

RS/6000 Enterprise Server Model H80
@server pSeries 660 Models 6H0 and 6H1



Installation Guide

Fourth Edition (June 2001)

Before using this information and the product it supports, read the information in "Safety Notices" on page vii, Appendix B, "Environmental Notices" on page 43, and Appendix C, "Notices" on page 45.

A reader's comment form is provided at the back of this publication. If the form has been removed, address comments to Information Development, Department H6DS-905-6C006, 11400 Burnet Road, Austin, Texas 78758-3493. To send comments electronically, use this commercial internet address: aix6kpub@austin.ibm.com. Any information that you supply may be used without incurring any obligation to you.

© **International Business Machines Corporation 2000, 2001. All rights reserved.**

Note to U.S. Government Users -- Documentation related to restricted rights -- Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

Contents

Safety Notices.	vii
Rack Safety Instructions	vii
Electrical Safety	viii
Laser Safety Information	ix
Laser Compliance	ix
Data Integrity and Verification	xi
About This Book	xiii
ISO 9000	xiii
Online Publications	xiii
Related Publications	xiii
Ergonomic Information	xiv
Trademarks	xiv
Chapter 1. Setting Up the System	1
Step 1. Checking Inventory	1
Step 2. Observe this Safety Notice During Installation	2
Step 3. Checking the Customer Environment	3
Step 4. Checking Customer Outlets	3
Step 5. Setting Up Rails in the Rack	5
Step 6. Installing Drawers in the Rack	9
Step 7. Connecting JTAG and VS/COMM Cables	11
CEC Drawer Attached to one I/O Drawer	11
Step 8. Connecting RIO and SPCN Cables	12
RIO Cabling.	12
CEC Drawer Attached to One I/O Drawer	13
CEC Drawer Attached to Two I/O Drawers.	14
CEC Drawer Attached to One I/O Drawer	15
CEC Drawer Attached to Two I/O Drawers.	16
Step 9. Setting Up Attached Devices	17
Step 10. Updating the Device Records	17
Step 11. Attaching External Devices	17
Step 12. Connecting the Power	18
Step 13. Installing Options	18
Step 14. Starting the Operating System	18
Step 15. Running System Verification	18
Chapter 2. Verifying the Hardware Operation	19
Step 1. Considerations Before Running This Procedure	19
Step 2. Loading the Diagnostics	19
Step 3. Running System Verification.	20
Step 4. Performing Additional System Verification	20
Step 5. Stopping the Diagnostics	21
Chapter 3. Installing Options for the System	23
Handling Static-Sensitive Devices	24

Stopping the System Unit	24
I/O Drawer PCI Slot LED Definitions.	25
Installing PCI Adapters	26
Installing a Non-Hot-Pluggable PCI Adapter	26
Installing a Hot-Pluggable PCI Adapter	28
Removing PCI Adapters.	29
Removing a Non-Hot-Pluggable PCI Adapter	29
Removing a Hot-Pluggable PCI Adapter	31
PCI Hot-Plug Manager Access	33
Accessing Hot-Plug Management Functions	33
PCI Hot-Plug Manager Menu	34
System Firmware Updates	35
General Information on System Firmware Updates	36
Determining the Level of Firmware on the System	36
System Firmware Update Using a Locally Available Image	37
Updating System Firmware From the Service Processor Menus	37
Updating System Firmware from the AIX Service Aids	38
Updating System Firmware from the AIX Command Line	38
Recovery Mode	38
Appendix A. Communications Statements	39
Federal Communications Commission (FCC) Statement	39
European Union (EU) Statement	39
International Electrotechnical Commission (IEC) Statement	40
United Kingdom Telecommunications Safety Requirements	40
Avis de conformité aux normes du ministère des Communications du Canada	40
Canadian Department of Communications Compliance Statement	40
VCCI Statement	40
Electromagnetic Interference (EMI) Statement - Taiwan	41
Radio Protection for Germany.	41
Appendix B. Environmental Notices	43
Product Recycling and Disposal	43
Environmental Design	43
Unit Emissions	43
Appendix C. Notices	45
Appendix D. System Records	47
Record the Serial Numbers.	47
Device Records	48
Memory Riser Card 1 or One-Way Processor Card	48
Memory Riser Card 2	48
Primary I/O Drawer Records	49
Secondary I/O Drawer Records	51
Appendix E. General Attributes Required When Using a TTY Terminal	53
Additional Communication Attributes.	54
Additional Keyboard Attributes.	55
Additional Printer Attributes.	56

Index 57

Safety Notices

A *danger* notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. *Danger* notices appear on the following pages:

- viii
- 2
- 23

A *caution* notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. *Caution* notices appear on the following pages:

- ix
- 2
- 3
- 7
- 9
- 23

For a translation of the safety notices contained in this book, see *System Unit Safety Information*, order number SA23-2652.

Rack Safety Instructions

- Do not install this unit in a rack where the internal rack ambient temperatures will exceed 40 degrees C.
- Do not install this unit in a rack where the air flow is compromised. Any side, front or back of the unit used for air flow through the unit must not be in direct contact with the rack.
- Care should be taken to ensure that a hazardous condition is not created due to uneven mechanical loading when installing this unit in a rack. If the rack has a stabilizer it must be firmly attached before installing or removing this unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to the rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement for the supply circuit.
- An electrical outlet that is not correctly wired could place hazardous voltage on the 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.

