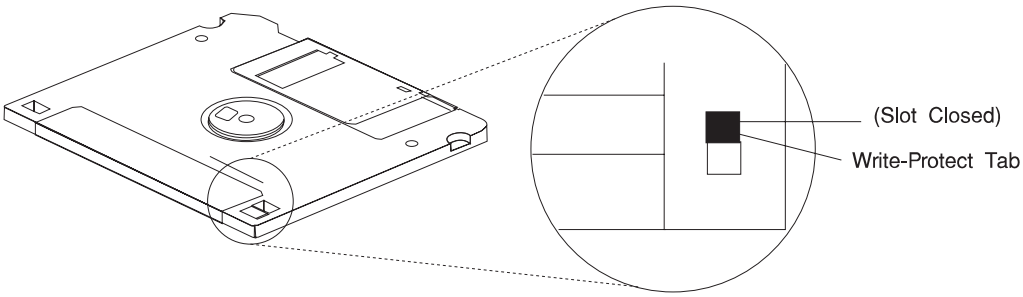
There is a write–protect tab on the 3.5–inch diskette.

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, as shown in the following illustration. Push the diskette into the drive until you hear a click. The click indicates that the diskette is securely in position in the drive.

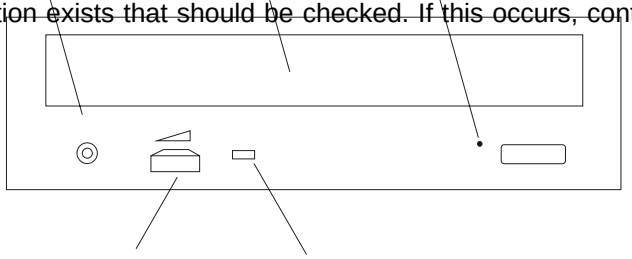
To unload the diskette, push the diskette–unload button. The diskette unloads partially from the drive. Pull the diskette out.

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 3 of the system unit. Your CD–ROM drive looks like the one shown in the illustration, and the controls are located as indicated.When the CD–ROM is set to On, the status light i
The following are status light states and the respective conditions of the CD–ROM drive:•Off during standby with a CD–ROM loaded or unloaded.•Blinks from the closing of the tray to completion of initializatio

– The disc is in the CD–ROM drive upside down.
– Some condition exists that should be checked. If this occurs, contact yourservice representative.2-14User's Guide



Loading the CD–ROM Drive

Press the unload button to open the tray. Place the disc in the tray with the printed side up. 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

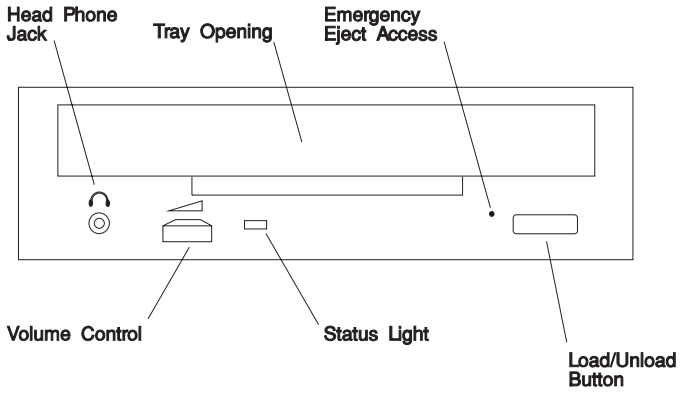
This CD–ROM drive has an internal head–cleaning mechanism, and therefore does not require an external cleaning device. The internal cleaning mechanism cleans the head every time the tray is closed with a disc in the tray.

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, such as when the tray will not open if the unload button has been pressed.

1. Power–off the CD–Rom drive.
2. 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 access.)
3. Push the tool in until some resistance is felt.
4. Maintain a small amount of pressure on the rod while pulling on the tray with your finger nail.
5. Pull the tray open and remove the disc.



Note: Normally the tray makes a ratcheting sound when pulling it open using the above procedure.

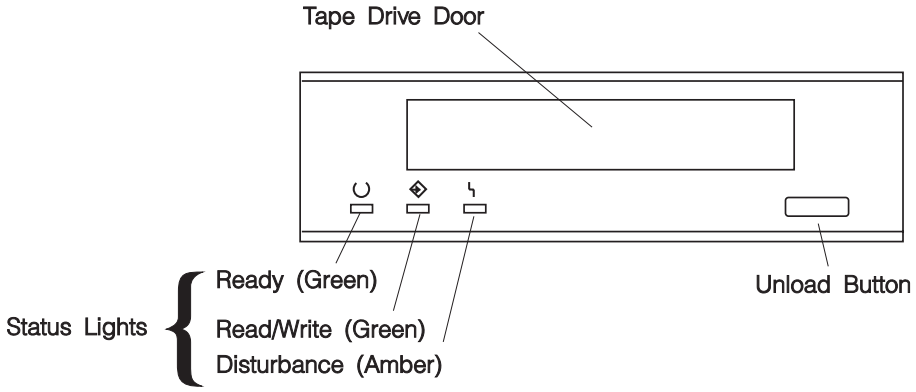
Using the 4.0GB 4-mm Tape Drive

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 next to 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: • The power is off. • The POST has completed successfully, but no tape cartridge has been loaded.	Off	Off	Off
A tape cartridge has been inserted and the 4-mm Tape Drive is Ready to receive commands from the system.	On	Off	Off
The tape is in motion and the 4-mm Tape Drive is running a device operation or cleaning.	On	Flashing	Off
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 2-20.	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.

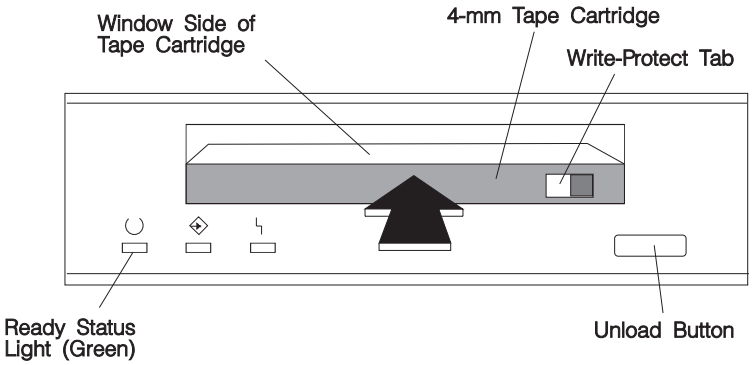
Loading the 4-mm Tape Cartridge

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 2-24. 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) will go 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.

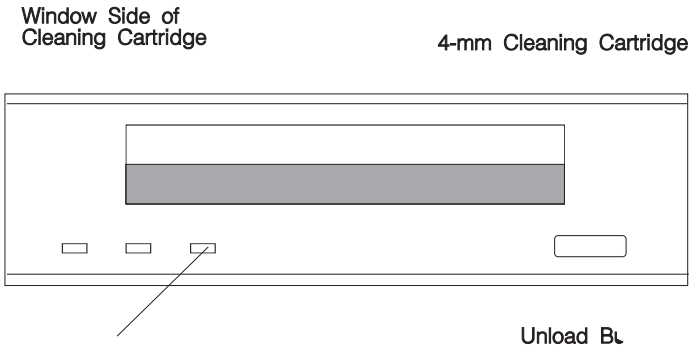
To unload and eject the tape cartridge, press the unload button. The 4-mm tape drive rewinds the tape and then ejects the tape cartridge from the tape drive.

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.

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 ir the following cleaning operations are performed automatically:



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 ll (SCSI-ll) 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 used 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 uses only 4-mm Digital Data Storage (DDS) cartridges.

Recommendations

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

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

  Attention: Use of other than recommended cleaning cartridges can damage your tape drive and voids 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. Refer to Appendix A for tape cartridge part numbers.

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 2-20.

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**
DDS	Read-only
DDS||||	Read/write in 2.0GB mode only.
DDS2	Read in either density; write in 4.0GB mode only.
Non-DDS	Not supported. The cartridge will eject.

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.2-24User's Guide

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 2-20, 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 deteriorates 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.

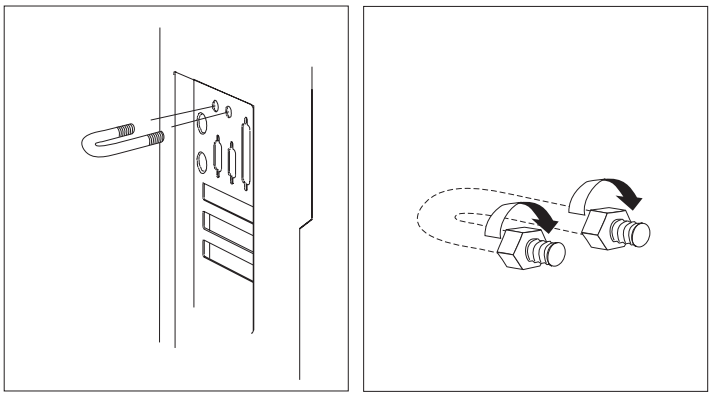
Installing a U-Bolt

Before you begin, make sure you have:

- Obtained a 19 mm (3/4 in.) U-bolt or wire rope (similar to National Manufacturing No. 3230, STK No. 176-735).
- Obtained a security cable.
- Obtained a lock, such as a combination lock or padlock.
- Read “Safety Considerations” on page 5-2 and “Handling Static-Sensitive Devices” on page 5-3.
- Removed the server cover (see “Removing the Cover” on page 5-4).

1. Install the U-bolt:

   Insert the U-bolt through the holes in the rear of the server, and secure it in place with the nuts.



2. Replace the server cover and attach the cables (see “Installing the Cover” on page 5-53).
3. Insert the security cable through the U-bolt. Loop the cable around (or through) an object from which it cannot be removed; then, fasten the cable ends together with the lock.

Chapter 3. System Management Services

These programs make it possible for you to view information about your system, run memory tests, and set the storage device from which the server boots.

If you have a graphical display connected to a display adapter in your system unit, then you can use the graphical System Management Services. Otherwise, you must use the text-based version of the System Management Services.

The graphical System Management Services is described in “Graphical System Management Services” on page 3-2; the text-based System Management Services is described beginning in “Text-Based System Management Services Programs” on page 3-11; the ASCII terminal is described beginning in “ASCII Terminal System Management Services Programs” on page 3-16.

To start the programs:

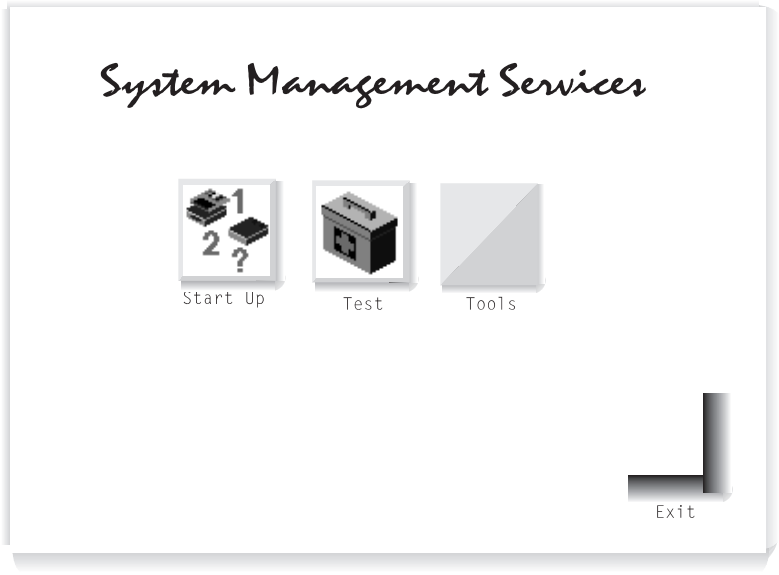
1. Turn on or shutdown and restart the system.
2. When the first screen appears, press the **F1** key to use the graphical System Management Services. To use the text-based System Management Services, press the **F4** key or number 4 key on an ASCII terminal.

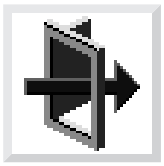
   Note: You must press **F1** or **F4** key after the diskette indicator appears on the screen, but before the last indicator appears. After you have pressed the F1 or F4 key, the initialization indicators continue to display, and the System Management Services screen displays after the last indicator.

Note: It is recommended that you create a Firmware Recovery Diskette using the Update Firmware selection in the System Management Services Tools section described in this chapter.

Graphical System Management Services

When the graphical System Management Services program begins, the following screen appears.





Exit: Returns you to the previous screen.

To select an object, use the arrow keys to highlight an object and then press **Enter** or the **Spacebar**. To leave the current screen, either press the **Esc** or select the **Exit** object.

Start Up

Highlight the device which the system will search for first when booting, and press the **Spacebar**. Notice that numbers appear over the objects, indicating the order of the startup sequence. Up to four devices can be specified. To cancel your selection, select the **Cancel** object. The **Default** object sets the sequence to:

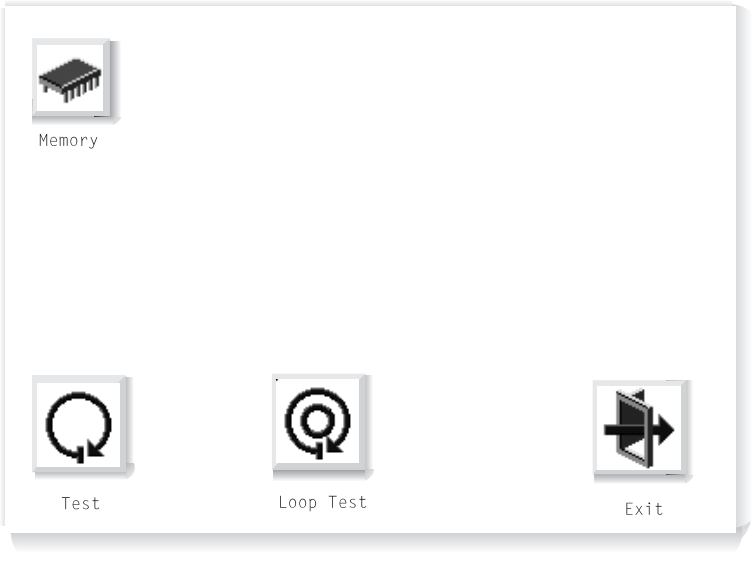
- Diskette drive
- CD-ROM drive
- Hard disk drive
- Tape drive
- Network (if installed)

If your system has more devices than shown in the list, their objects will be displayed after those in the default sequence.

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

Test

Selecting this object enables you to test the memory in your system unit.



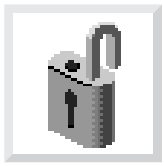
To begin the test, select the **Test** object.

The **Loop Test** object, when selected, allows the memory to be tested in a continuous loop. The test can be stopped by pressing the **S** key.

If a problem is detected during testing, an error code similar to the one below will be displayed under the object for the failing device.

00020000

If an error code appears, make a written record of the error code.

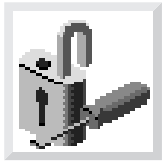


Power-On Password: Setting a power-on password helps protect information stored in your system. When you select this object, a screen with 8 empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. As you type a character, a key appears in the box. Press **Enter** when you are finished; you will be required to type the password again for verification. If you make a mistake, select the **Cancel** object and start again.

If you already had set a power-on password and wanted to remove it, select the following object.

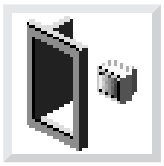
Note: If you *forget* your password, you will have to remove the battery for at least 30 seconds to disable the password. See Appendix B, “Removing the Battery” on page B-1.

A password can be set only after system power has been turned off and then on again. You cannot set a password after using the **Ctrl**+**Alt**+**Del** combination (or *warm boot*) to restart the system.



Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs. Follow the same procedure described for the power-on password.

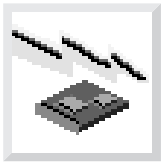
As with the power-on password, you must turn system power off and then on again before setting a privileged-access password.



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 systems that operate unattended. You *must* set a power-on password before you can enable the remote mode. When the remote mode is set, the object changes to **Remote On**.

If you remove the power-on password, the remote mode is automatically reset, and the object returns to **Remote Off**.

Selecting **Remote On** resets the startup mode to the normal startup sequence.



Firmware: Enables you to update system firmware.

Firmware should be selected only when a change to the system firmware is needed. A *Firmware Update* diskette will be made available to you when such an update is needed.

Firmware updates take several minutes, and you need a DOS formatted 1.44MB diskette. The procedure for updating the firmware is as follows.

Attention: Do not turn off power to your system during this procedure.

1. Select **Tools**, and then **Firmware**.
2. Make a backup copy of the system firmware using a DOS formatted 1.44MB diskette as prompted. This backup is a Firmware Recovery Diskette that may be used later to recover from system problems.
3. When the backup is complete, insert the *Firmware Update* diskette. The system firmware will be updated, and the system will automatically restart upon completion.

Error Log: Enables you to view error log information that is stored if an error occurs.

Service Processor: Enables you to update service processor firmware.

Service Processor should be selected only when a change to the service processor firmware is needed. A *Service Processor Update* diskette will be made available to you when such an update is needed.

Service processor updates take several minutes, and you need a DOS formatted 1.44MB diskette. The procedure for updating the service processor firmware is as follows.

Attention: Do not turn off power to your system during this procedure.

1. Select **Tools**, and then **Service Processor**.
2. Make a backup copy of the service processor firmware using a DOS formatted 1.44MB diskette as prompted. This backup is a Service Processor Firmware Diskette that may be used later to recover from system problems.
3. When the backup is complete, insert the *Service Processor Firmware Update* diskette. The service processor firmware will be updated, and the system will automatically restart upon completion.

RIPL: Allows you to select a remote system to load programs from when your system is first powered on.

Overriding the Stored Boot Sequence

In order to override the stored boot sequence for the current boot, press **F5** after the keyboard indicator appears on the screen, but before the last indicator appears. This forces the firmware to search for startup code on the devices listed in the default sequence, either diskette, CD-ROM, hard disk drive, or token-ring (if installed) or ethernet (if token-ring is not installed). Pressing **F5** does not modify what has already been selected through “Start Up” on page 3-4. That information is still stored in the system. Pressing **F5** is limited to the current boot.

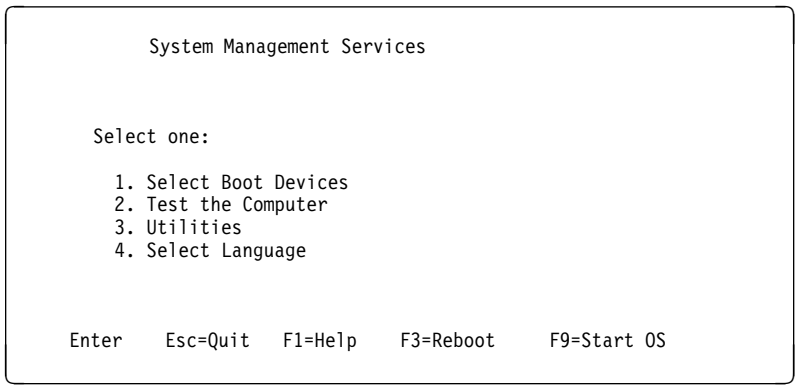
Text-Based System Management Services Programs

To start the programs:

1. Turn on or shutdown and restart the system.
2. As soon as the first screen appears, press the **F4** key.

   Note: You must press **F4** after the diskette indicator appears on the screen, but before the last indicator appears.

   The System Management Services screen appears.



Use the Up Arrow and Down Arrow keys (↑ or ↓) to highlight your selection; then press **Enter**.

You can get help information about any item on a menu by highlighting the item and pressing F1. The bottom of the screen shows which keys are active.

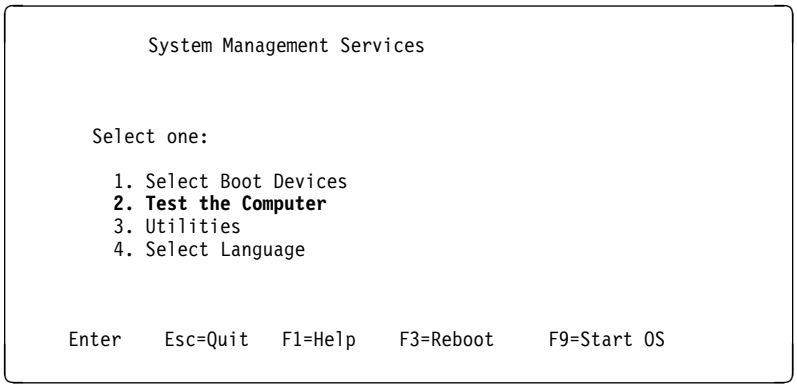
Select Boot Devices

```
          System Management Services


     Select one:

       1. Select Boot Devices
       2. Test the Computer
       3. Utilities
       4. Select Language


   Enter    Esc=Quit   F1=Help    F3=Reboot     F9=Start OS
```

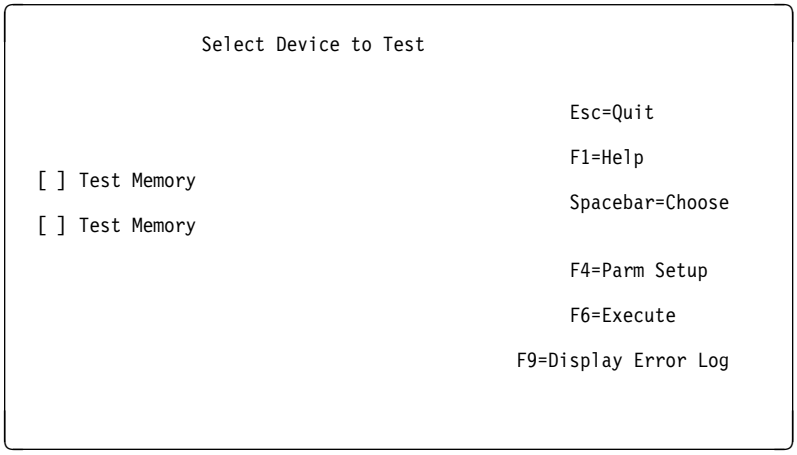
This selection enables you to view and change the sequence in which devices are read at startup time. You also can set or change a particular startup device, or specify the device the system is to start from.

```
          Boot Sequence Selection

     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. Boot Other Device


   Enter    Esc=Quit   F1=Help    F3=Reboot     F9=Start OS
```

Test the Computer



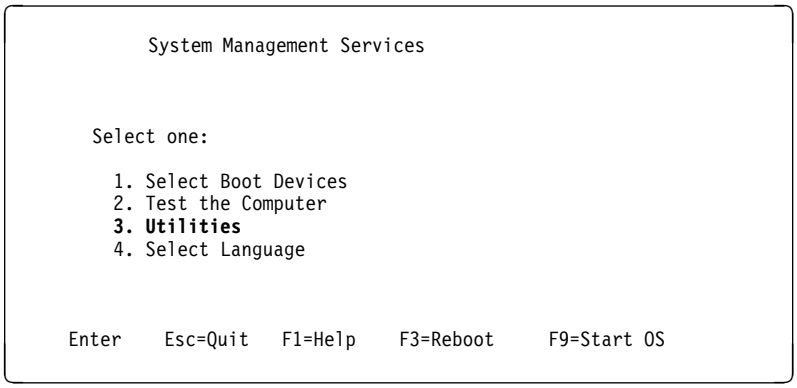
This selection enables you to test devices and functions of your system. The screen that displays, is similar to the screen that follows.



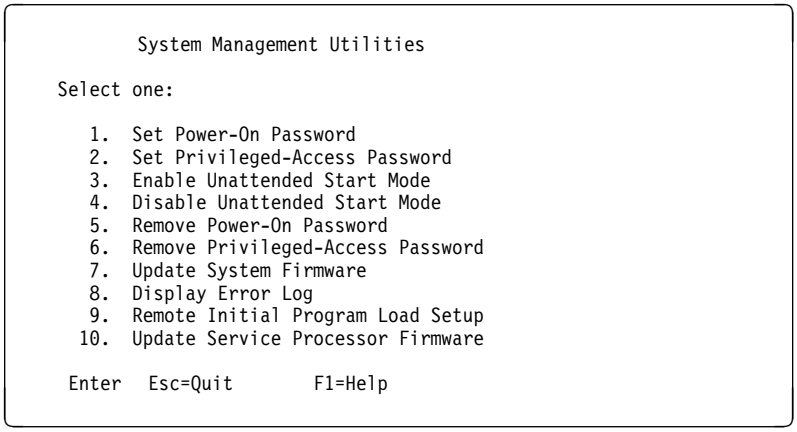
When you have selected the devices you want to test, press **F4** to set the test requirements, such as the number of times the tests are to be run, and whether testing should stop if an error occurs. After you set the requirements, press **Enter** to return to the Select the Device to Test screen; then press **F6** to start the tests.

To see if any errors were recorded in previous tests, press **F9** to display the error log.

Utilities



Selecting **Utilities** enables you to select from the System Management Utilities window. It has the following choices.



The **Power-On** and **Privileged-Access Password** are security features that help protect your system and stored information.

The **Unattended Start Mode**, when enabled, allows the system to start from the defined boot device.

Update System Firmware enables you to make these changes to the firmware of your system. To receive the latest updates, contact your authorized reseller or marketing representative. Firmware updates take several minutes, and you need a DOS formatted 1.44MB diskette. The procedure for updating the firmware is as follows.

Attention: Do not turn off power to your system during this procedure.

1. Select **Utilities**, and then **Update System Firmware**.
2. Make a backup copy of the system firmware using a DOS formatted 1.44MB diskette as prompted. This backup is a Firmware Recovery Diskette that may be used later to recover from system problems.
3. When the backup is complete, insert the *Firmware Update* diskette. The system firmware will be updated, and the system will automatically restart upon completion.

Display Error Log lets you see what problems have been recorded in previous tests.

Remote Initial Program Load Setup allows you to view parameters.

Update Service Processor Firmware enables you to make changes to the service processor firmware of your system. To receive the latest updates, contact your authorized reseller or marketing representative. Service processor updates take several minutes, and you need a DOS formatted 1.44MB diskette. The procedure for updating the firmware is as follows.

Attention: Do not turn off power to your system during this procedure.

1. Select **Utilities**, and then **Update Service Processor Firmware**.
2. Make a backup copy of the service processor firmware using a DOS formatted 1.44MB diskette as prompted. This backup is a Service Processor Firmware Recovery Diskette that may be used later to recover from system problems.
3. When the backup is complete, insert the *Service Processor Firmware Update* diskette. The service processor firmware will be updated, and the system will automatically restart upon completion.

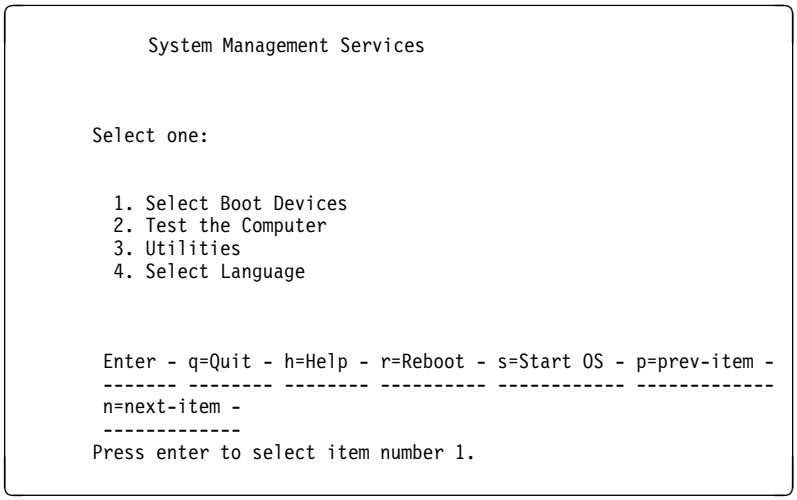
ASCII Terminal System Management Services Programs

To start the programs:

1. Turn on or shutdown and restart the system.
2. As soon as the first screen appears, press the **1 or 4** key.

   Note: You must press **1 or 4** key before the last indicator (boot .....) appears.

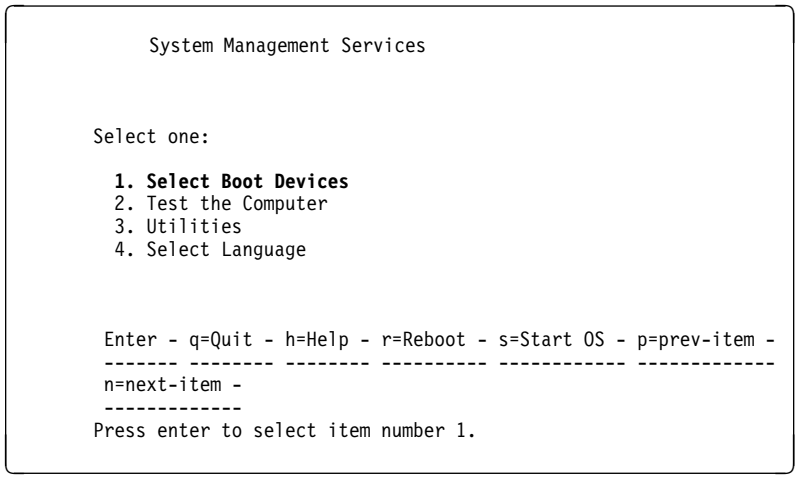
   The System Management Services screen appears.



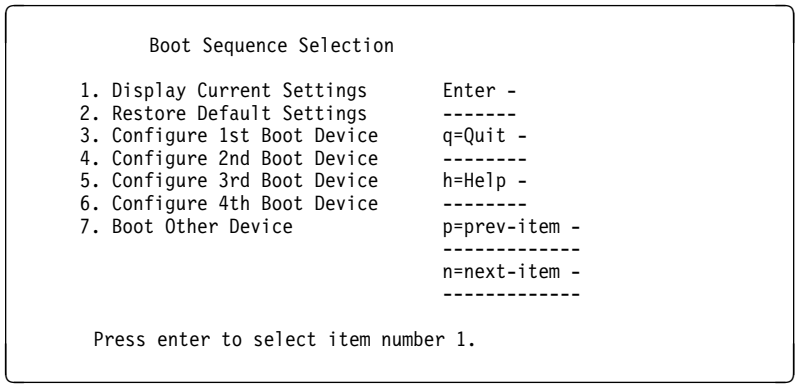
Use the next (n) and previous (p) keys to make your selection; then press **Enter**.

You can get help information about any item on a menu by pressing the h key. The bottom of the screen shows which keys are active.

Select Boot Devices



This selection enables you to view and change the sequence in which devices are read at startup time. You also can set or change a particular startup device, or specify the device the system is to start from.



Test the Computer

```
          System Management Services


     Select one:

       1. Select Boot Devices
       2. Test the Computer
       3. Utilities
       4. Select Language



      Enter - q=Quit - h=Help - r=Reboot - s=Start OS - p=prev-item -
      ------- -------- -------- ---------- ------------ -------------
      n=next-item -
      -------------
     Press enter to select item number 2.
```

This selection enables you to test devices and functions of your system. The screen that displays, is similar to the screen that follows.

```
               Select Device to Test

                                                 q=Quit -
                                                 --------
                                                 h=Help -
[>] Test Memory                                  --------
                                                Spacebar=Choose -
                                                -----------------

                                                 p=Parm Setup -
                                                 --------------
                                                 E=Execute -
                                                 -----------
 1. Test Memory                                d=Display Error Log -
                                               ---------------------
```

When you have selected the devices you want to test, press **p** to set the test requirements, such as the number of times the tests are to be run, and whether testing should stop if an error occurs. After you set the requirements, press **Enter** to return to the Select the Device to Test screen; then press **E** to start the tests.

To see if any errors were recorded in previous tests, press **d** to display the error log.

Update System Firmware enables you to make these changes to the firmware of your system. To receive the latest updates, contact your authorized reseller or marketing representative. Firmware updates take approximately 30 seconds, and you need a DOS formatted 1.44MB diskette. The procedure for updating the firmware is as follows.

Attention: Do not turn off power to your system during this procedure.

1. Select **Utilities**, and then **Update System Firmware**.
2. Make a backup copy of the system firmware using a DOS formatted 1.44MB diskette as prompted. This backup is a Firmware Recovery Diskette that may be used later to recover from system problems.
3. When the backup is complete, insert the *Firmware Update* diskette. The system firmware will be updated, and the system will automatically restart upon completion.

Display Error Log lets you see what problems have been recorded in previous tests.

Remote Initial Program Load Setup allows you to view parameters.

Update Service Processor Firmware enables you to make these changes to the system processor firmware of your system. To receive the latest updates, contact your authorized reseller or marketing representative. Service processor updates take several minutes, and you need a DOS formatted 1.44MB diskette. The procedure for updating the firmware is as follows.

Attention: Do not turn off power to your system during this procedure.

1. Select **Utilities**, and then **Update Service Processor Firmware**.
2. Make a backup copy of the service processor firmware using a DOS formatted 1.44MB diskette as prompted. This backup is a Service Processor Firmware Recovery Diskette that may be used later to recover from system problems.
3. When the backup is complete, insert the *Service Processor Firmware Update* diskette. The service processor firmware will be updated, and the system will automatically restart upon completion.

Chapter 4. Firmware

Firmware Beeps

The firmware uses the speaker as a means to communicate the result of certain tests. The following list describes the type of beeps.

- **No Beeps:** This is a hardware failure not involving the firmware. "The speaker may be bad or disconnected, or the system board may be bad."
- **One Beep:** Has been redefined as:
  - **One Short Beep(9/32 sec.):** Is used at Power-On when the hardware passes control to the firmware.
  - **One Long Beep(1 3/4 sec.):** It means initialization completed and no fatal errors occurred, so continue the boot process.
- **Continuous Beep:** This is a hardware failure not involving the firmware. "The system board has a failing component or a failure related to the speaker subsystem has occurred."
- **One Long and One Short Beep:** Firmware "... has detected an error on the video adapter card. ..."

Console Strategy

If the graphics adapter is present, the user interface is a Graphical User Interface (GUI). If the graphics adapter is not present and there is an active device in Serial Port 1, the active device is assumed to be an ASCII terminal, and the user interface is text. The user interface is either the graphics system or the ASCII terminal, but not both. Graphics interface default to GUI with the option to switch to text. ASCII terminal interface are always text. The PF keys are not used to initiate Maintenance Mode on ASCII terminal consoles, numeric keys are used instead (see key equivalent in each PF key definition below).

Normal Mode Boot Responses

The following assumes successful entry of the Power On Password (POP) if set. This applies to both normal and service modes.

In case no boot device is found during a normal boot attempt, the firmware requests the Privileged Access Password (PAP) if set, then it initiates the System Maintenance Services (SMS).

If the custom bootlist is discovered to be corrupted, Firmware rebuilds the custom bootlist according to the default sequence. The custom bootlist is four deep, and for

each matching device type found to be present in the system, firmware makes an entry in the custom bootlist. If a default boot list device is missing from the system, firmware enters 'none' in the corresponding location of custom bootlist.

Function Keys

PF1 Key

- PF1, when operated from a directly attached keyboard, invokes the System Management Services (SMS) GUI interface.
- The "key-switch" is set to ***Normal mode***.
- Numerical **1 key** is the equivalent key on an ASCII terminal. The result, however, will be the same as the function of PF4, as described below.

PF4 Key

- PF4, when operated from a graphics console, invokes the SMS program and present the text interface.
- The "key-switch" is set to ***Normal mode***.
- Numerical **4 key** is the equivalent key on an ASCII terminal.

PF5 Key

- The default boot list, located in firmware, is used.
- The "key-switch" is set to ***Service mode***.
- Numerical **5 key** is the equivalent key on an ASCII terminal.

This mode attempts to boot from the first device of each type found in the list. It will not search for other bootable devices of that type if the first device is not bootable. It will, instead, continue to the next device type in the list. If after one pass through the boot list no boot record is found, Firmware invokes the SMS program. The firmware supports up to four entries in the boot list.

The default boot order is:

1. Diskette
2. CD ROM
3. Hard File
4. Network
    a. Token Ring
    b. Ethernet

PF6 key: PF6 works like PF5 with some exceptions

- Firmware looks for a boot record according to the custom bootlist that was setup by System Management Services.

- If after one pass through the custom bootlist no boot record is found, firmware invokes the SMS program.
- The "key-switch" is set to ***Service mode***.
- Numerical **6 key** is the equivalent key on an ASCII terminal.

Password Design Description

Password Design Overview

The owner of the system has the option to limit access to the system. The system limits access by requiring the user to enter a password. There are three categories of restricted access.

The first category is power-on. If this category is enabled, the system prompts the user to enter the Power-On password (POP) when the system is powered on. The user must supply the Power-On password.

The second category is privileged access. Privileged access is needed to perform functions on the SMS, or boot from a device that isn't in the boot path. When the user attempts to do one of these things, the system prompts for the Privileged Access Password (PAP). The user must supply the PAP.

The third category is unattended start mode. In unattended start mode, the system boots from a defined boot device, but the keyboard is locked until the user enters the Power-On password.

Enabling Security

Utilities are provided to allow the system owner to enable any of the above security modes and to enter or change the Power-On or Privileged-Access passwords. The passwords can be up to 8 characters long. After entering a password, the user is prompted to verify it by entering it a second time. After the password has been entered two consecutive times, it is saved in non-volatile battery powered CMOS.

Storing of Password

The POP and PAP are stored in CMOS. The time that each password was saved, and the time that each password is read is also stored. If for any reason, the contents of CMOS are suspect (bad battery or CRC), the passwords are considered valid, but unusable. The areas in CMOS that contain the password are locked before the operating system is booted. After the passwords have been locked, the user must power off the system before the passwords can be accessed again.

Power On Password

When the system is powered on, it checks whether a Power-On password is present. If there is one present, and unattended start mode (see “Unattended Start Mode”) is not set, the owner has specified that the system cannot be used unless the Power-On password is supplied. The system prompts for the Power-On password. The user is given three attempts to enter the password. If the user fails to supply the password, the system goes to a hang state and must be powered off before continuing.

Privileged Utilities Password

If a user wants to boot, change or remove the Privileged-Access password, or use any of the other “Privileged” utilities, the system checks whether a Privileged Access password exists. If it does, the user is prompted to either enter the Privileged Access password. The user is given three tries to supply the correct password. If the user fails to do so, the system goes to a hang state and must be powered off before continuing.

Unattended Start Mode

If Unattended Start Mode is enabled, the system boots from the defined boot device without requiring any input from the user. The keyboard controller is programmed to lock up until the Power-On password is entered.

Firmware Flash Update Design

The firmware flash update can be performed in normal mode and recovery mode. The type of update mode determines what portions of the flash code is updated, whether the update is done "quietly" (no messages), and whether the original VPD information is merged into the new image before updating.

The default is a "normal" update, where the firmware flash update is performed from the System Management Services Menu. Messages and errors are communicated through the menu pop-up interface. The system user selects the Update Firmware option, and the composite image is loaded using the default file name and default media. The original system VPD information is merged in before the image is programmed. Only the sectors containing the composite image are programmed; those containing the recovery block are considered "read-only".

A "recovery" update, is executed automatically when a bad composite image is detected during early system initialization. Most messages and errors are suppressed; fatal errors are displayed in a serial interface compatible format. The default file name and default flash update media is assumed. The selected media drive (diskette drive) is continuously polled until a valid firmware image can be found and loaded. The original system VPD information is merged in before the composite image is programmed. The recovery block flash sectors are not modified during a recovery update.