Electrical Safety

Observe the following safety instructions anytime 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 communications 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 all power cables from the electrical outlet before relocating the system.

CAUTION:

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

Laser Safety Information

CAUTION:

This product may contain a CD-ROM which is a class 1 laser product.

Laser Compliance

All lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with the IEC 825 (first edition 1984) as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

CAUTION:

All IBM laser modules are designed so that there is never any human access to laser radiation above a class 1 level during normal operation, user maintenance, or prescribed service conditions. Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. Only trained service personnel should perform the inspection or repair of optical fiber cable assemblies and receptacles.

Data Integrity and Verification

IBM computer systems contain mechanisms designed to reduce the possibility of undetected data corruption or loss. This risk, however, cannot be eliminated. Users who experience unplanned outages, system failures, power fluctuations or outages, or component failures must verify the accuracy of operations performed and data saved or transmitted by the system at or near the time of the outage or failure. In addition, users must establish procedures to ensure that there is independent data verification before relying on such data in sensitive or critical operations. Users should periodically check the IBM support websites for updated information and fixes applicable to the system and related software.

About This Book

This book provides information about the RS/6000 Enterprise Server Model H80 and @server pSeries 660 Models 6H0 and 6H1, specifically how to install and remove options, use the system, use diagnostics and service aids and verify system operation. In this book, the RS/6000 Enterprise Server Model H80 and @server pSeries 660 Models 6H0 and 6H1 are hereafter referred to as the "system".

ISO 9000

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

Online Publications

IBM @server pSeries publications are available online. To access the online books, visit our Web site at: http://www.ibm.com/servers/eserver/pseries/library/hardware_docs/

Related Publications

The following publications are available:

- *System Unit Safety Information*, order number SA23-2652, contains translations of safety information used throughout this book.
- The *RS/6000 Enterprise Server Model H80, @server pSeries 660 Models 6H0 and 6H1 User's Guide*, order number SA38-0567, contains information on how to use the system, use diagnostics, use service aids, and verify system operations.
- The *RS/6000 Enterprise Server Model H80, @server pSeries 660 Models 6H0 and 6H1 Service Guide*, order number SA38-0568, contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.
- The *7014 Model T00 and T42 Rack Installation and Service Guide*, order number SA38-0577, contains information regarding the 7014 Model T00 and T42 Rack, in which the Model H80 or 660 Models 6H0 and 6H1 system may be shipped.
- The *RS/6000 Enterprise Server and @server pSeries Diagnostic Information for Multiple Bus Systems*, order number SA38-0509, contains diagnostic information, service request numbers (SRNs), and failing function codes (FFCs).
- The *RS/6000 Enterpriser Server and @server pSeries Adapters, Devices, and Cable Information for Multiple Bus Systems*, order number SA38-0516, contains information about adapters, devices, and cables for your system. This manual is intended to supplement the service information found in the *RS/6000 Enterprise Server and @server pSeries Diagnostic Information for Multiple Bus Systems*.
- The *PCI Adapter Placement Reference*, order number SA38-0538, contains information regarding slot restrictions for adapters that can be used in this system.
- *Site and Hardware Planning Information*, order number SA38-0508, contains information to help you plan your installation.

Ergonomic Information

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

The Healthy Computing Web site gives ergonomic guidelines to help you understand the ergonomic considerations that you should know when working at a computer workstation. The address is: <http://www.us.pc.ibm.com/healthycomputing>

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

- AIX
- RS/6000
- pSeries
- e (logo)

Other company, product, and service names may be trademarks or service marks of others.

Chapter 1. Setting Up the System

This chapter provides procedures to help you set up your RS/6000 Enterprise Server Model H80, or @server pSeries 660 Models 6H0 and 6H1.

The system is a multiprocessor, multibus system packaged in drawers. The processors and memory are packaged in a 5 EIA-unit central electronics complex (CEC drawer), and the I/O devices are in a 5 EIA-unit I/O drawer. The basic system consists of one CEC drawer and one or two I/O drawers in the same rack. Connections between the CEC drawer and I/O drawers are made through a number of cables.

Step 1. Checking Inventory

Before you begin the installation, check your inventory.

- ___ 1. The list of parts that are shipped with the system is as follows:
 - Drawer to rack mount brackets (four each).
 - Latch reset bracket (four each).
 - Nut clip (nine each).
 - Screws (nine each).
 - Left rail (four each).
 - Right rail (four each).
 - Nut clip (nine each).
 - Screws (nine each).
- ___ 2. *RS/6000 Enterprise Server Model H80, @server pSeries 660 Models 6H0 and 6H1 Installation Guide, SA38-0575 (this book)*
- ___ 3. *PCI Adapter Placement Reference, SA38-0538*
- ___ 4. *System Unit Safety Information, SA23-2652*
- ___ 5. Support Information and Warranty

Verify with the customer that the following items are available. You will need them to complete this installation.

- A floor plan, showing where to place each rack.
- A console, including cables and a power source.
- A modem for the electronic customer-support function (if the customer ordered this function). This includes the correct telephone jack, cables, and a power source.

Step 2. Observe this Safety Notice During Installation

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 communications 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.

CAUTION:

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

CAUTION:

Energy hazard, remove power before servicing. Disconnect two power supply cords.

Step 3. Checking the Customer Environment

Check the customer environment as follows:

- Verify with your installation planning representative or the customer that any station-protector boxes used are correctly installed according to the *Site and Hardware Planning Information* manual.
- Make sure the customer is aware that the recommended temperature for this system is 24° C (75° F) and the recommended relative humidity is 45%. The following are the acceptable operating ranges:
 - Temperature - 10° C (50° F) to 38° C (100° F)
 - Humidity - 8% to 80%
- Make sure the customer is aware that the front and rear service clearances around the central electronics complex (CEC), primary I/O, and secondary I/O drawer and rack should be 36 inches (900mm). The service clearances are important for proper air circulation, weight distribution, and safety for both the service representative and the customer.

Step 4. Checking Customer Outlets

CAUTION:

Do not touch the receptacle or the receptacle faceplate with anything other than your test probes before you have met the requirements in substep 8 below.

This system may be configured as 220 V ac or -48 V dc power. If the system is going to be used in a dc environment, you will need to have dc power cables, and a dc power supply.

Check the customer outlets as follows:

- ___ 1. Have the customer locate and turn off the branch circuit CB (circuit breaker). Attach tag S229-0237, which reads “Do Not Operate.”

Note: All measurements are made with the receptacle faceplate in the normally installed position.

- ___ 2. Some receptacles are enclosed in metal housings. On receptacles of this type, perform the following steps:
 - a. Check for less than 1 volt from the receptacle case to any grounded metal structure in the building, such as a raised-floor metal structure, water pipe, building steel, or similar structure.
 - b. Check for less than 1 volt from receptacle ground pin to a grounded point in the building.

Note: If the receptacle case or faceplate is painted, be sure the probe tip penetrates the paint and makes good electrical contact with the metal.

- ___ 3. Check the resistance from the ground pin of the receptacle to the receptacle case. Check resistance from the ground pin to building ground. The reading should be less than 1.0 ohm, which indicates the presence of a continuous grounding conductor.
- ___ 4. If any of the three checks made in substep 2 are not correct, ask the customer to remove the power from the branch circuit and make the wiring corrections; then check the receptacle again.

Note: Do not use the digital multimeter to measure grounding resistance.

- ___ 5. Check for infinite resistance between the phase pins. This is a check for a wiring short.

CAUTION:

If the reading is other than infinity, do not proceed! Have the customer make necessary wiring corrections before continuing. Do not turn on the branch circuit CB until all the above steps are satisfactorily completed.

- ___ 6. Have the customer turn on the branch circuit CB. Measure for appropriate voltages between phases. If no voltage is present on the receptacle case or grounded pin, the receptacle is safe to touch.
- ___ 7. With an appropriate meter, verify that the voltage at the outlet is correct.
- ___ 8. Verify that the grounding impedance is correct by using the ECOS 1020, 1023, B7106, or an appropriately approved ground impedance tester.

Note: Do *not* use the 120-volt convenience outlets inside a machine to power the tester.

Step 5. Setting Up Rails in the Rack

If your system arrived installed in a rack with all the cables attached, skip to “Step 9. Setting Up Attached Devices” on page 17. If not, continue with this step.

Note: Read the following drawer placement notes, and Caution statements before installing the RS/6000 Enterprise Server Model H80, or @server pSeries 660 Models 6H0 and 6H1 rails.

Note: Service clearance may be required on the early Model H80 I/O and CEC drawers. Refer to the following notes for specific instructions.

Notes:

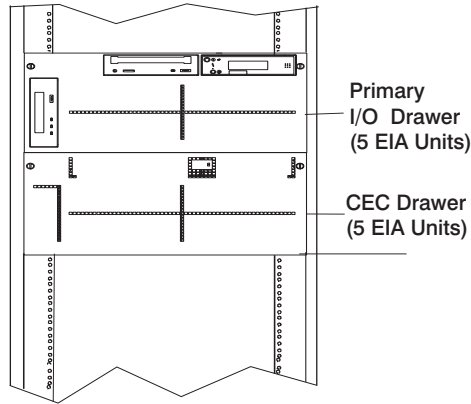
1. The 7014 Model T00 and T42 racks have EIA numbers visible from the front and rear that start with 1 (at the bottom) to 36, or 42 (at the top). Therefore, the rail surface that a drawer sits on is approximately in line with the lower edge of the EIA position for that drawer. The lowest EIA number completely occupied by a drawer is said to be that drawer's EIA position. An EIA number is also used in identifying cables attached to that drawer. The *model H80, 660 models 6H0 and 6H1* I/O and CEC drawers occupy 5 EIA units each.
2. Because of service restriction for the CEC drawer (see note 6), the I/O drawer should be installed above the CEC drawer as shown in the figure under note 8 on page 7.
3. The system has two service positions. One position is with the drawer pulled out the front of the rack, and the other position is with the drawer pulled out the rear of the rack.
4. Two stabilizers are required on the rack before installing the system if the rack is not bolted to the floor. One must be installed at the bottom front of the rack unit, and the other at the bottom rear of the rack unit. Both must be installed prior to servicing the system.
5. If the system is the only system in the rack, follow these placement guidelines:
 - 7014 T42 rack, start from bottom or center the drawers about the 17th EIA location.
 - 7014 T00 rack, start from bottom or mount rails so that the top drawer will not exceed 32nd EIA location.