For any update, the firmware flash update routine checks if the system flash part can be updated. The flash ID and sector protection bits are retrieved from the part. If the flash ID could not be read or the flash ID indicates an unsupported part, then the update routine is terminated. If the ID indicates a supported part, then the sector programming data structures are initialized. The sector protection bits are examined, to ensure that the sectors to be updated are not write-protected. If a sector to be updated is write-protected, then the update routine is terminated. If the flash part passes all of these validity tests, then the routine moves onto file operations.

The firmware flash update routine checks the selected flash media for the flash file. If the file is located and loaded successfully from the media, it is then examined to ensure it is a valid firmware image. A firmware image is verified by checking if it has a valid CRC, valid file length, valid flash table/system ID structure. If the firmware image could not be loaded or is invalid, then the update routine is terminated.

For normal or recovery mode, once a valid firmware image is loaded successfully, the VPD information is merged from the flash ROM to the image. The VPD information is duplicated in the recovery block and composite image, which ensures that there is a protected copy of the VPD in case the composite image is corrupted.

Now that the firmware image is ready for programming, the firmware flash update. routine begins the section of code that erases and programs the flash part. During this section of code, a system power-down results in a corrupted flash ROM. Notice that for normal and recovery mode, only the composite image sectors are erased and reprogrammed, so those sectors would be the only ones that could be corrupted. Since the recovery block is protected in these modes, the system can still be restored through a recovery flash update. To minimize the risk while updating the flash, the routine displays a message warning the user `Flash update in progress. Do not power down the system...`

Before the flash part can be programmed with the new image, the firmware flash update routine must erase the appropriate sectors. For all modes, the composite image sectors are erased and reprogrammed first. If an erase operation fails, it is retried according to the flash part spec. If the flash part won't erase even after retries, the update routine is terminated. If the erase operation was successful, the firmware flash update routine programs the composite image into the corresponding flash sectors. If a byte in the flash part cannot be programmed with a new value, even after the specified retries, the update routine is terminated. If the composite image was programmed successfully, the routine checks if it still needs to update the recovery block portion.

The firmware has now been successfully updated. The firmware flash update routine will remove any "in process" messages, perform some general clean-up and then reboot the system. Once the system is re-booted, the new flash image is active and executed.

Power On Self Test (POST)

Processor POST

The firmware tests the processor. If there is a failure, the system will Check-Stop (stop) and the initial beep of the speaker is not heard.

Memory Module and L2 cache POST

The firmware RAM POST tests all of memory; it is done in segments. After the initial short beep, if the system stops with the hard file indicator on solid, then this is the indication that no memory was found.

If any memory is found then a small segment is used. If the segment cannot be found then the system stops with the hard file indicator on solid.

A larger amount of memory is tested for stuck or coupled bits. The L2 cache is tested, if it fails there is a momentary indication when the display becomes available, the error is also put in the SMS error log.

During system initialization when icons are being displayed for the various components of the system, one of the icons is the memory module icon. During display of this icon an L2 cache, 8 digit error code would be displayed if L2 is not fully functional; also the remainder of memory is tested and if a failure is detected, an 8 digit error code is posted. This error indicates which memory module slot is at fault.

A separate memory test is provided in the System Management Services (SMS). This test can be made to loop. It tests memory similar to the POST and also gives an 8 digit error indications for the memory module slot. The L2 cache is not retested in the SMS memory test.

Update Flash CRC

The firmware performs a Cyclic Redundancy Check (CRC) on the update portion of the flash module. If the check is not good then the firmware goes into recovery mode. This mode is recognized by the hard file indicator being on continuously (or blinking), and the diskette drive indicator blinking periodically.

Video/Graphics Adapter POST

The firmware does test the VGA adapter but not the display. The system gives a speaker beep sequence when the VGA adapter is found to be non-functional. The beep sequence is a one long beep followed by one short beep; the error is logged and the system continues.

SCSI subsystem POST

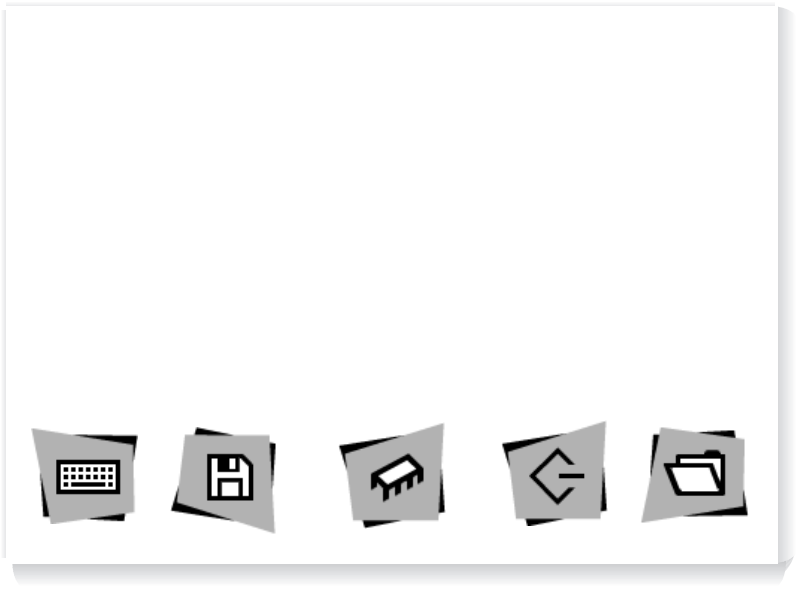
The SCSI POST opens the adapter and runs several test scripts which check and exercise the various functions related to the chips on the SCSI adapter, such as DMA, and simulate mailbox commands. If an error is detected then an 8 digit error code is displayed, and the error is entered in the SMS error log and the system continues.

Keyboard/Mouse Adapter

The keyboard/mouse adapter has a built in power on test, and the firmware checks the results. If an error is detected then an 8 digit error code is displayed, and the error is entered in the SMS error log and the system continues.

Post Indicators

When the POST is finished, the following screen displays.



The POST screen displays the following objects.

Keyboard: Initialize the keyboard and mouse. The window for pressing the F1 (GUI) and F4 (English) keys is now open.

Diskette: Initialize the adapter.

Memory Module: Test all memory greater than 3 Meg.

SCSI: Adapters are being initialized. Network is also initialized if present.

Boot Disk: System is attempting to boot from the boot list.

If using an ASCII terminal, the following text is displayed.

- dskt .....OK
- mem .....OK
- scsi .....OK
- boot .....OK

If the POST does not complete successfully, you will not get an "OK" and an error code will be displayed.

Chapter 5. Installing Options

This chapter provides instructions to help you add options to your server. 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 on hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

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

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

DANGER

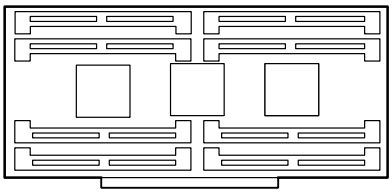
To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

Handling Static-Sensitive Devices

Attention: Adapters, planars, diskette drives, disk drives, tape drives, CD–ROM drives, and memory-module kits 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:

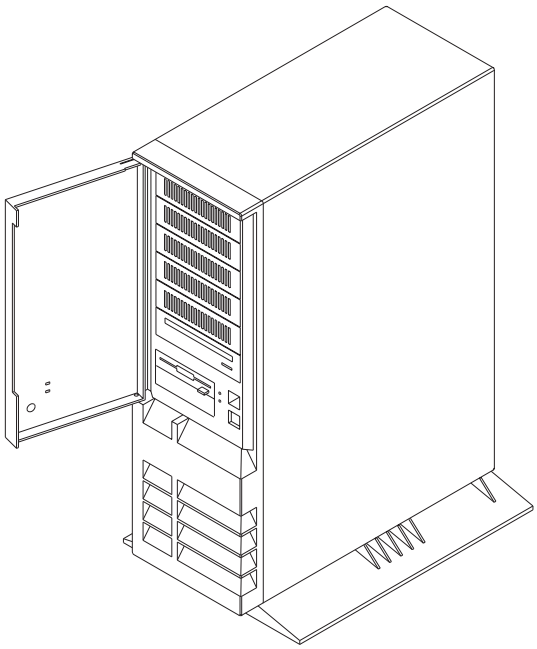
- If you have an antistatic wrist strap available, use it while handling the device.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- Grasp cards and 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.



Removing the Cover

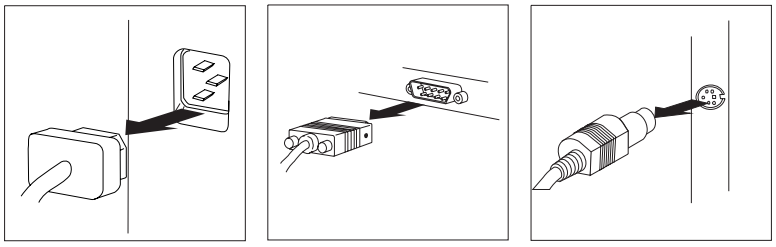
Note: Before you begin, be sure you have read “Safety Considerations” on page 5-2.

1. Unlock and open the door.



2. Remove all media (diskettes, CD-ROMs, or tapes) from the drives; then, turn off the server and all attached options.
3. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

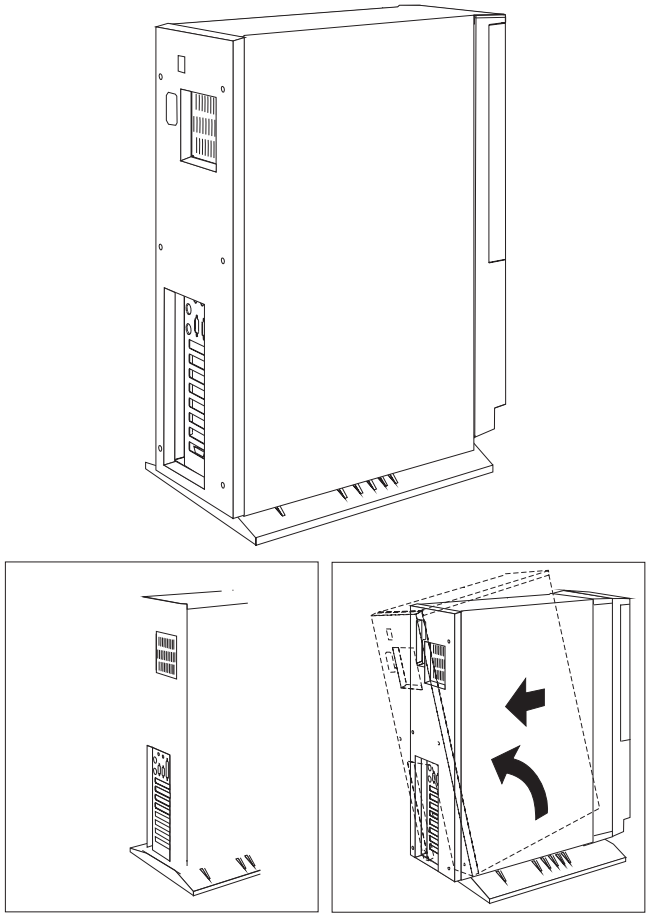
4. Unplug all power cords (cables) from electrical outlets.
5. Note the locations of the following; then, disconnect them from the back of the server:
   - Power cord
   - Display cable
   - Keyboard cable
   - Any other cables and cords.



6. Remove the cover:
   a. Loosen the six screws in the recessed holes on the back of the cover.

      Note: The screws stay in place; do not attempt to remove them.

   b. Grasp the sides of the cover, pull it back a slightly, then tilt it back a few inches.
   c. Grasp the cover at the top front edge with one hand, and just above the I/O slots with the other hand.
   d. Remove the cover gently, in a rotating motion, as shown.
   e. Store the cover in a safe place.



Option List

- Installing memory-module kits — “Installing Memory-Module Kits” on page 5-8.
- Removing memory-module kits — “Removing Memory-Module Kits” on page 5-13.
- Upgrading the CPU card. — “Upgrading the CPU Card” on page 5-17.
- Installing an adapter — “Installing Adapters” on page 5-21.
- Removing an adapter — “Removing Adapters” on page 5-27.
- Installing an internal drive — “Installing Internal Drives” on page 5-29.
- Removing an internal drive — “Removing Internal Drives” on page 5-41.
- Installing a service processor. — “Installing a Service Processor” on page 5-49.

Installing Memory-Module Kits

You can increase the amount of memory in your server by installing *memory-module kits*. Your server uses 168-pin, dual inline Error Correcting Code (ECC) memory modules (DIMMs) to increase system memory.

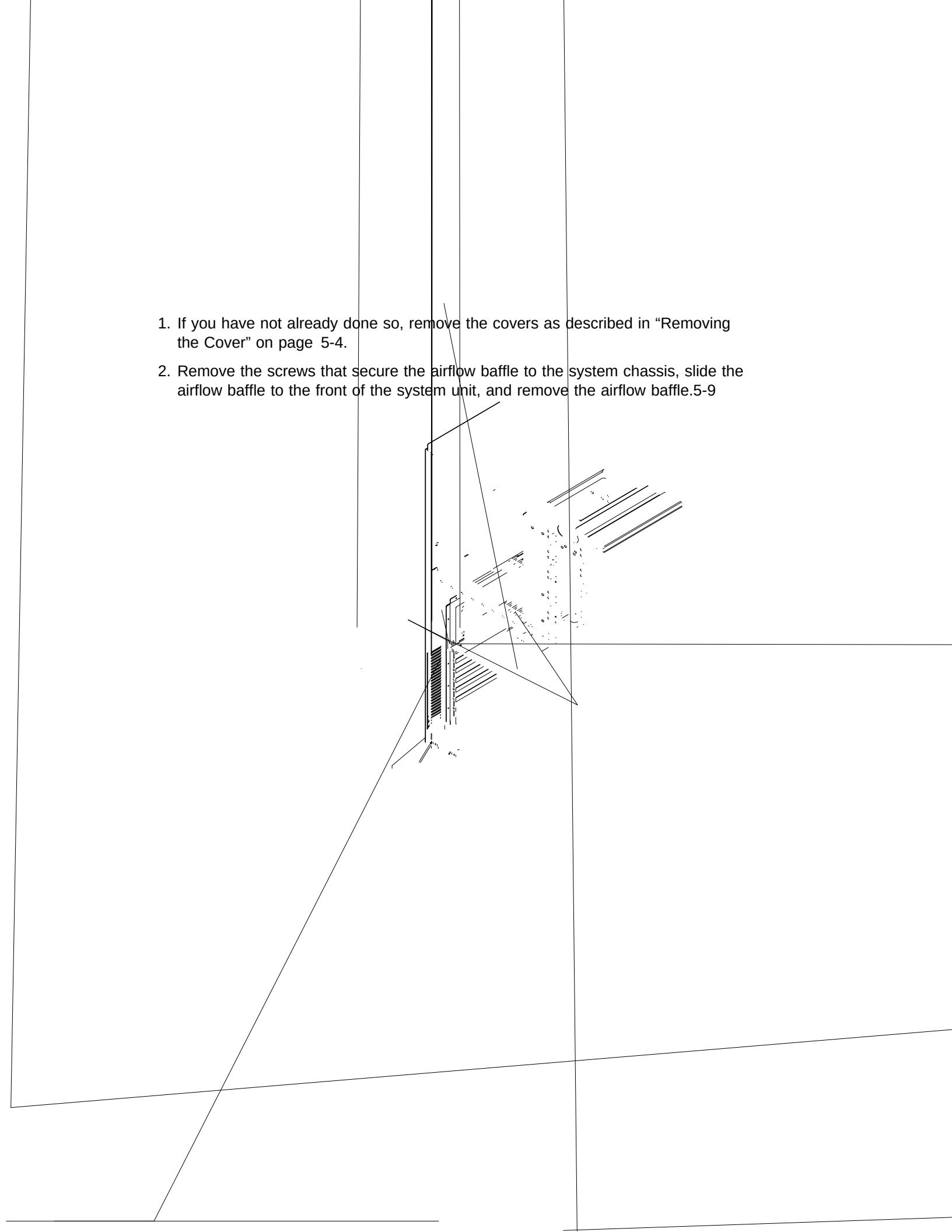
You install memory-module kits into connectors inside the server. The memory-module kit sizes available for your server are 16MB, 32MB, 64MB, and 128MB. The available speed for these kits is 70 ns.

The amount of memory that you can install varies according to the CPU card installed in your system.

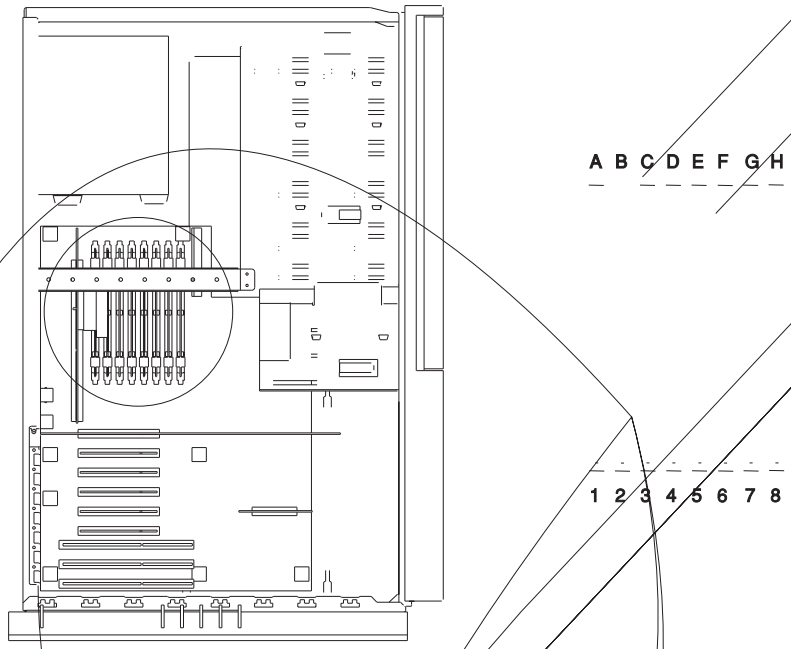
CPU Card	Maximum Memory
100 MHz	512MB
133 MHz	960MB
166 MHz	1024MB

Attention: This system does not support channel memory, such as memory expansion adapters.

1. If you have not already done so, remove the covers as described in “Removing the Cover” on page 5-4.
2. Remove the screws that secure the airflow baffle to the system chassis, slide the airflow baffle to the front of the system unit, and remove the airflow baffle.5-9



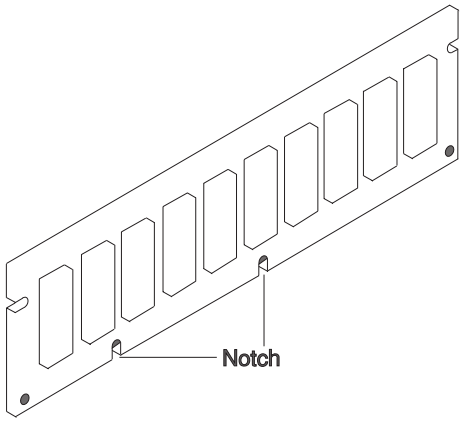
4. Locate the memory-module kit connectors on the system board. Some memory-module kits are already installed in your server.



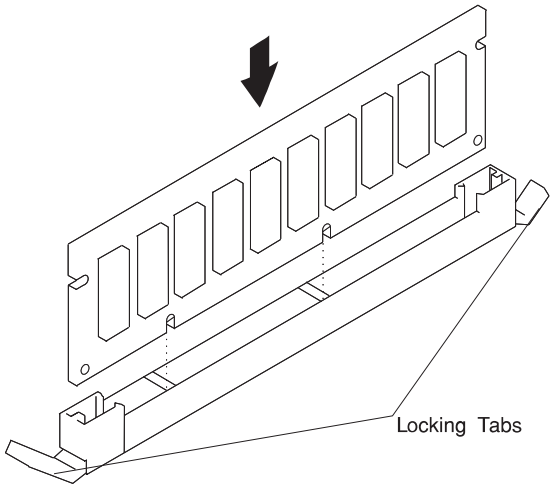
5. Install the memory-module kit

   Note: New memory-module kits must be installed in the first available vacant connector, starting at A and progressing to H. The only exception is the 128MB memory module which cannot be installed in connector A due to mechanical interference.

   a. The memory-module kits are keyed so that they can only be inserted one way. Align the memory-module kit notches with the keys in the memory connectors.