Note: In order to address concurrent serviceability issues on racks with multiple systems installed, it is suggested that the 1st EIA unit be left vacant to allow the bottom drawer room to pass over the cables when the drawer is moved into the rear service position.

- 7014 S00 rack, there are no specific guidelines for this rack.
6. The CEC drawer requires 5 EIA units (8.75 inches) service clearance from the top of the 7014 Model T00 and T42 rack. It should never be installed in the top most position in these racks.
 7. Early H80 I/O drawers require 4 EIA units service clearance from the top of the rack when placed in their rear service position. These early drawers have a rear service stop latch 11.25 inches (285.75mm) from the rack mounting flange at the front of the drawer. The redesigned drawers have a rear service stop latch 5.75 inches from

the rack mounting flange at the front of the drawer and do not have this service clearance requirement.

8. If there are no drawers placed immediately above the system, install drawer anti-tip guides as shown in the rack drawer rail instructions shipped with the system. This will help support the drawers when placed in their rear service position.



CAUTION:

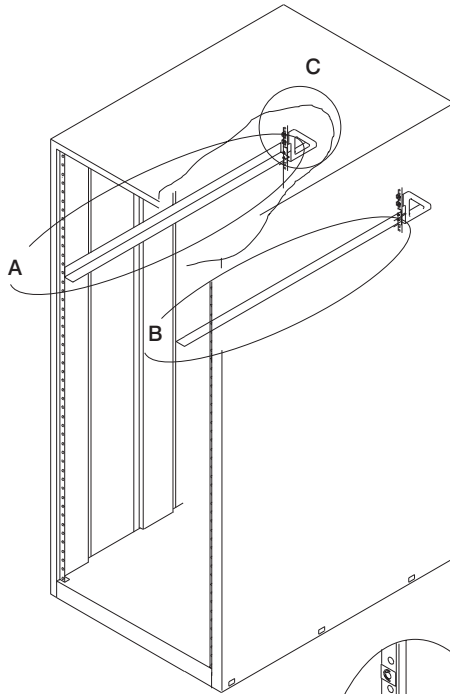
The stabilizer must be firmly attached to the bottom front of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.

CAUTION:

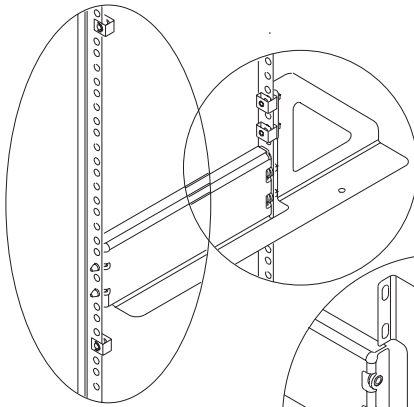
The stabilizer must be firmly attached to the bottom rear of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.

To set up the rails in the rack, do the following:

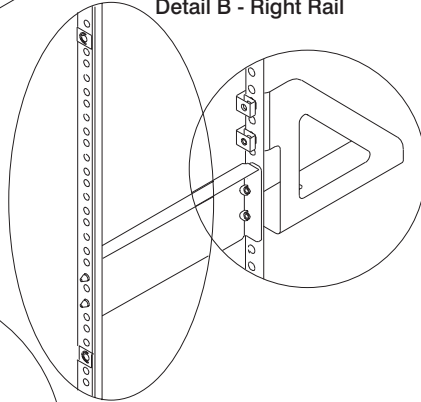
1. Determine the EIA locations for the drawer rails. (See "Step 5. Setting Up Rails in the Rack" on page 5.)
2. Install the nut clip on the rails, install the rails in the rack unit as shown in the following figure.