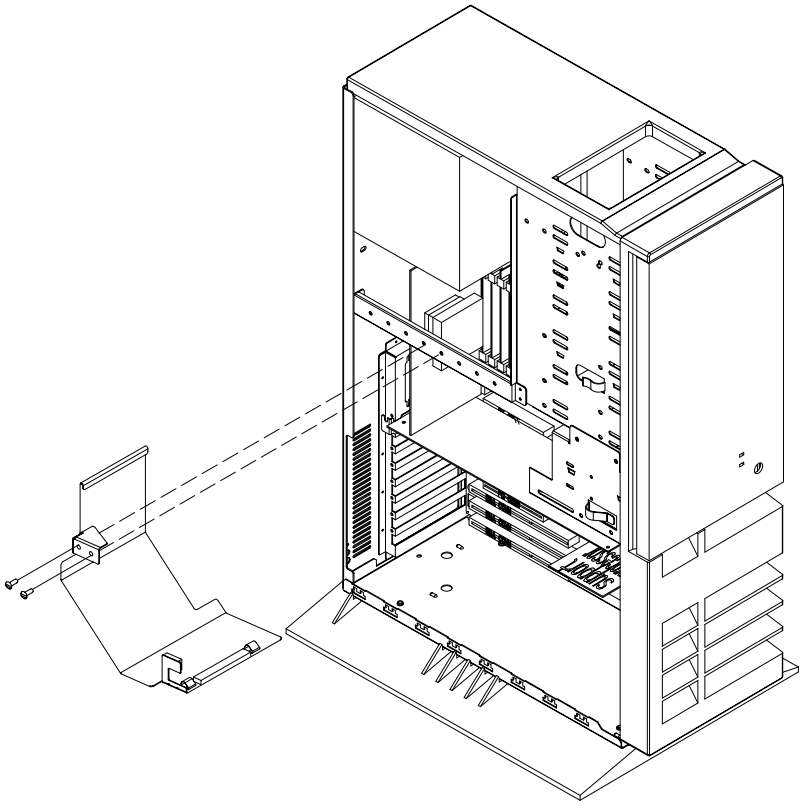


   b. Insert the memory-module kit into the next unused memory connector. Push down on the memory-module kit until the latch tabs lock the memory-module kit into the connector. (Do not attempt to move the latch tabs yourself. They will lock automatically when you have fully inserted the memory-module kit.)



Attention: Inserting the memory-module kit at an angle may damage the memory-module kit.

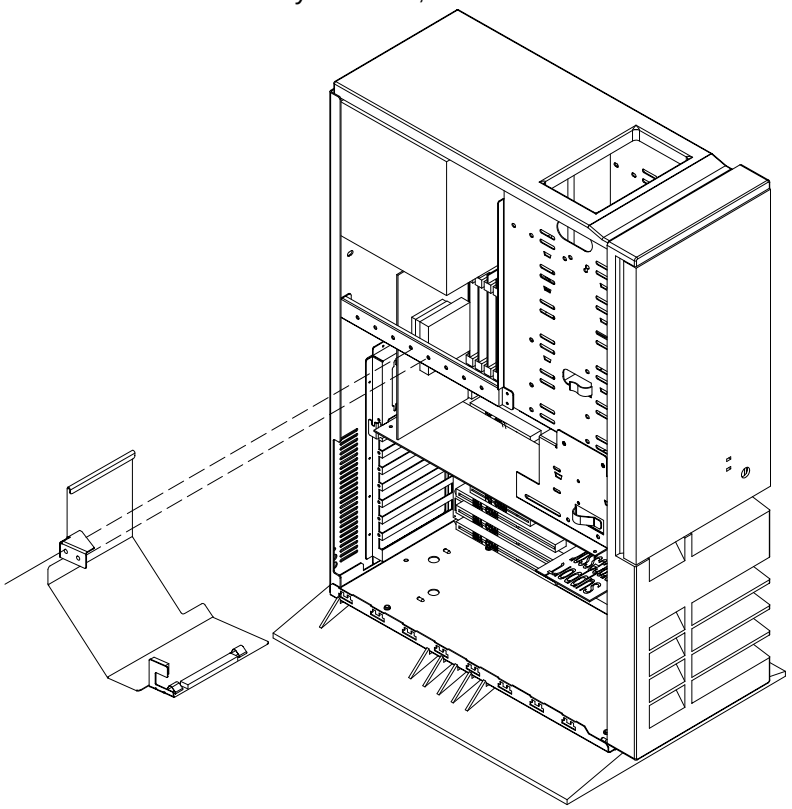
6. Go to “Memory Modules” on page A-2 to update the memory capacity.
7. If you have other procedures to preform, refer to “Option List” on page 5-7.
8. If you do not have other procedures to perform, replace the airflow baffle and the system unit cover:
   a. Insert the airflow baffle toward the front of the system unit.
   b. Slide the airflow baffle toward the rear of the system unit, being careful not to disturb already-installed memory-module kits.
   c. Insert and tighten the screws that secure the airflow baffle to the system unit chassis.



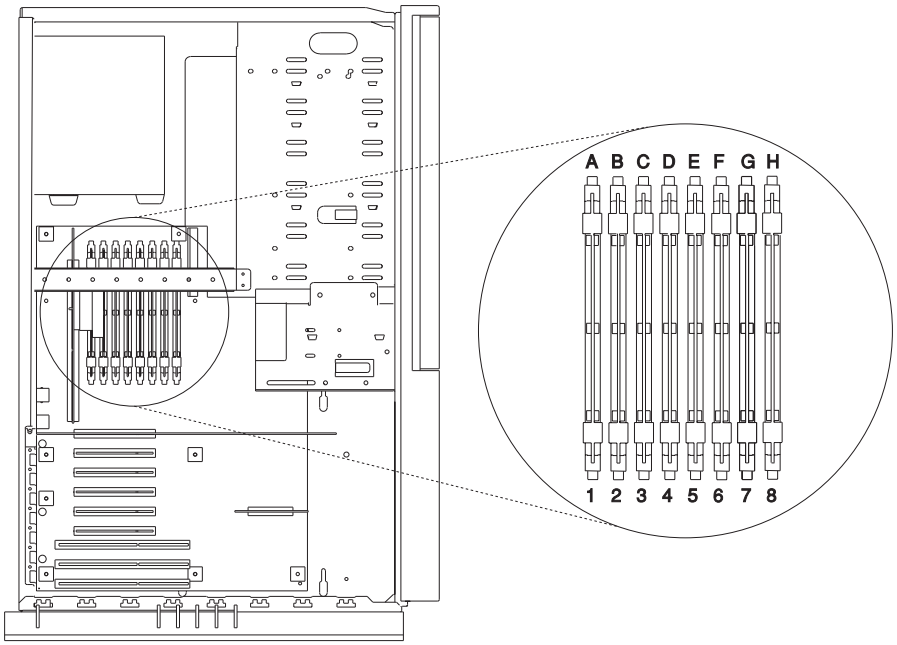
   d. Replace the covers as described in “Installing the Cover” on page 5-53.

Removing Memory-Module Kits

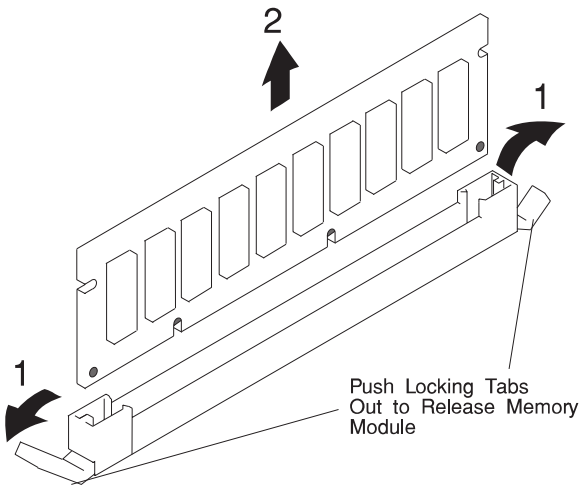
1. If you have not already done so, remove the covers as described in “Removing the Cover” on page 5-4.
2. Remove the screws that secure the airflow baffle to the system chassis, slide the airflow baffle to the front of the system unit, and remove the airflow baffle.5-13



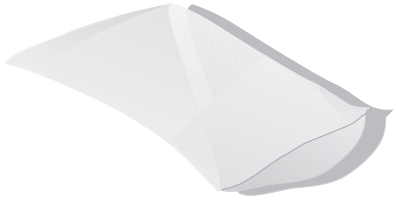
4. Locate the memory-module kit connectors and determine which memory-module kits you want to remove.



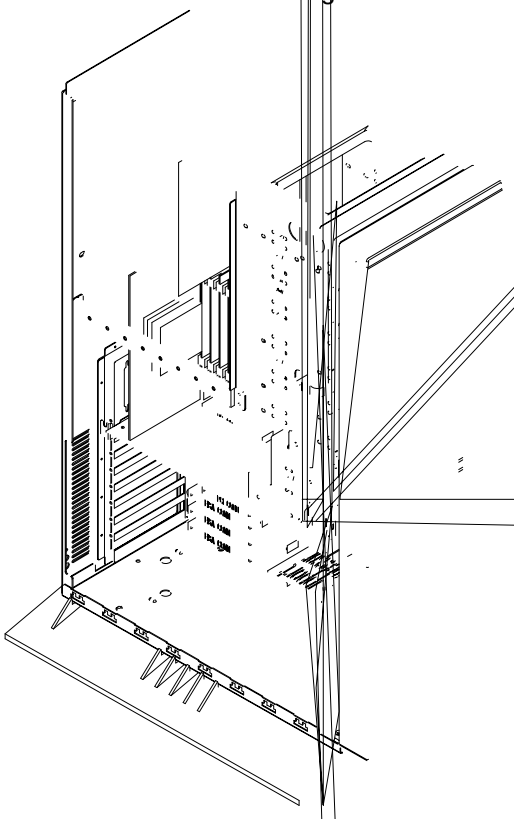
5. Remove the memory-module kit:



6. Store any memory-module kits you are no longer using in a static-protective package. Make a note of the kit size and speed for future reference.



7. Go to “Memory Modules” on page A-2 to update the memory capacity.
8. If you have other procedures to preform, refer to “Option List” on page 5-7.
9. If you do not have other procedures to perform, replace the airflow baffle and the system unit cover:
    a. Insert the airflow baffle toward the front of the system unit.
    b. Slide the airflow baffle toward the rear of the system unit, being careful not to disturb already-installed memory-module kits.
    c. Insert and tighten the screws that secure the airflow baffle to the system unit chassis.d. Replace the covers as described in “Installing the Cover” on page 5-53.



Upgrading the CPU Card

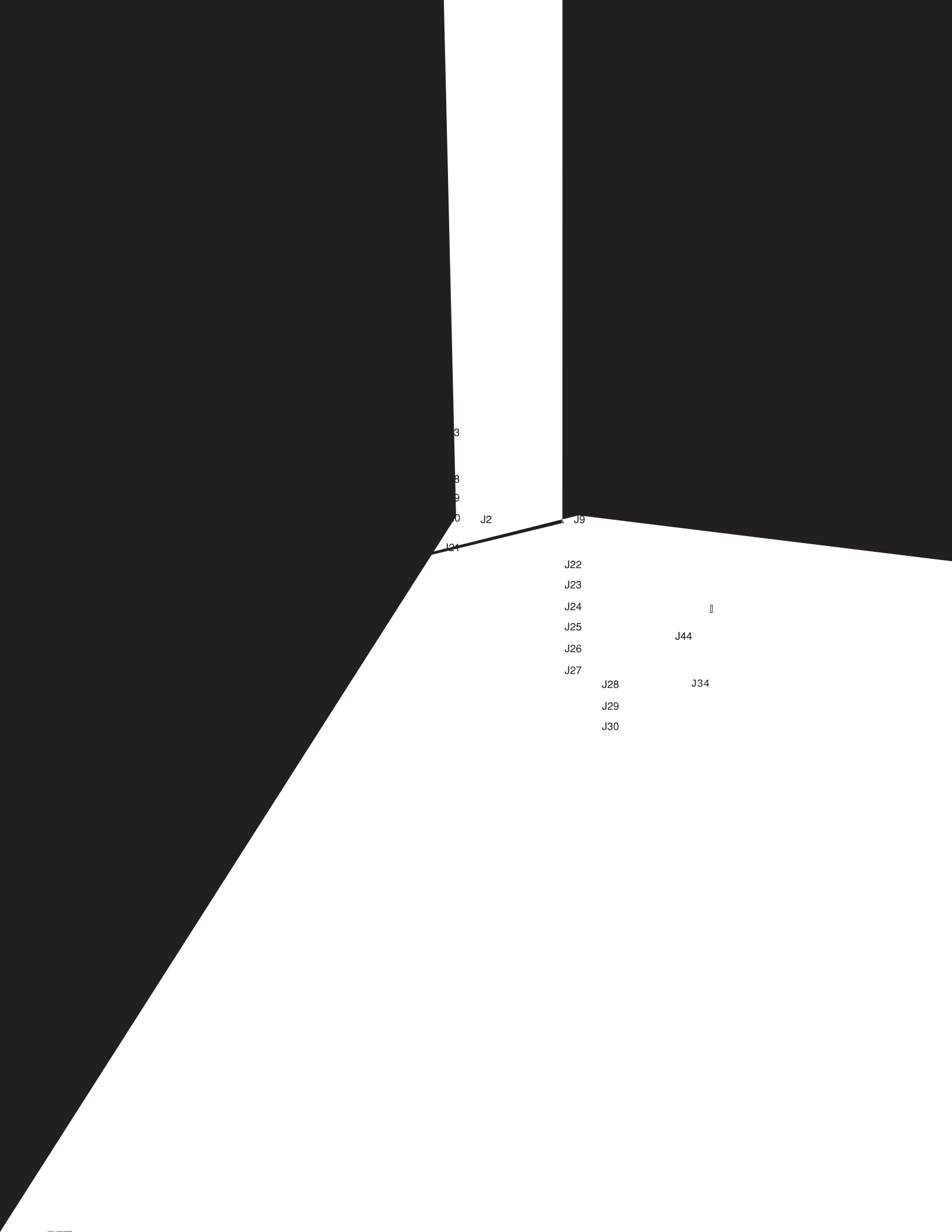
1. If you have not already done so, remove the covers as described in “Removing the Cover” on page 5-4.

   Attention: Make sure the power cord is unplugged and the standby power (Power LED) is Off before removing the CPU card.

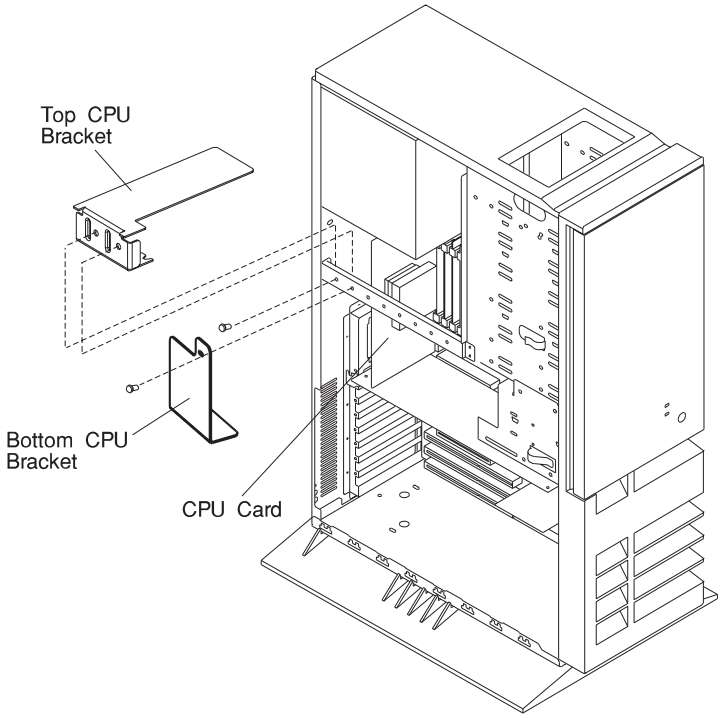
2. Remove the two screws that secure the top and bottom CPU brackets to the system chassis, then remove the CPU brackets.

   Note: Some earlier systems may not have a bottom CPU bracket.3. Remove the CPU card.

4. Locate the CPU card connector.


J2
J9
J22
J23
J24
J25
J26
J27
J28
J29
J30
J44
J34

6. Replace the top CPU bracket and install the left screw to secure the bracket.



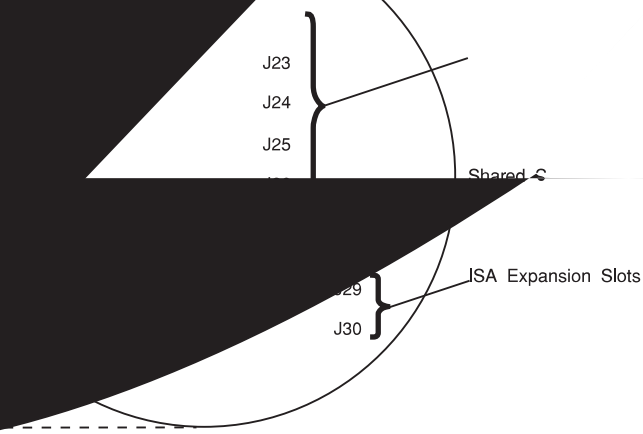
7. If you have a bottom CPU bracket, align the hole in the bottom CPU bracket with the right screw hole and install the right screw.

   If you do not have a bottom CPU bracket, install the right screw.

8. If you have other procedures to preform, refer to “Option List” on page 5-7.
9. If you do not have other procedures to perform, replace the covers as described in “Installing the Cover” on page 5-53.

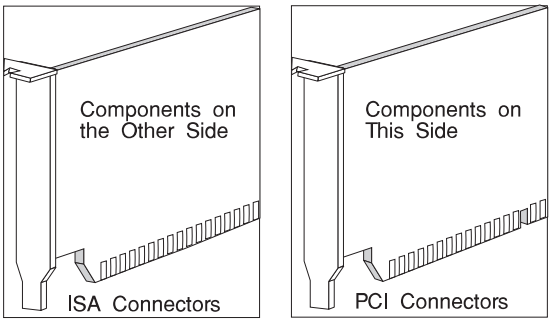
expansion

The remaining slots are available for future expansion
can add adapters to provide communication, specialized graphics, and sound. This
extends the capabilities and power of your server. Many adapters provide
bus-master capabilities, which enable the adapters to perform operations without
interrupting the server's microprocessor.These expansion slots have Plug and Play capabilities. When operating sy



Considerations

Two types of adapters are available for your IBM RS/6000 7024 E Series: ISA and PCI.



1. Review the documentation that came with the adapter and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that came with the adapter documentation.
2. You can install PCI adapters in slots 1–6.
3. You can install ISA adapters in slots 6, 7, and 8 only. Note that slot 6 can accommodate one adapter that is either PCI or ISA.

Attention: To avoid possible damage to adapters and server components, be sure that the adapters you install do not touch each other or the components (such as the microprocessor) inside the server. For example, if the adapter you are installing physically touches the microprocessor or another component, select a different expansion slot that can adequately accommodate the adapter's size. Full-size PCI adapters can be installed in PCI expansion slots 1–6. Full-size ISA adapters can be installed in expansion slots 6–8.