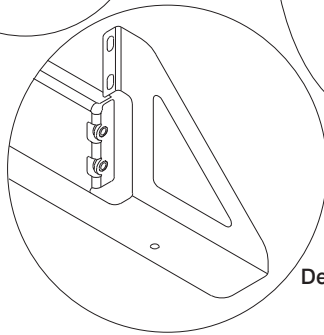
Detail A - Left Rail



Detail B - Right Rail



Detail C - Rear of Left Rail



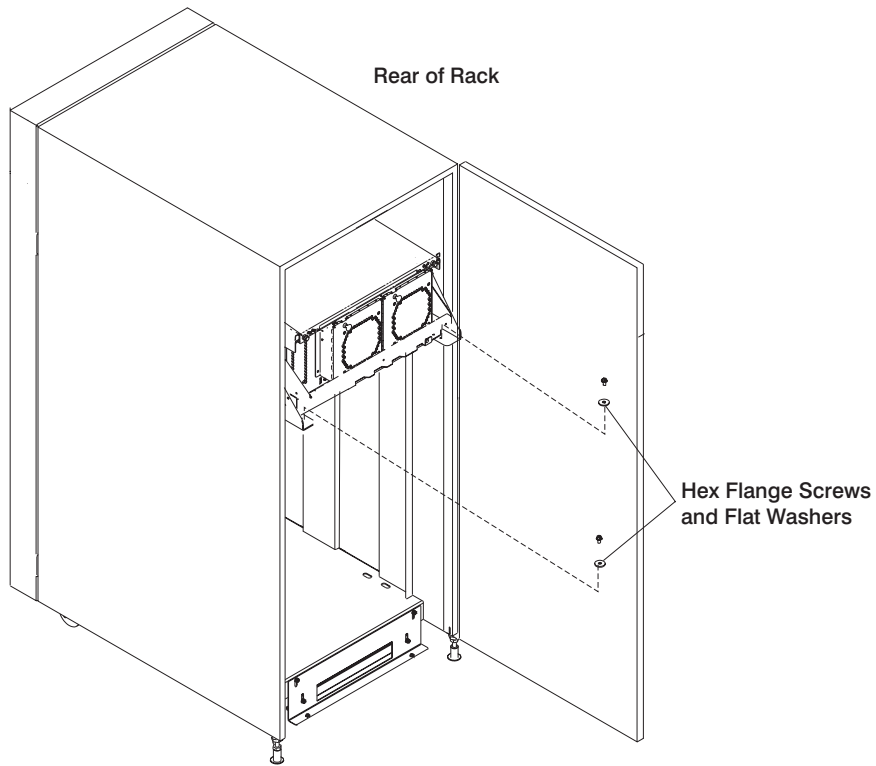
Step 6. Installing Drawers in the Rack

CAUTION:

This unit weighs between 32 kg (70.5 pounds) and 55 kg (121.2 pounds). Three persons are required to safely move it. Using fewer than three persons to move it can result in injury.

To install the drawers in the rack, do the following:

1. Slide the shipping box containing the drawer in front of the rack.
2. If the front door of the rack is present, remove it to make installing the drawer easier.
3. Remove the following parts to facilitate lifting the drawer into the rack unit:
 - Front bezel
 - Both power supplies
4. Lift the drawer onto the support rails, and slide it *slowly* into the rack.
5. Continue sliding the drawer into the rack until the front of the drawer rests against the nut clips on the rack.
6. Attach the rear of the drawer to the rack rails with the two hex flange screws and the two flat washers provided with the drawer. This action secures the drawer to the rack.

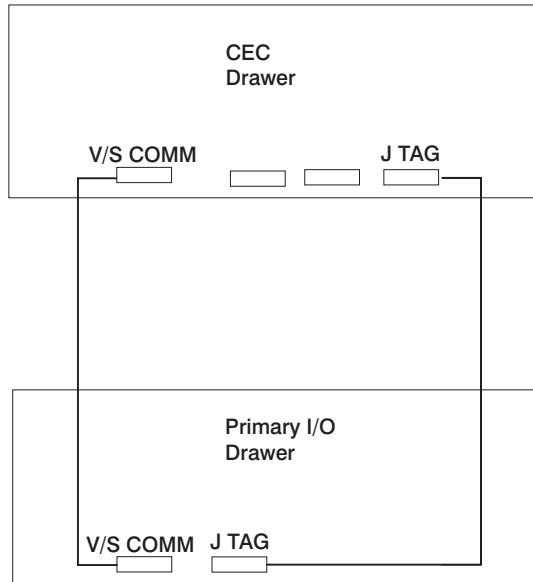


7. Replace the parts that you removed earlier:
 - Both power supplies
 - Front bezel

Step 7. Connecting JTAG and VS/COMM Cables

Use the following figure to connect the JTAG and VS/COMM cables.

CEC Drawer Attached to one I/O Drawer



Step 8. Connecting RIO and SPCN Cables

The RIO and SPCN cables provide two functions in the system: remote data bus connection and power control. The following basic rules must be followed when connecting these two types of cables:

- The I/O drawers must be connected in a loop fashion for both the RIO cables and the SPCN cables. The loop connection provides redundant paths so that if a failure occurs in part of a cable, the system will continue to operate. If a failure occurs, a warning message is displayed on the system console but the system continues to operate.
- One loop is required for the SPCN cabling. This loop begins and ends at the primary I/O drawer.
- Two loops are possible for the RIO cabling, depending on the number and desired configuration of I/O drawers. These loops begin and end at the primary I/O drawer.

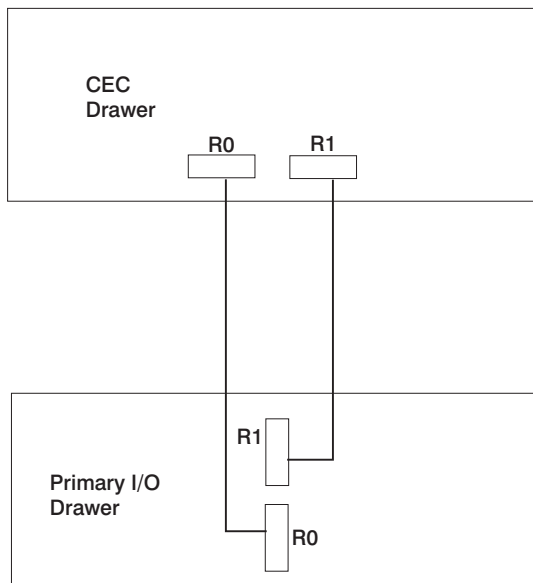
RIO Cabling

The following rules apply to RIO cable connections:

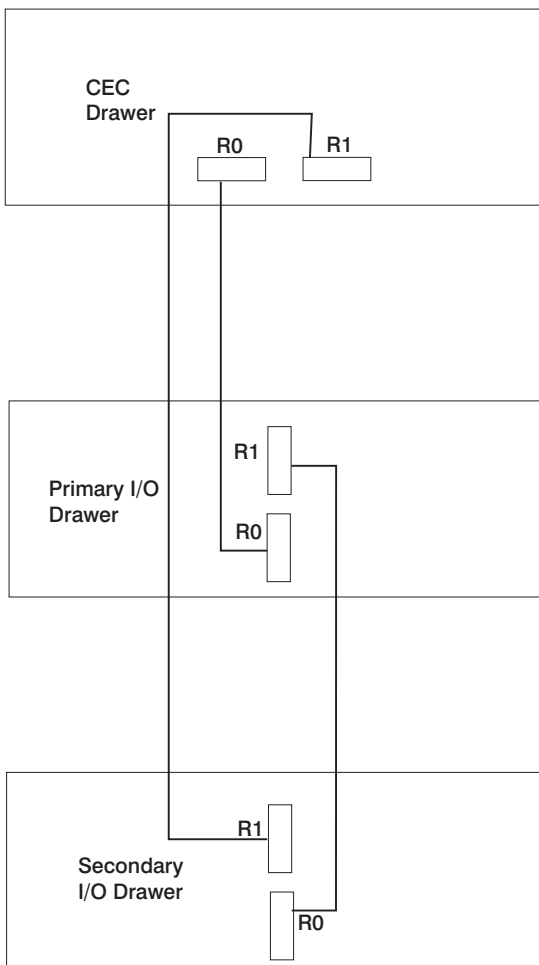
- I/O drawers 0 and 1 are connected using the first RIO loop, which uses RIO ports 0 and 1 on the CEC drawer.
- The primary I/O drawer must be installed and connected to RIO port 0 of the CEC drawer. The connection must be made from RIO port 0 of the CEC drawer to RIO port 0 of the primary I/O drawer. This connection is required to make the primary drawer the first drawer in the loop, which allows the firmware to initialize the system.

The following figures provide cabling examples for all valid cabling configurations. Match your configuration to the correct figure and connect your RIO cables as shown.

CEC Drawer Attached to One I/O Drawer



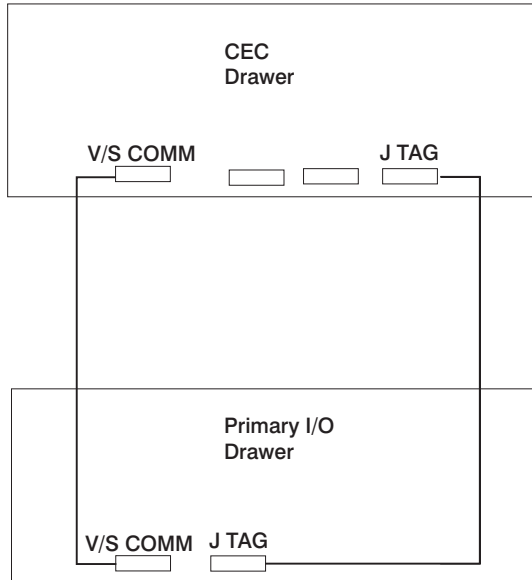
CEC Drawer Attached to Two I/O Drawers



SPCN Cabling

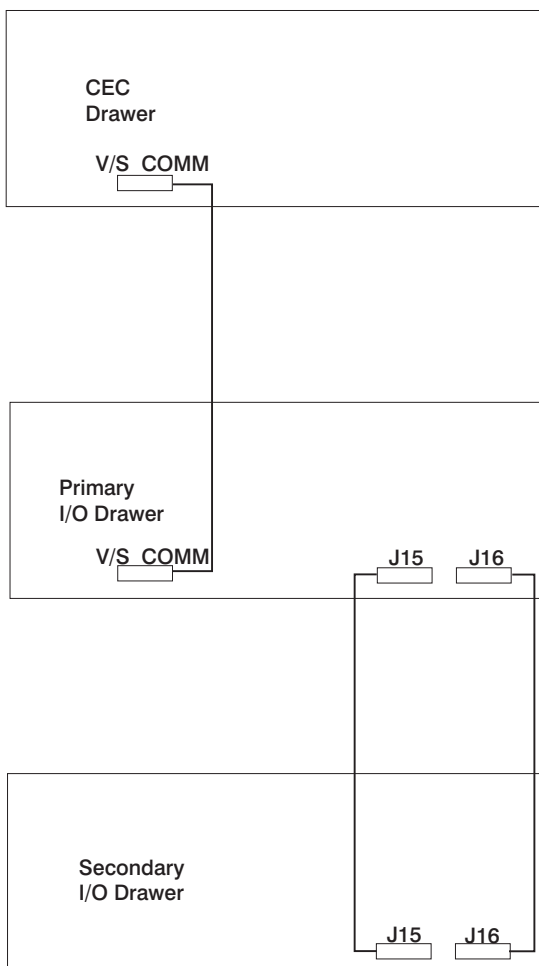
The following figures provide cabling examples for all valid cabling configurations. Match your configuration to the correct figure and connect your SPCN cables as shown.

CEC Drawer Attached to One I/O Drawer



Note: The V/S COMM cable includes SPCN signals in addition to other signals.