Installing Sequence

To ensure that your server configures correctly, you must observe the following protocol if you install different types of adapters at the same time:

1. Install the ISA adapters.
2. Reinstall the cover (see “Installing the Cover” on page 5-53) and reconnect the cables (see step 2 on page 5-54).
3. Configure the ISA adapters.
4. Disconnect the cables (see step 4 on page 5-5) and remove the cover (see “Removing the Cover” on page 5-4).
5. Install the PCI adapters.
6. Reinstall the cover (see “Installing the Cover” on page 5-53) and reconnect the cables (see step 2 on page 5-54).

   Note: During POST, your server automatically configures all currently installed ISA Plug and Play and PCI devices.

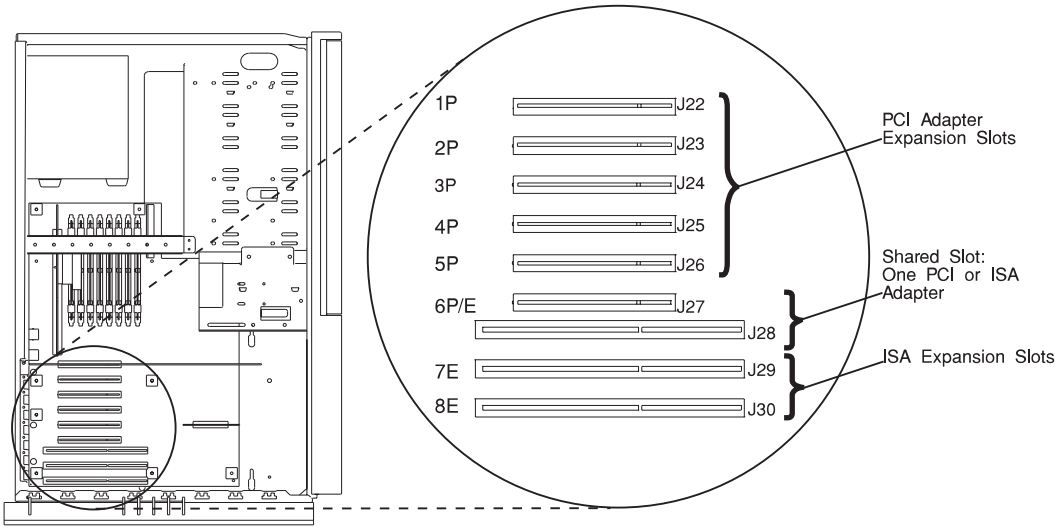
If you do not install and configure the adapters in this order, you might receive system configuration errors or encounter configuration conflicts.

Attention: ISA interrupts cannot be shared.

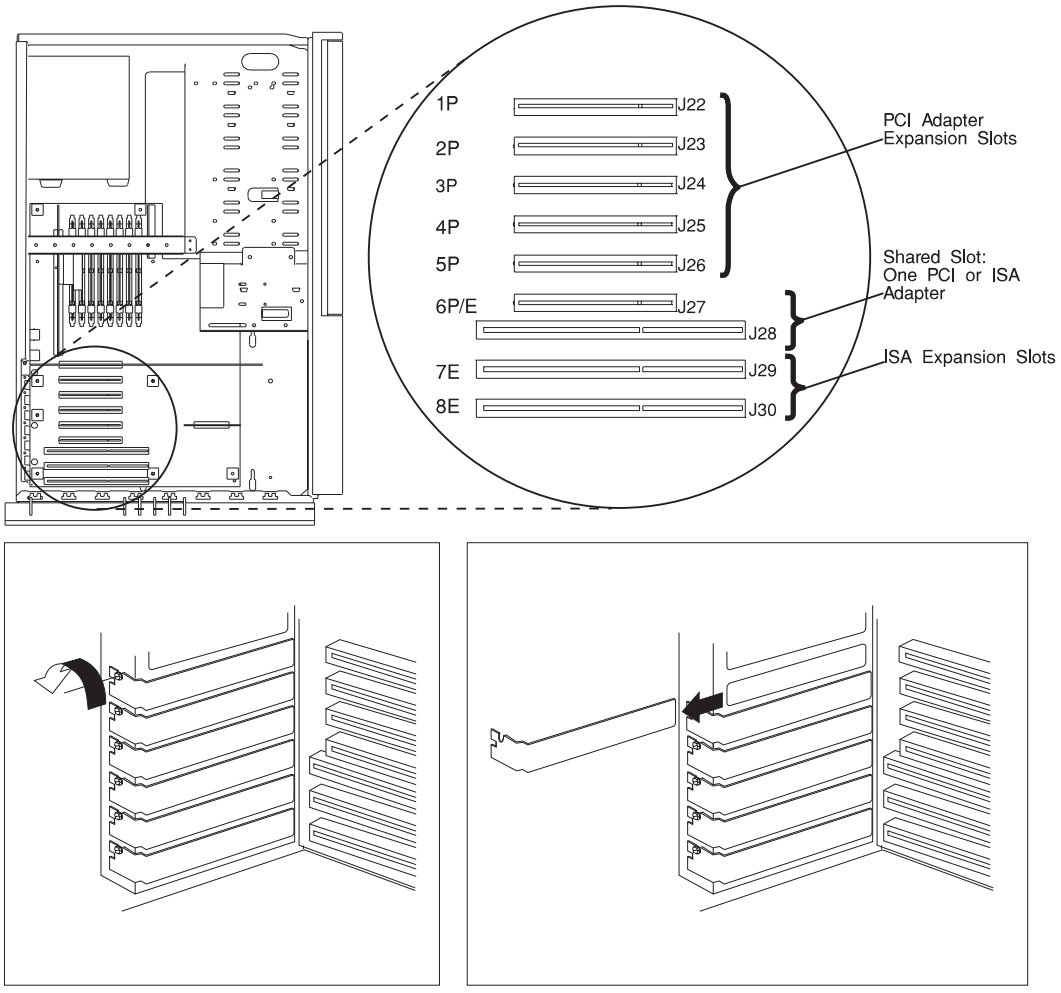
Installation Procedure

1. Determine which expansion slot you will use for the adapter. The top six slots are for PCI adapters, and the bottom three slots are for ISA adapters. Slot 6 and is a shared slot: if you install one type of adapter in slot 6, you cannot install the other as well.

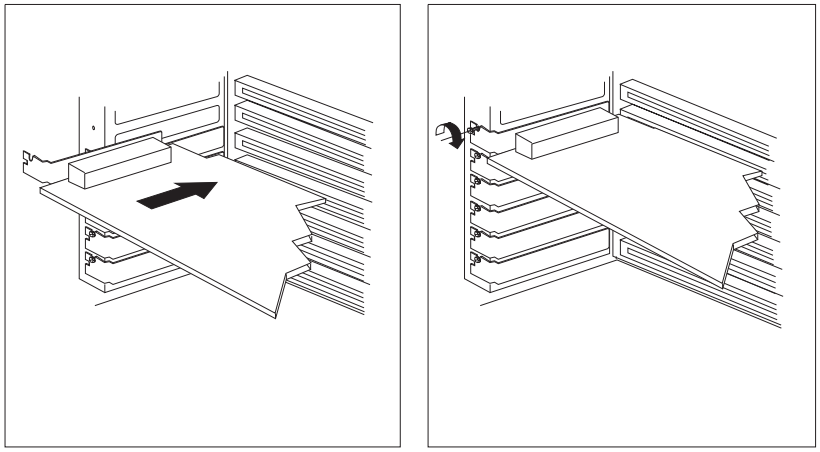
   Check the instructions that came with the adapter for any requirements or restrictions. If there are no restrictions other than those listed in “Considerations” on page 5-22, you can use any empty ISA or PCI slot.



2. Remove the expansion-slot cover:
   a. Loosen and remove the screw on the top of the expansion-slot cover.
   b. Slide the expansion-slot cover out of the server.
   c. Store it in a safe place for future use.



3. Install the adapter:
   a. Carefully grasp the adapter and align it with the expansion slot.
   b. Support the server with one hand, and slide the adapter straight into the expansion slot with the other hand. Press the adapter *firmly* into the expansion slot.
   c. Tighten the expansion-slot screw on the top of the adapter's bracket.



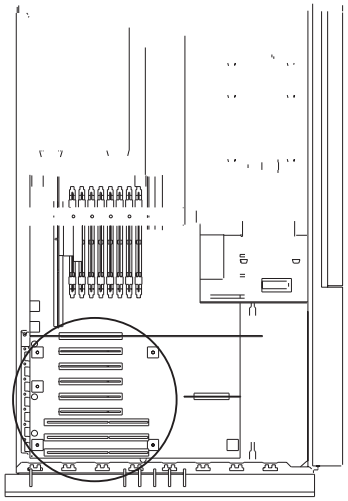
4. Go to “Adapters” on page A-4 to write the adapter name next to the slot into which it is installed; then, return here to determine your next step.

   Note: Remember to reinstall the cover (see “Installing the Cover” on page 5-53) and run the appropriate configuration programs.

5. If you have any more options to install, see “Option List” on page 5-7.

Removing Adapters

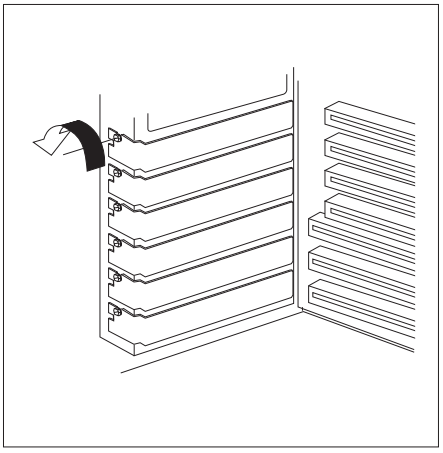
1. Remove the adapter:
    a. Note the slot number of the adapter you are removing.
    b. Loosen and remove the screw on top of the adapter's bracket.
    c. If there are any internal cables attached to the adapter, disconnect them.
    d. Put one hand on top of the server for support, and with the other hand, carefully pull the adapter out of the slot.

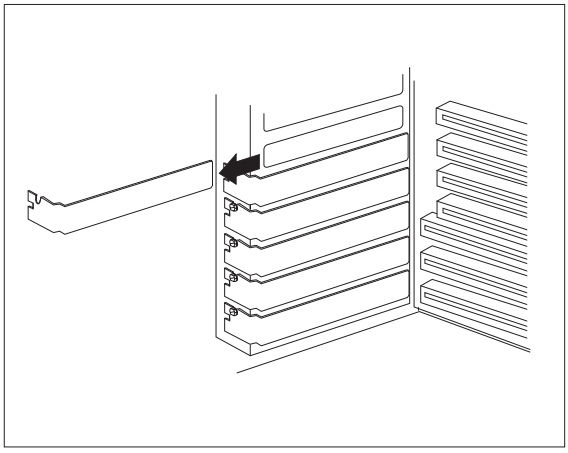


2. If you are installing another adapter in this expansion slot, follow the instructions given under “Installing Adapters” on page 5-21.

   If you are not installing another adapter in this expansion slot, replace the expansion-slot cover:

   a. Slide the cover over the open expansion slot.
   b. Tighten the expansion-slot screw on the top of the expansion-slot cover.





3. Go to “Adapters” on page A-4 and delete the name of the adapter you removed; then, return here to determine your next step.

   Note: Remember to reinstall the cover (see “Installing the Cover” on page 5-53) and run the appropriate configuration programs.

4. If you have any more options to install, see “Option List” on page 5-7.

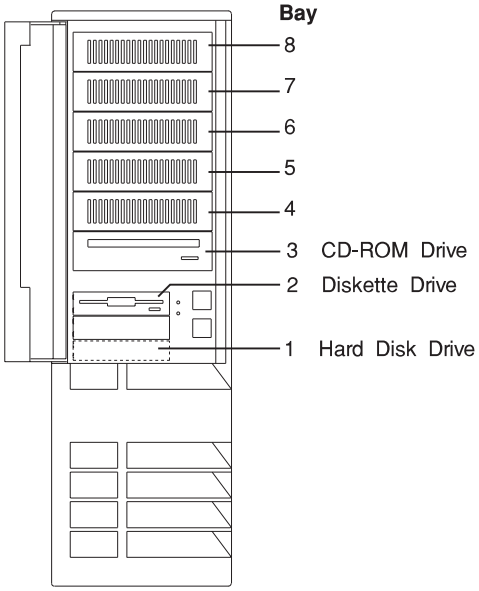
Installing Internal Drives

Several types of drives are available, such as:

- Diskette
- Hard disk
- Tape
- CD-ROM.

If you are installing a CD-ROM drive, refer to “Laser Safety Information” on page xvii before installing the drive.

Internal drives are installed in *bays*. The bays are referred to by numbers 1 through 8. A hard disk drive is preinstalled in bay 1 in all models. A diskette drive is preinstalled in bay 2 in all models. A CD-ROM drive is preinstalled in bay 3 in all models. Bays 4–8 may contain a hard disk, tape drive, or CD-ROM drive, or may be unoccupied and ready to receive additional drives.



Cover plates (sometimes called *bezels*) cover the front of some installed drives. If you install a drive that uses removable media (diskette, CD-ROM, or tape), you might have to remove or change the cover plate.

Important:

1. Bay 1 is for 3.5-inch hard disk drives only. All models are shipped with a hard disk drive preinstalled in bay 1.
2. Bay 2 is for a 3.5-inch diskette drive only. All models are shipped with a diskette drive preinstalled in bay 2.
3. Bay 3 has a preinstalled SCSI CD-ROM drive.
4. Bays 4–8 contain trays for housing 3.5-inch drives. If you want to install a 5.25-inch drive in one of these bays, you must remove screws and the tray before attempting to install the drive.

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 a 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.

Drives come in a variety of sizes and types. Table 5-1 shows the widths, types, and maximum heights for the drives that you can install in each bay.

Bay	Drive Width	Drive Type	Maximum Drive Height
1	3.5-inch	Hard disk	25.4 mm (1 inch), with a drive in bay 2
2	3.5-inch	Diskette	25.4 mm (1 inch)
3	5.25-inch	CD-ROM	41.3 mm (1.6 inches)
4–8	3.5-inch or 5.25-inch	Hard disk, removable media*	41.3 mm (1.6 inches)
Note: Removable media include CD-ROMs, diskettes, and tapes.			

Table 5-1. Maximum Allowable Drive Sizes

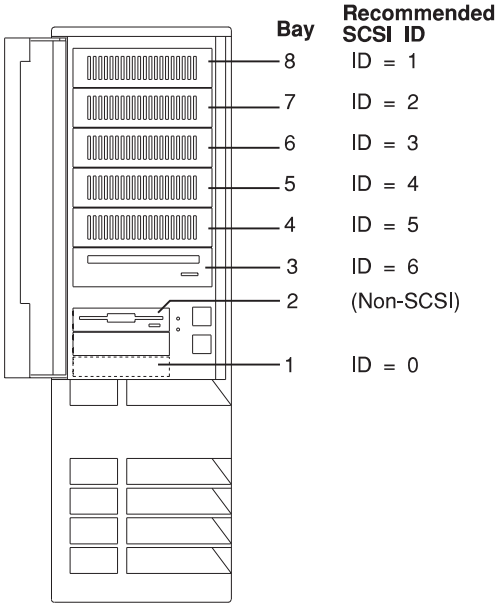
SCSI Drives: Some drives have a special design called *small computer system interface*, or SCSI. This design allows you to attach multiple drives to a single SCSI-2 adapter.

Note: Any information about SCSI drives in this book also applies to other SCSI devices such as scanners and printers.

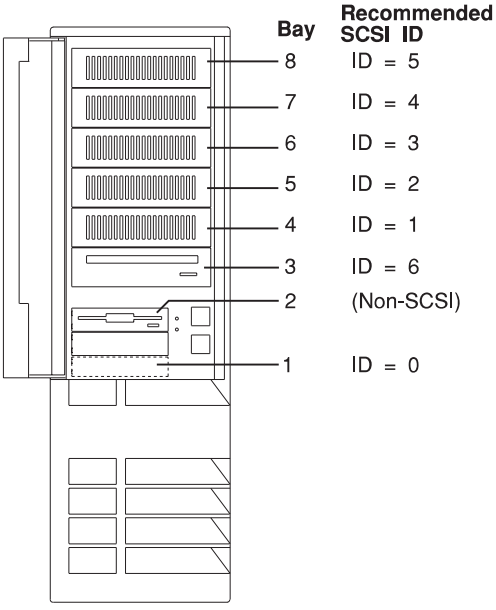
All IBM RS/6000 7024 E Series models come with a built-in SCSI-2 interface. All models also come with a preinstalled SCSI hard disk drive and CD-ROM drive. If you install additional SCSI devices, you must set a unique identification (ID) for each SCSI device that you connect to the SCSI-2 adapter, so that the SCSI-2 adapter can identify the devices and ensure that different devices do not attempt to transfer data at the same time. The default ID for the SCSI-2 adapter is 7. The ID for the preinstalled CD-ROM drive is 6. Your server comes with at least one preinstalled hard disk drive in bay 1 set to SCSI ID 0.

If you order your system with any more drives preinstalled, they are set to the following SCSI IDs if they are installed in the indicated bays. It is strongly recommended you set the SCSI ID of any drive you install to match the address listed for bay in which you install the new drive.

Early Systems



Current Systems

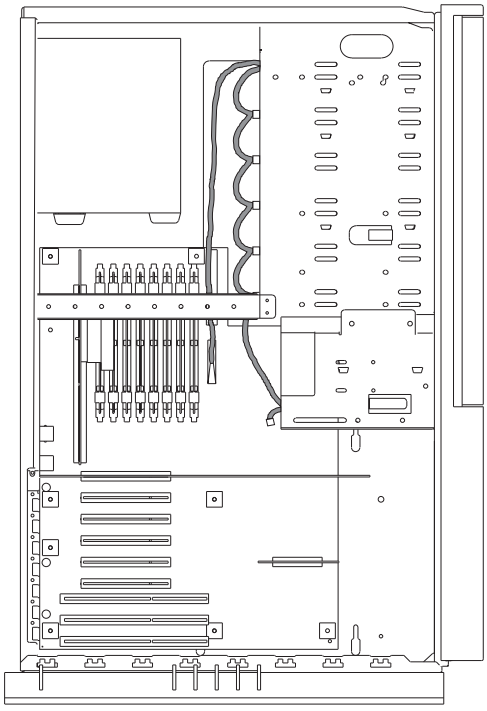


Fast/Wide (16-bit) devices support SCSI IDs 0 to 15; narrow (8-bit) devices support SCSI IDs 0 to 6.

Refer to the instructions that came with the SCSI devices for information about setting a SCSI ID.

If you attach internal SCSI devices, you must remove the termination from all of the devices within the chain, including the final device in the chain. The internal SCSI cable provides its own termination.

The following illustration shows a server with preinstalled hard disk drives. The last device in the internal chain is the internal SCSI drive in bay 1.



Note: A Fast/Wide cable connects the hard disk drive to the SCSI-2 adapter. A 16-bit to 8-bit SCSI Internal Converter is used to connect the CD-ROM drive to the wide cable. The external SCSI-2 connector requires a 68-pin external cable connector.

Refer to the instructions that came with the SCSI device for more information about termination. Refer to the *User's Guide* for additional information about your server's SCSI subsystem.

Preinstallation Steps (All Bays)

Before you begin, be sure you have:

- Read “Safety Considerations” on page 5-2 and “Handling Static-Sensitive Devices” on page 5-3.
- Read the manual that came with the internal drive
- Removed the server cover (see “Removing the Cover” on page 5-4).

1. Choose the bay in which you want to install the drive. (Refer to Table 5-1 on page 5-30 for the drive types and sizes available for each bay.)
2. Touch the static-protective bag containing the drive to any unpainted metal surface on the server; then, remove the drive from the bag.
3. Check the instructions that came with the drive or contact your authorized reseller or marketing representative to see if you need to set any switches or jumpers on the drive. Change them if necessary.

Installing Drives in Bays 1 and 2

The following information is important. Read the information completely before you install any drive.

- All models are shipped with a preinstalled SCSI hard disk drive in bay 1 attached to a 7-drop, Fast/Wide (16-bit) cable. This cable can be used to install up to five more Fast/Wide devices. The CD-ROM drive is connected to this cable through the 16-bit to 8-bit SCSI Internal Converter.
- All models are also shipped with a 1.44MB diskette drive already installed. The diskette drive is attached with its own non-SCSI cable.

  Note: If you install any 8-bit devices, you need the 16-bit to 8-bit SCSI Internal Converter.
- Follow the instructions in the documentation that came with the drives, including those that describe how to set jumpers and switches, and how to remove termination.
- If a tray or carrier is attached to a drive that you intend to install, you must remove the tray before installing the drive.

Installing Drives in Bays 3–8

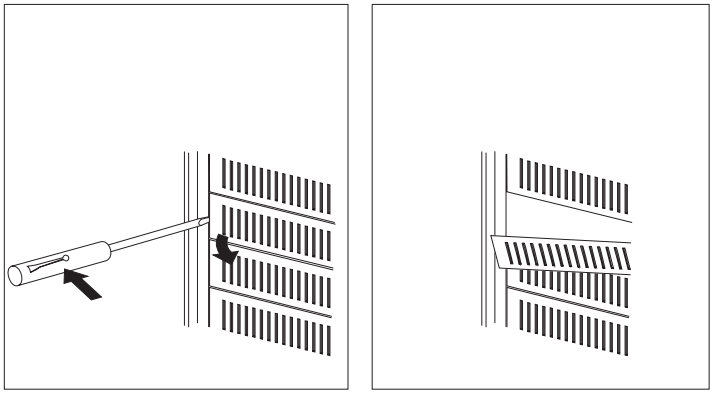
The following information is important. Read the information completely before you install any drive.

- All models are shipped with a SCSI CD-ROM drive preinstalled bay 3.
- All models are shipped with a preinstalled SCSI hard disk drive in bay 1 attached to a 7-drop, Fast/Wide (16-bit) cable. This cable can be used to install up to five more Fast/Wide devices. The CD-ROM drive is connected to this cable through the 16-bit to 8-bit SCSI Internal Converter.

  Note: If you install any 8-bit devices, you need the 16-bit to 8-bit SCSI Internal Converter.

  If you install 16-bit devices, you must use a 16-bit cable. If you connect the CD-ROM drive to a 16-bit cable, you must use the 16-bit to 8-bit SCSI Internal Converter. To order the cable and converter, contact your authorized reseller or marketing representative.
- Follow the instructions in the documentation that came with the drives, including those that describe how to set jumpers and switches, and how to remove termination.

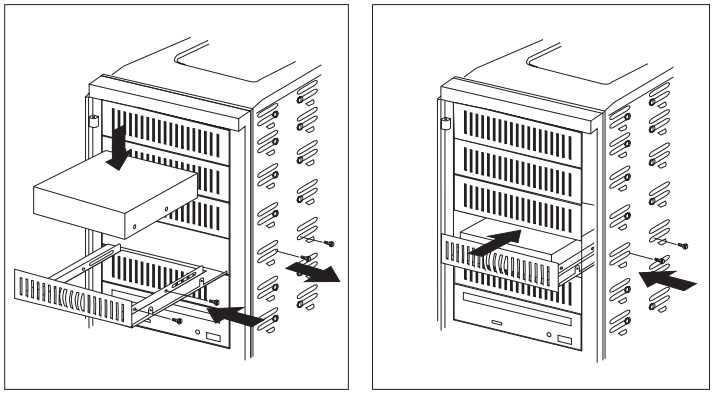
1. Open the door.
2. Remove the cover plate from the target bay:
   a. Insert a small flat-blade screwdriver under the side of the cover plate.
   b. Lift the cover plate and remove it from the server's front panel. (Save the cover plate for future use.)



3. Remove the screws that secure the tray (from both sides of the tray housing) in the target bay. Then, slide the tray out of the bay.
4. If you are installing a 5.25-inch drive, go to step 8 on page 5-38.

   If you are installing a 3.5-inch drive, place the drive on the tray, with the connectors facing the rear of the tray.
5. Insert the screws that came with the drive into the holes on the tray. Tighten the screws.

   Attention: To ensure that the drive functions properly, do not overtighten the screws.
6. Slide the drive and tray into the target bay.
7. Reinstall and tighten the four screws you removed in step 3. Go to step 9 on page 5-39.

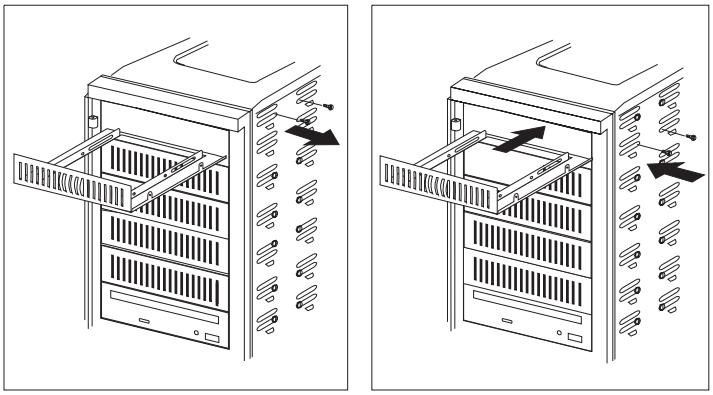


8. If you are installing a 5.25-inch drive, complete the following steps:

   Note: Do not use the tray, but store it for future use.

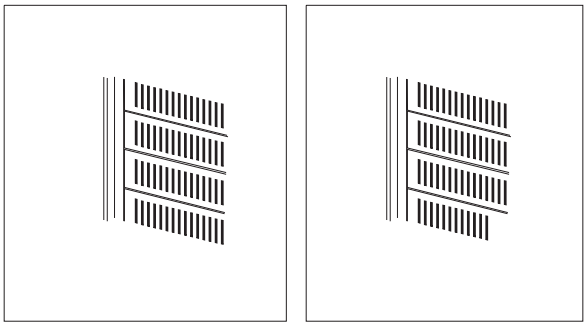
   a. Position the drive with the connectors facing the rear of the server.
   b. Slide the drive to the rear until it stops.
   c. Loosely reinstall the four screws you removed from the tray housing in step 3 on page 5-37.
   d. Align the drive and tighten the screws.

      Attention: To ensure that the drive functions properly, do not overtighten the screws.



9. Connect the drive to a connector on the appropriate cable.

12. If necessary, replace the cover plate at the front of the bay:
    a. If you installed a nonremovable-media drive, use the cover plate that you removed in step 2 on page 5-36.
    b. If you installed a removable-media drive, do not install a cover plate.
    c. Insert the tabs on the right end of the cover plate into the target bay opening in the server's front panel.
    d. Pivot the plate and press it into place.



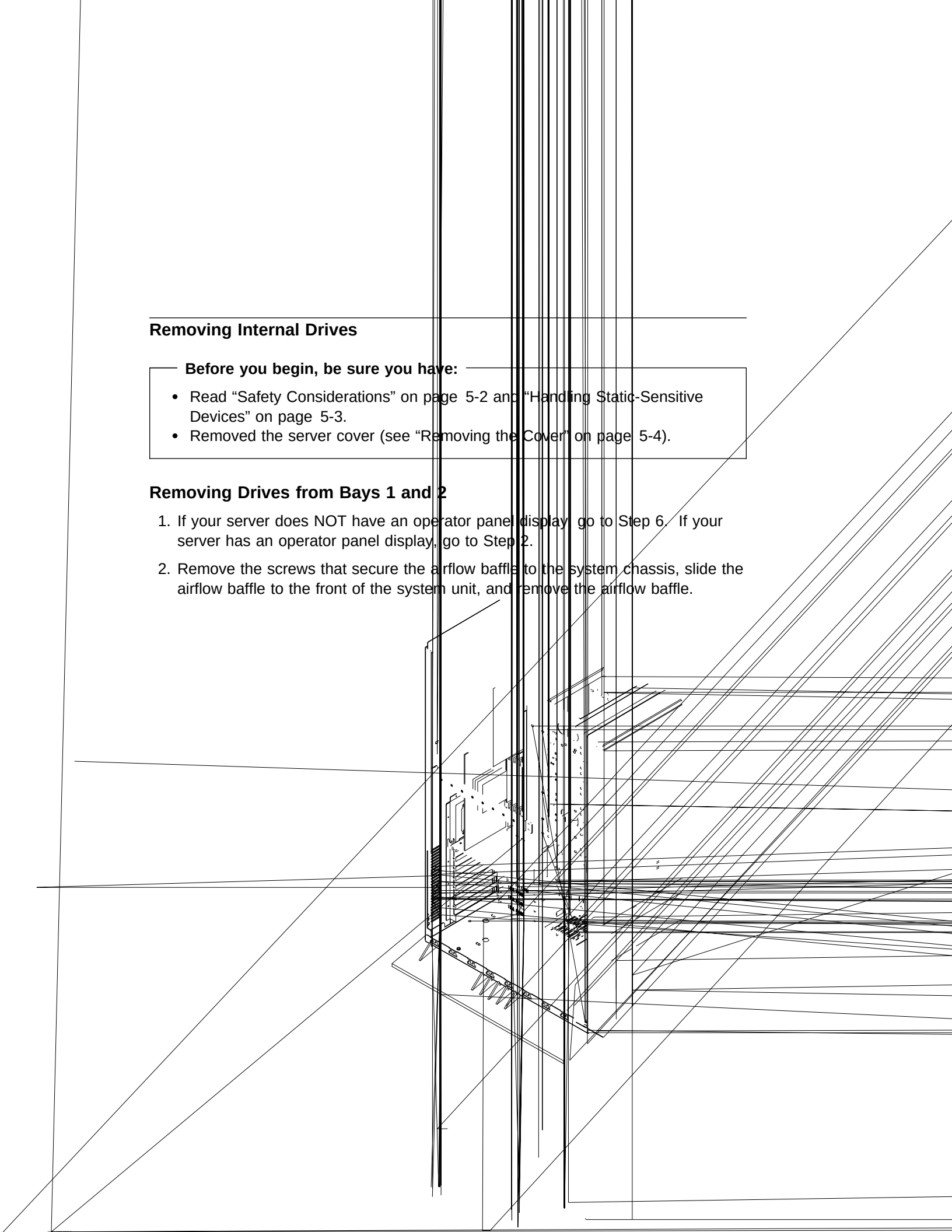
Removing Internal Drives

Before you begin, be sure you have:

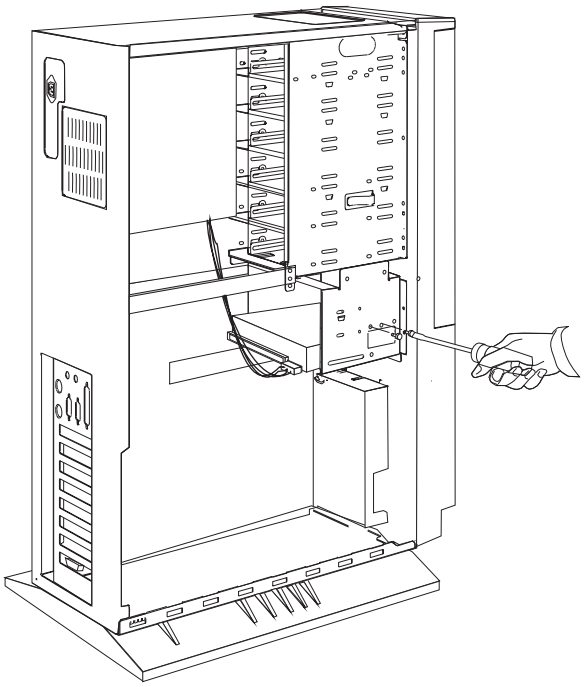
- Read “Safety Considerations” on page 5-2 and “Handling Static-Sensitive Devices” on page 5-3.
- Removed the server cover (see “Removing the Cover” on page 5-4).

Removing Drives from Bays 1 and 2

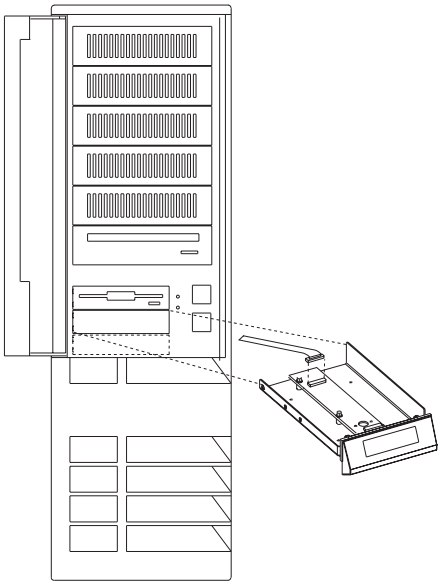
1. If your server does NOT have an operator panel display, go to Step 6. If your server has an operator panel display, go to Step 2.
2. Remove the screws that secure the airflow baffle to the system chassis, slide the airflow baffle to the front of the system unit, and remove the airflow baffle.



3. Remove the screws that secure the operator panel display assembly to the system chassis.



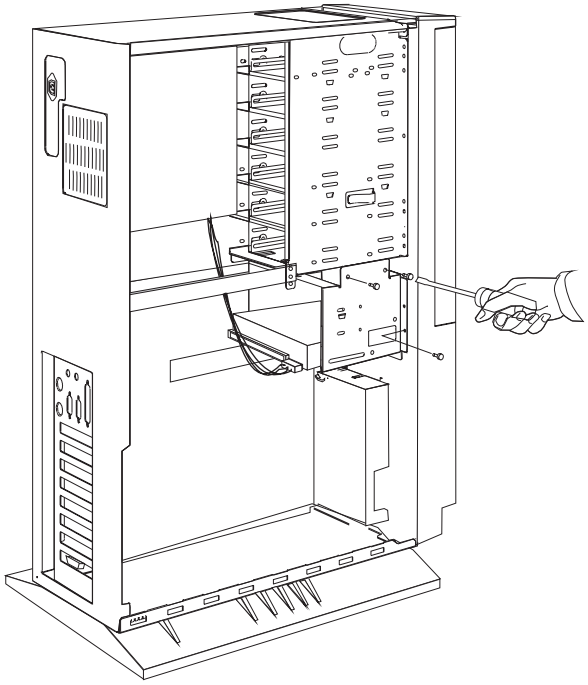
4. Open the door.
5. Pull the display panel from the front of the system unit and unplug the operator panel display cable from the rear of the operator panel display.



6. Remove the four screws from the drive housing containing bays 1 and 2.

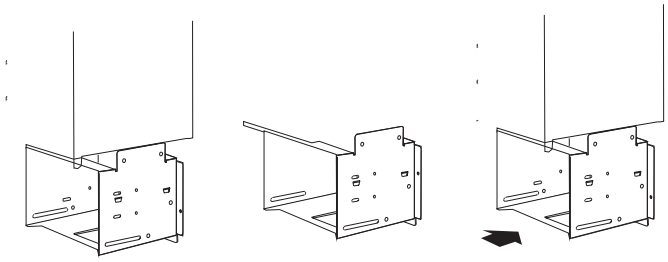
   Note: Three screws are shown near the screwdriver in the following illustration. The fourth screw is located under the housing, on the left-hand side.

   Gently pull the housing away from the bracket that holds its other side in place.



7. To remove a drive from bay 1 or 2, complete the following steps:

    a. Find the drive you plan to remove.
    b. Disconnect the cables (signal and power) from the rear of the drive.
    c. Remove the screws that hold the drive in the housing.
    d. Slide the drive out of the bay and store it in a safe place.



8. If you are installing another internal drive, go to step 1 on page 5-33.

   If you are removing another internal drive, return to “Removing Internal Drives” on page 5-41.

   If you are not installing or removing another internal drive, continue with the next step.

9. Update your records in “Internal Drives” on page A-3; then, return here to determine your next step.

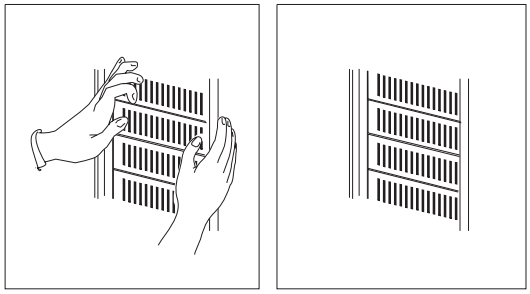
10. If you have any more options to install, see “Option List” on page 5-7.

place.

4. Update your records in “Internal Drives” on page A-3; then, return here to determine your next step.
5. If you are installing another internal drive, go to step 1 on page 5-33.

   If you are removing another internal drive, return to “Removing Internal Drives” on page 5-41.

   If you are not installing or removing another internal drive, continue with the next step.
6. Replace the cover plate:
   a. Locate the original blank cover plate that was shipped with your server.
   b. Insert the tabs on the right end of the cover plate into the target bay opening in the server's front panel.
   c. Pivot the plate and press it into place.

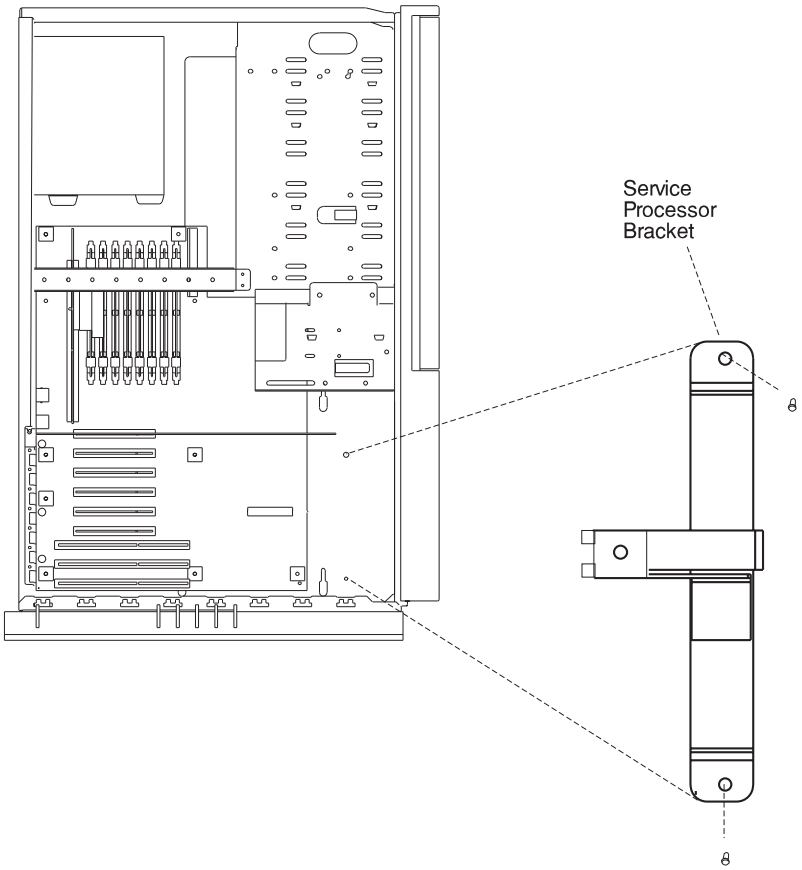


7. If you have other procedures to perform, refer to “Option List” on page 5-7.

Installing a Service Processor

1. Refer to the *Service Processor Installation and User's Guide* before installing the service processor.
2. If you have not already done so, remove the covers as described in “Removing the Cover” on page 5-4.