CEC Drawer Attached to Two I/O Drawers

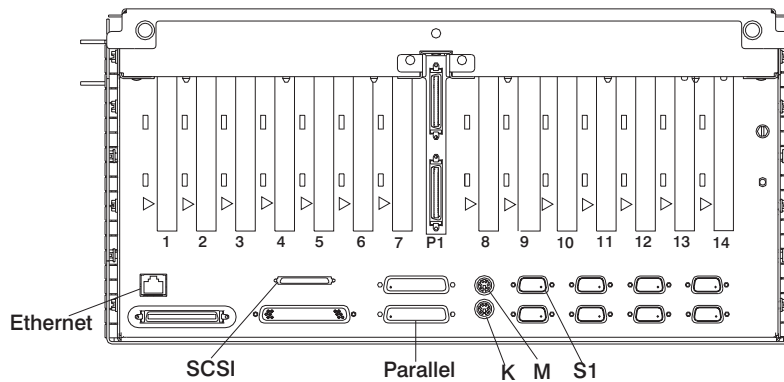


Step 9. Setting Up Attached Devices

Note: During the setup of each device, connect only the device end of the signal cable. *Do not* connect the device signal cables to the rack now.

Do the setup procedures in the documentation provided for each device being attached to the rack. Then return to “Step 10. Updating the Device Records”.

Connect the ASCII terminal to serial port 1 (S1). Connect the keyboard (K), mouse (M), and graphics display (if available). Refer to the following figure for the locations of the connectors.



Step 10. Updating the Device Records

Update the “System Records” in Appendix D, “System Records” on page 47 to reflect the configuration of the system adapters and devices that are installed.

Step 11. Attaching External Devices

External devices used with the system are connected to connectors on the I/O drawers or to adapters that are installed in any of the I/O drawers. Attach any external devices now.

Step 12. Connecting the Power

To connect the power, do the following:

1. Plug the drawer power cords into the power distribution bus (PDB) of the rack.
2. Plug the power cords of the external devices into power outlets.
3. Plug the PDB power cord into the customer's electrical outlet.

Step 13. Installing Options

If you have any options to install, go to Chapter 3, "Installing Options for the System" on page 23 and install those options at this time. Return here after installing your options.

Step 14. Starting the Operating System

If you plan to install the AIX operating system now, refer to the *AIX Installation Guide*, order number SC23-4112.

If the AIX operating system was preinstalled on your system, go to the AIX operating system installation documentation.

Perform the following steps to power on the CEC drawer and attached I/O drawers:

1. Open the rack door. Look for 0K in the primary I/O drawer operator panel display, which indicates that the system is in standby mode.
2. Press the power button on the primary I/O drawer operator panel.

The power LED on the primary I/O drawer operator panel starts blinking at a fast rate. Checkpoint codes (9xxx) appear in the operator panel display.

When the power-on sequence is complete:

- The power LED on the primary I/O drawer operator panel stops blinking and stays on.
- The power LED on the CEC drawer stops blinking and stays on.

Step 15. Running System Verification

If your system did not load the AIX operating system successfully, or you would like to test your hardware, go to Chapter 2, "Verifying the Hardware Operation" on page 19.

Chapter 2. Verifying the Hardware Operation

The system verification procedure checks the system for correct hardware operation. If you have a problem with your system in the future, use this procedure to test the system hardware to help you determine if you have a hardware problem. Run the system verification procedure as described in the following steps.

Step 1. Considerations Before Running This Procedure

Read the following before using this procedure:

- The AIX operating system must be installed on your system before you attempt to perform this procedure.
- If this system unit is directly attached to another system unit or attached to a network, be sure communications with the other systems are stopped.
- This procedure requires use of all of the system resources. No other activity can be running on the system while you are performing this procedure.
- This procedure requires a display connected to a graphics adapter, or an ASCII terminal attached to the S1 port or the S2 port.
- This procedure runs the AIX online diagnostics in service mode. If the system console is an ASCII terminal, see the documentation for your type of ASCII terminal to find the key sequence you need in order to respond to the diagnostics.
- You must select a console display before running the diagnostics. The instructions for selecting a console display are displayed on all of the graphic displays or a terminal attached to the S1 port or the S2 port. Follow the displayed instructions to select a console display.

Step 2. Loading the Diagnostics

To run the online diagnostics in service mode from the boot hard disk, do the following:

1. Stop all programs including the AIX operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROM discs.
3. Turn off the system unit power.
4. Turn on the system unit power.
5. After the **keyboard** POST indicator displays on the firmware console and before the last POST indicator (**speaker**) displays, press the numeric 6 key on either the directly attached keyboard or the ASCII terminal to indicate that a service mode boot should be initiated using the customized service mode boot list.
6. Enter any requested password.

Note: If you are unable to load the diagnostics to the point when the DIAGNOSTIC OPERATING INSTRUCTIONS display, call your support center for assistance.

Step 3. Running System Verification

When the Diagnostic Operating Instructions display, do the following to run system verification:

1. Press Enter.
2. To do a general checkout with minimal operator action, select the **Diagnostic Routines** option on the Function Selection menu.
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; the advanced diagnostics may instruct you to install wrap plugs to better isolate a problem.
3. Select the **System Verification** option on the Diagnostic Mode Selection menu.
4. To run a general checkout of all installed resources, select the **All Resource** option on the Diagnostic Selection menu. Follow the instructions on the screen to complete the checkout procedure.

To check one particular resource, select that resource on the Diagnostic Selection menu.

The checkout program ends with either of the following results:

- The Testing Complete screen displays a message stating No trouble was found.
- The A Problem Was Detected On (Time Stamp) menu displays, with either a service request number (SRN) or an error code. Make a note of any codes displayed on the display or operator panel.