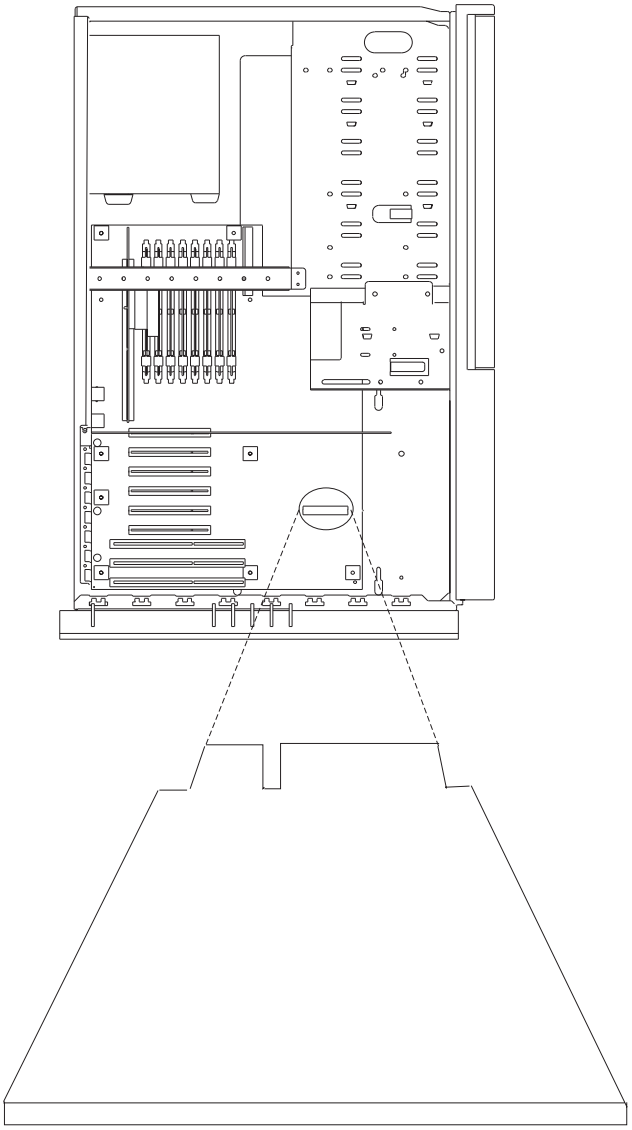
   Attention: Make sure the power cord is unplugged and the standby power (Power LED) is Off before installing the service processor.
3. Install the service processor bracket on the system board with the two screws provided.



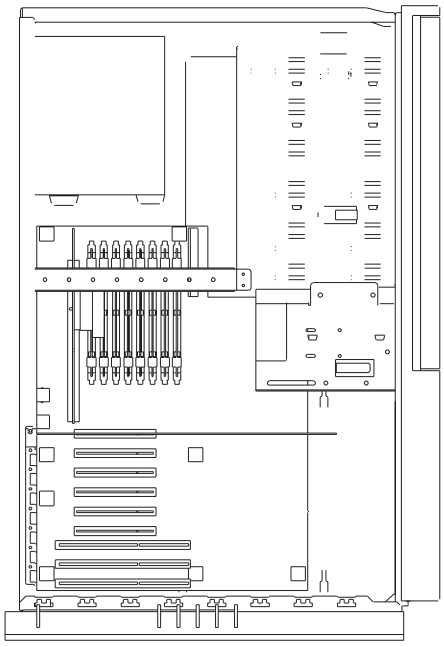
4. Locate the service processor connector.

Attention: If a long adapter interferes with installation of the service processor, move the long adapter to another slot.

5. Install the service processor.

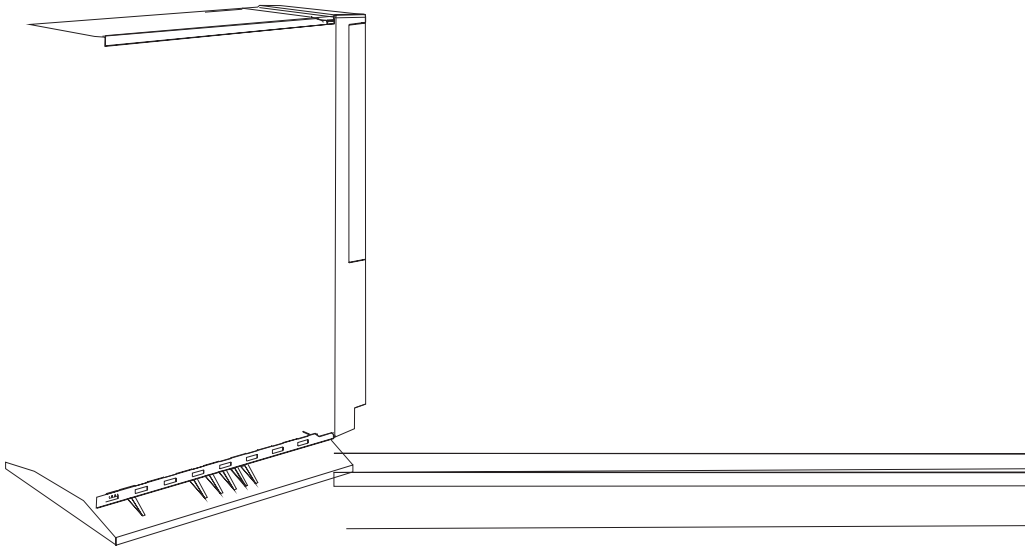


6. Install the retainer on the service processor bracket with the screw provided.7. If you have other procedures to preform,



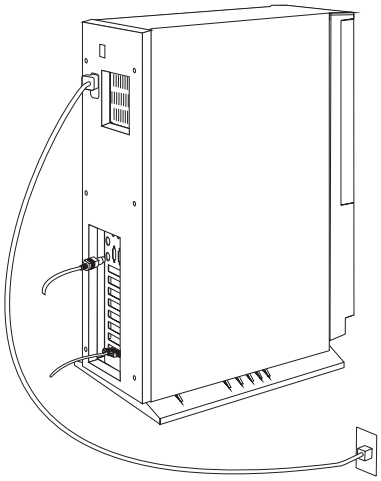
Installing the Cover

1. Replace the cover:
    a. Align the cover over the frame of the server and slide the cover in place.
    b. Tighten the six screws in the recessed holes on the cover.



2. Connect all cables to the back of the server; then, plug all power cords into properly grounded electrical outlets.

   Note: If you are in the United Kingdom and have a modem or fax machine attached to your server, reconnect the telephone line *after* you plug in the power cords.



Completing Options Installation

To complete the setup of your system unit, go to “Connecting the Cables” on page 1-7.

Chapter 6. Using the Standalone and Online Diagnostics

Sources for the Diagnostic Programs

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

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

Standalone and Online Diagnostics Operating Considerations

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

- Run Online Diagnostics in Service Mode when possible, unless otherwise directed. The Online Diagnostics perform additional functions, compared to Standalone Diagnostics.
- When running Online Diagnostics, device support for some devices may not have been installed. If this is the case, that device will not appear in the resource list.
- When running Standalone Diagnostics, device support for some devices may be contained on supplemental diagnostic media. If this is the case, the device will not appear in the resource list when running diagnostic unless the supplemental media has been processed.
- Support for some tty terminals is optionally installed. If you attach a tty terminal to a system to run diagnostics beware that it may not work properly since the AIX support for the terminal may not be installed.

Selecting a Console Display

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

Identifying the Terminal Type to the Diagnostics Programs

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

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

Undefined Terminal Types

If an undefined terminal type from the DEFINE TERMINAL option menu is entered, the menu will prompt the user to enter a valid terminal type, and the menu will be redisplayed until either a valid type is entered or the user exits the DEFINE 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 will be reset to "dumb", the Diagnostic Operating Instruction panel will be displayed, and the user will be required to go through the DEFINE TERMINAL process again.

Running Standalone Diagnostics

Consider the following when you run Standalone Diagnostics:

- The diagnostic disc must remain in the CD-ROM drive for the entire time that diagnostics are executing.
- The diagnostic CD-ROM disc cannot be ejected from the CD-ROM drive once the diagnostic programs have loaded. The disc can only be ejected after the system has been powered-Off and then powered-On (Standalone mode) or after the diagnostics program has terminated (Online concurrent mode). The disc must be ejected prior to the system attempting to load the diagnostic programs again.
- The CD-ROM drive from which diagnostics were loaded cannot be tested.
- The SCSI adapter (or circuitry) controlling the CD-ROM drive from which 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 installation of the AIX operating system, all three modes of operation are available.
- The diagnostics cannot be loaded on a system (client) from a server if that system is not set up to IPL from a server over a network, or the server has not been setup to send a service mode IPL of the diagnostics. When the system is set up to IPL from a server, the diagnostics are executed in the same manner as they are from disk.
- If the diagnostics were loaded from disk or a server, you must shutdown the AIX operating system before powering the system unit off to prevent possible damage to disk data. This is done in one of two ways:
  - If the diagnostic programs were loaded in Standalone mode, press the F3 key until DIAGNOSTIC OPERATING INSTRUCTIONS displays; then follow the displayed instructions to shutdown the AIX operating system.
  - If the diagnostic programs were loaded in maintenance or concurrent mode, enter the shutdown -F command.
- Under some conditions the system may stop, with instructions displayed on attached displays and terminals. Follow the instructions to select a console display.

Running the Diagnostics from a tty terminal

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

- See the operator manual for your type of tty terminal to find the key sequences you need to respond to the diagnostics. For the 3151, refer to the 3151 ASCII Display Station Guide to Operations, form number GA18-2633. For the 3164, refer to the 3164 ASCII Color Display Station Description, form number GA18-2617.
- When the diagnostics present display information through the S1 port, certain attributes are used. These attributes are set as if the diagnostics were using a 3161 display terminal. The following tables list attributes for the 3161 ASCII Display Terminal and for two other ASCII display terminals commonly used with the system.
- If you have a tty terminal other than a 3151, 3161 or 3164 attached to the S1 port, your terminal may have different names for the attributes. Use the attribute descriptions in the following tables to determine the settings for your terminal.

General Attributes Always Required

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

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

Refer to the following table.

General Setup Attributes	3151 /11/31 /41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
Machine mode	3151	3151	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 column	24 x 80	24 x 80		Uses the EIA-232 interface protocol.
Scroll	Jump	Jump	Jump	When the last character on the bottom line is entered, the screen moves down one line.
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.

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

Additional Communication Attributes

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

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

Communication Setup Attributes	3151 /11/31 /41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
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 Mode of Operation

The Online diagnostics can be run in three modes:

- Service Mode allows checking of most system resources.
- Concurrent Mode allows the normal system functions to continue while selected resources are being checked.
- Maintenance Mode allows checking of most system resources

Service Mode

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

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

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

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

1. Stop all programs including the AIX operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROM discs.
3. Turn the system unit's power off.
4. Turn the system unit's power on.
5. After the first POST indicator appears on the system unit's console, press F6 on the direct attached keyboard or 6 on the tty keyboard to indicate that diagnostics are to be loaded.

   Note: The term "POST indicator" refers to the ICONS (graphic display) or device mnemonics (ASCII terminal) that are displayed while the POST are executing.
6. Enter any requested password.
7. Follow any instructions to select a console.
8. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.
9. Follow the displayed instructions to checkout the desired resources.
10. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.
11. Press the F3 key (from a defined terminal) or press 99 (for an undefined terminal) to shutdown the diagnostics before turning off the system unit.

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

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

Concurrent Mode

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

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

- SCSI adapters connected to paging devices
- The disk drive used for paging
- Some display adapters
- Memory
- Processor.

There are three levels of testing in concurrent mode:

- The **share-test level** tests a resource while the resource is being shared by programs running in the normal operation. This testing is mostly limited to normal commands that test for the presence of a device or adapter.
- The **sub-test level** tests a portion of a resource while the remaining part of the resource is being used in normal operation. For example, this test could test one port of a multiport device while the other ports are being used in normal operation.
- The **full-test level** requires the device not be assigned to or used by any other operation. This level of testing on a disk drive may require the use of the **varyoff** command. The diagnostics display menus to allow you to vary off the needed resource.

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

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

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

Running the Online Diagnostics in Concurrent Mode

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

- Log on to the AIX operating system as root or superuser.
- Enter the diag command.
- When the DIAGNOSTIC OPERATING INSTRUCTIONS are displayed, follow the instructions to check out the desired resources.

- When testing is complete; use the F3 key to return to the DIAGNOSTIC 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 and other resources that can not be tested by the Online Diagnostics.

Error Log Analysis is not done by the Standalone Diagnostics.

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

Running the Standalone Diagnostics

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

1. Stop all programs including the AIX operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROMs.
3. Turn the system unit's power off.
4. Set the key mode switch to the service position.
5. Turn the system unit's power on.
6. Insert the diagnostic media drive.
7. When the keyboard POST indicator appears, press the F5 key on the direct attached keyboard, or the number 5 key on the tty keyboard.
8. Enter any requested passwords.
9. Follow any instruction to select the console.
10. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.
11. Follow the displayed instructions to checkout the desired resources.
12. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.

General Information About Multiple Systems

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

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

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

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

These guidelines generally present considerations for the following:

- Starting and stopping the communications with the other system.
- Considerations before running diagnostics on the system.
- Analyzing the error log information.
- Using the wrap plugs with the diagnostics.

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

High-Availability SCSI

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

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

High-Availability Cabling

Refer to *IBM RS/6000 Adapter, Device, and Cable Information for Multiple Bus Systems*. additional cabling information

Diagnostic Summary

Memory and Processor Testing

- Memory and Fixed-Point Processors are only tested during POST.
- A complete memory test is run during POST.
- The POST will only halt and report problems that prevent the system from booting.
- All other problems are logged into Residual Data and are only analyzed and reported if the Base System or Memory Diagnostic is run.
- The Base System Diagnostic also tests the Floating Point Processor.

Residual Data Analysis

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

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

Error Log Analysis

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

- Error Log Analysis is only preformed when running online diagnostics.
- Error Log Analysis is NOT preformed when running from removable media except for mounted CD-ROM.
- Error Log Analysis will only report problems if the errors have reached defined thresholds. Thresholds can be from 1 to 100 depending upon the error.
- Permanent errors do not necessarily mean a part should be replaced.
- Automatic Error Log Analysis (diagela) provides the capability to do error log analysis whenever a permanent hardware error is logged.

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

- Problem Determination Mode will run all tests unless the resource is being used. If a problem is not found, then Error Log Analysis is performed.
- In Problem Determination Mode, Error Log Analysis is performed even if a resource is being used.
- A screen will always appear informing the user that the resource needs to be freed if a resource is being used.
- System Verification Mode does not do ELA. This mode should be run when doing a repair verification.
- Residual Data Analysis is done in either mode.

4.2 Diagnostic Changes

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

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

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

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

The following sections describe the 4.2 Diagnostic Subsystem.

diag Command Line Options:

```
COMMAND LINE OPTIONS:

        diag Command line flags are as follows:

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

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

        Default execution mode will be non-advanced mode.
```

Location Codes

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

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

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

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

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

The possible values for AB are as follows:

```
00      for processor bus
01      for ISA buses
04      for PCI buses
05      for PCMCIA buses (not supported)
```

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

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

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

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

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

  For systems that have memory modules that plug directly into the system planar the location code is 00-00-00-GH where GH is the memory module slot. For system that have memory cards with memory modules, the location code is 00-CD-EF-GH where CD is the card slot and GH is the memory module slot.
- For caches GH defines the cache. Values for GH are 01 through 16.
- For PCMIAs GH defines the PCMIA. Values for GH are 01 through 16.
- For async devices GH defines the port on the fanout box. Values are 00 to 15.
- For a diskette drive H defines which diskette drive 1 or 2. G is always 0.
- For all other devices GH is equal to 00.

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

For SCSI the Location Code is defined as:

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

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

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

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

Examples:

```
Processor-PCI bus
  00-00              PCI bus

Memory module in system planar
  00-00-00-01

Memory module in card
  00-0A-00-01

Integrated PCI adapters for
  04-A0              ISA bus (Integrated PCI-ISA bridge)
  04-B0              Secondary PCI bus (Integrated PCI-PCI bridge)
  04-C0              Integrated PCI SCSI controller

Non-integrated PCI adapters
  04-01              Any PCI card in slot 1
  04-02              Any PCI card in slot 2

Integrated ISA adapters
  01-A0              Diskette adapter
  01-B0              Parallel port adapter
  01-C0              Serial port 1 adapter
  01-D0              Serial port 2 adapter
  01-E0              Keyboard adapter
  01-F0              Mouse adapter

Non-integrated ISA adapters
  01-01              First ISA card defined/configured
  01-02              Second ISA card defined/configured
  01-03              Third ISA card defined/configured
  01-04              Fourth ISA card defined/configured

Device attached to SCSI controller
  04-C0-01-4,0       Device attached to Integrated PCI SCSI controller
```

Chapter 7. Introduction to Tasks and Service Aids

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

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

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

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

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

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

- Service Aids

  This selection will look at the machine configuration, exercise external interfaces, format media, look at past diagnostic results, control what resources are tested, check out media, etc.

Tasks

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

Note:

- Add or Delete Drawer Configuration
- Add Resource to Resource List
- AIX Shell Prompt
- Backup and Restore Media
- Change Hardware Vital Product Data
- Check Spare Sectors Service
- Configure Dials and LPFKeys
- Configure ISA Adapters
- Configure Ring Indicate Power On

- Configure Service Processor
- Create Customized Diagnostic Configuration Diskette
- Delete Resource from Resource List
- Disk Maintenance
- Disk Media
- Display/Alter Bootlist
- Display Configuration and Resource List
- Display Hardware Error Report
- Display Hardware Vital Product Data
- Display Machine Check Error Log
- Display or Change Diagnostic Run Time Options
- Display Previous Diagnostic Results
- Display Resource Attributes
- Display Service Hints
- Display Software Product Data
- Display Test Patterns
- Generic Microcode Download
- Local Area Network Analyzer
- Microcode Download
- Periodic Diagnostics
- PCI RAID Physical Disk Identify
- Process Supplemental Media
- Run Diagnostics
- Run Error Log Analysis
- SCSI Bus Analyzer
- SCSI Device Identification and Removal=
- SCSI Tape Utility
- SSA Service Aid
- Update Disk Based Diagnostics
- 7135 RAIDiant Array Service Aids

- 7318 Serial Communication Network Server

aids which are provided.

AIX Shell Prompt Service Aid

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

Backup/Restore Media Service Aid

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

Configure Ring Indicate Power On Service Aid

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

The settings allows the user to:

- Enable/Disable power on from Ring Indicate
- Read/Set the number of rings before power on

Configure Service Processor Service Aid

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

Enter one of the following service aids:

- Surveillance Setup
- Modem Configuration
- Call In/Call Out Setup
- Site Specific Call In/Call Out Setup

Surveillance Setup Service Aid

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

The settings allow you to:

- Enable/disable surveillance
- Set the surveillance time interval, in minutes
- Set the surveillance delay, in minutes

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

Modem Configuration Service Aid

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

Call In/Out Setup Support Service Aid

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

The settings allows the user to:

- Enable/Disable call in on either serial port.
- Enable/Disable call out on either serial port.
- Set the line speed on either serial port.

Site Specific Call In/Out Setup Support Service Aid

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

The site specific NVRAM settings allow you to:

- Set the phone number for the service center
- Set the phone number for the customer administration center
- Set the phone number for a digital pager

- Set the phone number for the customer system to call in
- Set the phone number for the customer voice phone
- Set the customer account number
- Set the call out policy
- Set the customer RETAIN id
- Set the customer RETAIN password
- Set the remote timeout value
- Set the remote latency value
- Set the number of retries while busy
- Set the system name

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

Create Customized Diagnostic Configuration Diskette

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

Diagnostic Package Utility Service Aid

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

- Format a 1, 2, or 4MB diskette

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

- Create a Standalone Diagnostic Package Configuration Diskette

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

  – Default refresh rate for a LFT

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

  – Different async terminal console

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

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

Dials and LPFK Configuration Service Aid

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

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

Dials and LPFKs Configuration Service Aid Before version 4.2

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

Configure Dials and LPFKs Task Version 4.2+

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

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

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

Disk Based Diagnostic Update Service Aid Before Version 4.2

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

Update Disk Based Diagnostic Task Version 4.2

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

Disk Media Service Aids

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

- Certify

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

- Format

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

- Format and Certify

  Format and Certify does the same as format does. After the Format is completed, Certify is run. This Certify 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).

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

Optical Disk Service Aids

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

- Initialize

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

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

- Spare Sector Availability

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

Disk Maintenance Service Aid

- Disk to Disk Copy Service Aid
- Display/Alter Sector Service Aid

Disk to Disk Copy Service Aid

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

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

1. Remove both drives.
2. Set the SCSI address of the new drive to the SCSI address of the old drive.
3. Install the new drive in the old drive's location.
4. Install any other drives that were removed into their original location.

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

Display/Alter Sector Service Aid

This service aid allows the user to display and alter information on a disk sector. Care must be used when using this service aid because inappropriate modification to some disk sectors may result in total loss of all data on the disk. Sectors are addressed by their decimal sector number. Data is displayed both in hex and in ASCII. To prevent corrupted data from being incorrectly corrected, the service aid 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. Diskette format support was added in version 4.2.

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

Display/Alter Bootlist Service Aid

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

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

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

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

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

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

- Display Configuration and Resource List
- Display Hardware Vital Product Data
- Change Hardware Vital Product Data
- Add or Delete Drawer configuration

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

This service aid will display all installed resources along with any VPD for those resources. Use this service aid when you want to look at the VPD for a specific resource.

Display Software Product Data Prior to Version 4.2

This service aid displays information about the installed software.

Display Software Product Data beginning with Version 4.2

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

- List Installed Software
- List Applied but Not Committed Software Updates
- Show Software Installation History
- Show Fix (APAR) Installation Status
- List Fileset Requisites
- List Fileset Dependents
- List Files Included in a Fileset
- List File Owner by Fileset

Display Configuration Service Aid and Display Configuration and Resource List Task

This service aid 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

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

This service aid provides a way to:

- Display the Diagnostic Test List

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

- Add a resource to the Diagnostic Test List

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

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

- Delete a resource from the Diagnostic Test List

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

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

Display Machine Check Error Log Service Aid

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

When a machine check occurs, information is collected and logged in a NVRAM error log before the system unit shuts down. This information is logged in the AIX error log and cleared from NVRAM when the system is rebooted from either hard disk or LAN. The information is not cleared when booting from Standalone Diagnostics. When booting from Standalone Diagnostics, this service aid can take the logged information and turn it into a readable format that can be used to isolate the problem. When booting from the hard disk or LAN, the information can be viewed from the AIX error log using the Hardware Error Report Service Aid. In either case the information is analyzed when running the `sysplanar0` diagnostics in Problem Determination Mode.

Display Previous Diagnostic Results Service Aid

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

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

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

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

Display Resource Attributes

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

Display or Change Diagnostic Run Time Options Task

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

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

The run time options are:

- Display Diagnostic Mode Selection Menus

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

- Include Advanced Diagnostics

  This option allows the user to select if the Advanced Diagnostics should be included or not (the default is no).

- Include Error Log Analysis

  This option allows the user to select if the Error Log Analysis (ELA) should be included or not (the default is no).

- Run Tests Multiple Times

This option allows the user to select if the diagnostic should be run in loop mode or not (the default is no).

Note: This option is only displayed when running Online Diagnostics in Service Mode.

Display Test Patterns Service Aid

This service aid provides a means of making adjustments to system display units by providing displayable test patterns. Through a series of menus the user selects the display type and test pattern. After the selections are made the test pattern is displayed.

Generic Microcode Download Service Aid

This service aid provides a means of restoring a diskette (or other media) and executing a restored program. This program 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

This service aid also displays all ISA adapters supported by diagnostics. Diagnostic support for ISA adapters not shown in the list may be supported from a Supplemental Diskette. ISA adapter support can be added from a Supplemental Diskette with this service aid.

Whenever an ISA adapter is installed, this Service Aid must be run and the adapter configured before the adapter can be tested. This Service Aid must also be run (and the adapter removed) whenever an ISA adapter is physically removed from the system.

If diagnostics are run on an ISA adapter that has been removed from the system,the diagnostics fail.

This service aid is only supported by the Standalone Diagnostics. SMIT should be used to configure ISA adapters for AIX.

ISA adapters cannot be detected by the system.

Note: When using this service aid choose the option that places the adapter in the "Defined State". Do not select the option that places the device in the "Available State.

Local Area Network Service Aid and Local Area Network Analyzer Task

This service aid and task are used to exercise the LAN communications adapters (Token-Ring, Ethernet, and Fiber Distributed Data Interface (FDDI). The following services are available:

- Connectivity testing between two network stations. Data is transferred between the two stations. This requires the user to input the Internet Addresses of both stations.
- Monitoring ring (Token-Ring only). The ring is monitored for a period of time. Soft and hard errors are analyzed.

  Additional information about this service aid can be found in the Local Area Network Service Aids CIS.

  Prior to version 4.2 this service aid was accessed via the Local Area Network Service Aids selection of the Service Aid Selection Menu. Beginning with version 4.2 this service aid is accessed via the Local Area Network Analyzer options from the Task Selection Menu.

Microcode Download Service Aid

This service aid provides a way to copy device microcode to a device. It is used to update the microcode on a device. It presents a list of devices that use microcode. The device on which the microcode is to be installed is selected. The service aid instructs the user on its use.

PCI RAID Physical Disk Identify

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

Periodic Diagnostics Service Aid

This service aid provides a tool for configuring periodic diagnostics and automatic error log analysis. A hardware resource can be chosen to be tested once a day, at a user specified time. If the resource cannot be tested because it is busy, error log analysis is performed. Hardware errors logged against a resource can also be monitored by enabling Automatic Error Log Analysis. This allows error log analysis to be performed every time a hardware error is put into the error log. If a problem is detected, a message is posted to the system console and a mail message sent to the user(s) belonging to the system group with information about the failure such as Service Request Number.

The service aid provides the following functions:

- Add or delete a resource to the periodic test list
- Modify the time to test a resource
- Display the periodic test list
- Modify the error notification mailing list
- Disable Automatic Error Log Analysis

Process Supplemental Media Task

Notes:

- This task is supported in Standalone Diagnostics only.
- Process and test one resource at a time.
- Do not process multiple supplements at a time.

Diagnostic Supplemental Media contain all the diagnostic programs and files required to test a resource. Supplemental media is normally released and shipped with the resource.

When prompted, insert the supplemental media. Then press Enter. After processing has completed, go to the resource selection list to find the resource to test.

This prompts for either diskette or tape media, reads in media using cpio, and executes **diagstart** shell script.

Run Diagnostics Task

The Run Diagnostics task invokes the Resource Selection List menu. When the commit key is pressed, Diagnostics are run on all selected resources.

The procedures for running the diagnostics depends on the states of the Diagnostics Run Time Options. The run time options are:

- Display Diagnostic Mode Selection Menus

  If this option is on, the Diagnostic Mode Selection Menu will be displayed when the commit key is pressed.

- Include Advanced Diagnostics

  If this option is on, Advanced Diagnostics will be included.

- Include Error Log Analysis

  If this option is on, Error Log Analysis will be included.

- Run Tests Multiple Times

  If this option is on, diagnostic are run in loop mode. This option is only valid when running Online Diagnostics in Service Mode.

Run Error Log Analysis Task

The Run Error Log Analysis task invokes the Resource Selection List menu. When the commit key is pressed, Error Log Analysis will be run on all selected resources.

SCSI Bus Service Aid and SCSI Bus Analyzer Task

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

Prior to version 4.2 the SCSI Bus Service Aid was accessed via the SCSI Bus selection from the Service Aid Selection Menu. Beginning with version 4.2 the SCSI Bus Service Aid is accessed via the SCSI Bus Analyzer option from the Task Selection Menu.

To use this service aid, the user should have an understanding of how a SCSI Bus works. This service aid should be used when the diagnostics cannot communicate with anything on the SCSI Bus and cannot isolate the problem. Normally the procedure for finding a problem on the SCSI Bus with this service aid is to start with a single device attached, ensure that it is working, then start adding additional

devices and cables to the bus ensuring that each one works. This service aid 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 menus 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 Device Identification and Removal

This service aid allows the user to choose a SCSI device or location from a menu and to identify a device, located in a &7027. system unit.

The service aid also does the following:

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

SCSI Tape Utilities Service Aid

This service aid provides a means to obtain the status or maintenance information from a SCSI tape drive. Only some models of SCSI tape drive are supported.

The service aid provides the following options:

- Display time since a tape drive was last cleaned.

  The time since the drive was last cleaned is displayed onto the screen. In addition, a message whether the drive is recommended to be cleaned 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.

SSA Service Aids

This service aid provides tools for diagnosing and resolving problems on SSA attached devices. The following tools are provided:

- Set Service Mode
- Link Verification
- Configuration Verification
- Format and Certify Disk

7135 RAIDiant Array Service Aid

The 7135 RAIDiant Array service aids contain the following functions:

- Certify LUN

  This selection reads and checks each block of data in the LUN. If excessive errors are encountered the user 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.

7318 Serial Communications Network Server Service Aid

This service aid provides a tool for diagnosing terminal server problems.

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, “Hardware Problem Determination” 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, “Using the Standalone and Online Diagnostics” 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 `System Checkout` (if displayed) option on the Diagnostic Selection menu.

   If you want to check one particular resource, select that resource on the Diagnostic Selection menu.
6. Go to Step 4.

Step 4. Additional System Verification

The checkout programs end with either the Testing Complete menu and a message stating `No trouble was found` or the A Problem Was Detected On (Time Stamp) menu with an SRN.

1. Press Enter to return to the Diagnostic Selection menu.
2. If you want to check other resources, select the resource. When you have checked all of the resources you need to check, go to Step 5.

Step 5. Stopping the Diagnostics

1. If running Online diagnostics, the system first should be shut down using the following procedure:
   a. Press F3 repeatedly until you get to the Diagnostic Operating Instructions, then follow the displayed instructions.
   b. Press F3 once, and then follow the displayed instructions to shut down system.
2. If you changed any attributes on your ASCII terminal to run the diagnostics, change the settings back to normal.
3. This completes the system verification. Report the SRN to the service organization if you received one. To do a normal boot, turn off the system unit and wait 30 seconds, and then set the power switch of the system unit to On.

Chapter 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 Chapter 6, “Using the Standalone and Online Diagnostics” 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 10."

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
The system stops with the Diagnostic Operating Instructions display with an obvious 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	

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 table on the following page, 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 do 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 will automatically begin testinghe e ´´ èà l the . ngh ll err* b lay?)è¢ ´ in t« g»

Diagnostic Response	Action
The Testing Complete menu and the `No trouble` was found message displayed and you have tested all of the resources.	Go to “Step 17.”

Step 14

The diagnostics produced an SRN for this problem.

1. Record the SRN and other numbers read out.
2. Report the SRN to the service organization.
3. **STOP.** You have completed these procedures.

Step 15

When you are loading the Standalone Diagnostics, the attributes for the terminal must be set to match the defaults of the diagnostic programs. The ASCII terminal must be attached to serial port 1 on the system unit.

Are you going to load Standalone Diagnostics and run them from a ASCII terminal?

NO Go to “Step 16.”

YES Go to “Running the Diagnostics from a tty terminal” on page 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-on light does not come on, or comes on and does not stay on.	Check the power cable to the outlet. Check the circuit breakers and check for power at the outlet. Assure the room temperature is within 60 - 90°F. If you do not find a problem, record error code M0PS0000 and report the problem to the service organization.
The system appears to be stopped, the disk activity light is off and a beep was NOT heard from the system unit.	Processor POST failure. Report error code M0CPU000.
The system appears to be stopped and the disk activity light is on continuously and a beep was NOT heard from the system unit.	No good memory could be found. Report error code M0MEM000.

Symptom	Action
The system appears to be stopped and the disk activity light is on continuously and a beep was heard from the system unit.	No good memory could be found. Report error code M0MEM001.
The diagnostics are loaded and there was no beep heard from the system unit during the IPL sequence.	Record error code M0SPK001.
The system stops with the Diagnostic Operating Instructions displayed.	Go to “Step 6.”
The disk drive activity light is blinking rapidly.	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 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.
One long beep followed immediately by a short beep was heard from the system unit.	Record error code M0GA0000 and report the problem to the service organization.
A continuous beep is heard from the system unit.	Record error code M0SB0000 and report the problem to the service organization.
The system does not respond when the password is entered.	Go to Step 7.

Symptom	Action
The system stopped and an indicator is displayed on the system console and an eight-digit error code is not displayed.	If the indicator (text or icon) represents: • a keyboard, record error code M0KBD000 and report the problem to the service organization. • boot disk, record error code M0HD0000 and report the problem to the service organization. • memory, record error code M0MEM002 and report the problem to the service organization. • a diskette drive, 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.
The System Management Services menu is displayed.	The device or media you are attempting to boot from may be faulty. 1. Check the SMS error log for any errors. To check the error log: • Choose tools • Choose error log • If an error is logged, check the time stamp. • If the error was logged during the current boot attempt, record it and report it to your service person. • If no recent error is logged in the error log, continue to the next step below. 2. If you are attempting to load the Online Diagnostics, try loading the Standalone Diagnostics. Otherwise, record error code M0SCSI01 and report to the service organization.
The system appears to be stopped, the disk activity light is on continuously, and a beep was heard from the system unit.	Record error code M0MEM001 and report the problem to the service organization.
The system stops and the message "STARTING SOFTWARE PLEASE WAIT ..." is displayed.	Report error code M0SCSI01.
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.

Appendix A. Server Records

Recording the Server Serial Number

The IBM RS/6000 7024 E Series identification numbers are located near the bottom, on the front of the server.

Record and retain the following information. In the box below, check or highlight the applicable server information for future reference.

Product Name	IBM RS/6000 7024 E Series
CPU Type/Speed	_____
Serial Number	_____
Key Serial Number	_____

Note: Two keys are provided with your server. Always store the keys in a safe place. If you lose them, you must order a replacement lock mechanism and keys from the manufacturer.

Memory Modules

Slot	Capacity
A (1)	_____
B (2)	_____
C (3)	_____
D (4)	_____
E (5)	_____
F (6)	_____
G (7)	_____
H (8)	_____
TOTAL	_____
L2 CACHE	_____

Installed Device Records

Use the following tables to keep a record of your system's default configuration settings and the options currently 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. It is recommended that you copy these tables before recording information in them, in case you need extra space to write in new values later, when you update your system's configuration.

Internal Drives

Early Systems

Bay	SCSI ID (Recommended)	SCSI ID (Actual)	Drive
8	1	_____	_____
7	2	_____	_____
6	3	_____	_____
5	4	_____	_____
4	5	_____	_____
3	6	_____	CD-ROM drive
2	NA	NA	Diskette
1	0	_____	Disk Drive

Current Systems

Bay	SCSI ID (Recommended)	SCSI ID (Actual)	Drive
8	1	_____	_____
7	2	_____	_____
6	3	_____	_____
5	4	_____	_____
4	5	_____	_____
3	6	_____	CD-ROM drive
2	NA	NA	Diskette
1	0	_____	Disk Drive

Adapters

Slot	IRQ	DMA	I/O Port	ROM/RAM Address	Additional Information
1 (PCI)					
2 (PCI)					
3 (PCI)					
4 (PCI)					
5 (PCI)					
6 (PCI/ISA)					
7 (ISA)					
8 (ISA)					

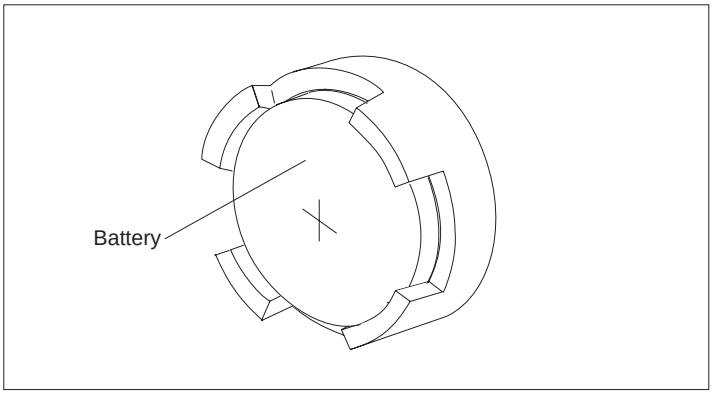
Note: Slot 6 can accommodate a PCI adapter or an ISA adapter, but not both at the same time. Before setting values, review make sure that the new configuration does not conflict with the values recorded here.

Appendix B. Removing the Battery

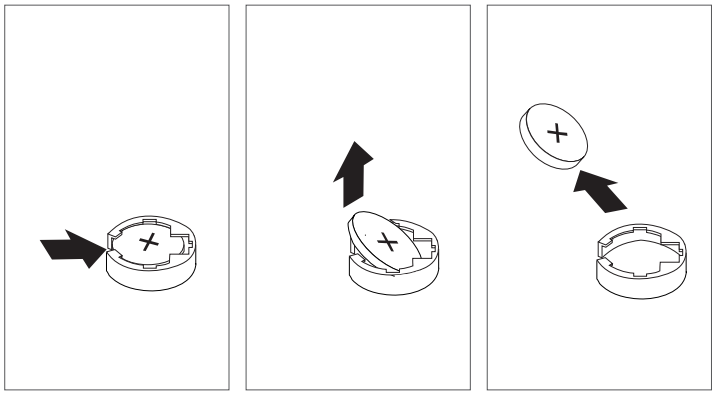
CAUTION:
A lithium battery can cause fire, explosion, or a severe burn. Do not recharge, disassemble, heat above 100°C (212°F), solder directly to the cell, incinerate, or expose cell contents to water. Keep away from children. Replace only with the part number specified for your system. Use of another battery may present a risk of fire or explosion.

Removal

1. If you have not already done so, remove the covers as described in “Removing the Cover” on page 5-4.
2. Locate the battery on the system board.

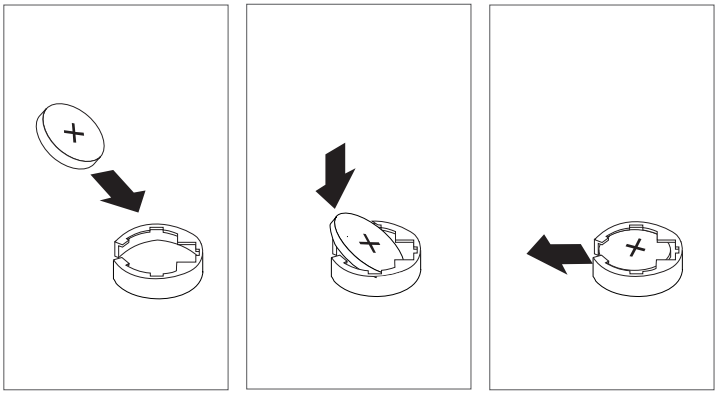


3. Use one finger to slightly slide the battery toward the front of the server. (The spring mechanism behind the battery will push it out toward you as you slide it forward.) Use your thumb and index finger to hold the battery as it pushes out of the socket.



Replacement

Tilt the battery so that you can insert it into the front of the socket. As you slide the battery toward the front of the server, push it down into the socket.



Notes:

1. Ensure that the battery polarity is correct; place the battery in the holder with the positive side facing up.
2. The system time and date must be reset.
3. The system unit non-volatile random access memory (NVRAM) may contain configuration information and a customized bootlist. Removing or replacing the battery erases this information. The System Management Service can be used to recreate it.

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