To perform additional system verification, go to "Step 4. Performing Additional System Verification". To exit diagnostics, go to "Step 5. Stopping the Diagnostics" on page 21.

Step 4. Performing Additional System Verification

To perform additional system verification, do the following:

1. Press Enter to return to the Diagnostic Selection menu.
2. To check other resources, select the resource. When you have checked all of the resources you need to check, go to "Step 5. Stopping the Diagnostics" on page 21.

Step 5. Stopping the Diagnostics

To stop the diagnostics, do the following:

1. To exit the diagnostics, press the F3 key (from a defined terminal) or press 99 (from an undefined terminal).
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. If you received an error code, record the code and report it to the service organization.

If the server passed all the diagnostic tests, the verification process is complete and your server is ready to use.

Chapter 3. Installing Options for the System

Follow the procedures in this chapter to install options the RS/6000 Enterprise Server Model H80 and @server pSeries 660 Models 6H0 and 6H1.

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 communications 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.

CAUTION:

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

CAUTION:

Energy hazard, remove power before servicing. Disconnect two power supply cords.

Handling Static-Sensitive Devices

Attention: Adapters, planars, diskette drives, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags, 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.

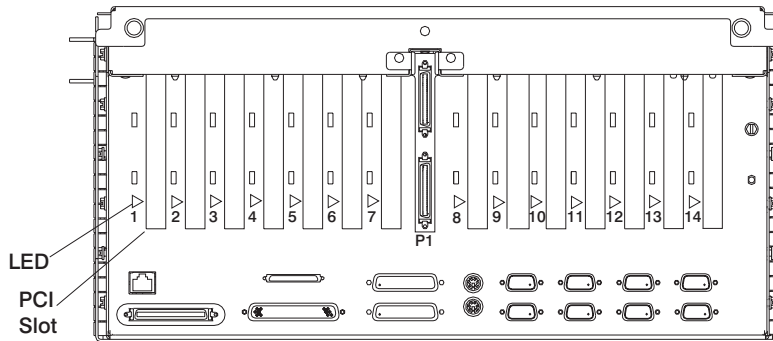
Stopping the System Unit

Attention: When shutting down your system to install options, shut down all applications first and then shut down the operating system. The system power turns off and the system will be in Standby mode when the operating system is shut down. Before removing power from the system unit, ensure that the shutdown process is complete. Failure to do so can result in the loss of data. Some option-installation procedures do not require the system to be stopped for installation. If necessary, the option installation procedures in this section will direct you here if stopping the system is required.

1. Log in to the system as **root**.
2. Stop any applications that are running on the system.
3. At a command line, type shutdown to stop the operating system.
4. After you shut down the operating system, set the power switches of any attached devices to Off.
5. The system unit is powered down by the shutdown procedure.

I/O Drawer PCI Slot LED Definitions

The following table describes the possible states of the LEDs associated with the I/O drawer PCI slots. These LEDs are located at the rear of the I/O drawer. One LED is associated with each PCI slot.



LED Indication	PCI Slot State	Definition
Off	Off	Slot power is off. It is safe to remove or replace an adapter.
On (not flashing)	On	Slot power is on. Do not remove or replace an adapter.
Flashing slowly (one flash per second)	Identify	Slot has been identified by the software. Do not remove or replace an adapter at this time.
Flashing fast (six to eight flashes per second)	Action	Slot is ready for removal or replacement of an adapter.

Installing PCI Adapters

Note: If you are installing devices which connect to an adapter, install the devices and cables before you install the adapter.

If the adapter you are installing requires device driver software, see the documentation for the adapter and load the software before installing the adapter.

Note: To get to the diskette, you will need to remove the front bezel refer to the figure on page 51 in appendix D.

With this system, you can install PCI adapters with the power on. These adapters are referred to as *hot-pluggable PCI adapters*. Some adapters are not hot-pluggable and power must be removed from the system for adapter installation.

Before you install the adapter, determine if the PCI adapter you are installing is hot-pluggable. See the *PCI Adapter Placement Reference*, order number SA38-0538.

If you are installing a PCI adapter that is:

- Not hot-pluggable, go to “Installing a Non-Hot-Pluggable PCI Adapter”.
- Hot-pluggable, go to “Installing a Hot-Pluggable PCI Adapter” on page 28.

Installing a Non-Hot-Pluggable PCI Adapter

To install the non-hot-pluggable adapter, do the following:

1. Turn off the power and unplug the system unit power cable from the electrical outlet.

If the system is operating under AIX, type shutdown to power off the system.

If you cannot use this method, you can power off the system by using the following operator-panel power button procedure:

Attention: Using the primary I/O drawer operator panel power button to power off the system may cause unpredictable results in the data files, and the next IPL will take longer to complete.

- a. Open the rack door.
- b. Press the power button on the primary I/O drawer operator panel.

The primary I/O drawer operator panel power LED starts blinking at a fast rate. B0FF appears in the primary operator panel display.

When the power-off sequence is complete, the system will go into standby mode, as evidenced by:

- 0K displays in the primary operator panel display.
 - The primary I/O drawer operator panel power LED will start blinking at a slow rate.
 - The CEC drawer power LED will start blinking at a slow rate.
2. Place the I/O drawer in the rear service position, as follows:
 - a. If you have not already done so, open the front door of the rack unit.
 - b. Loosen the two thumbscrews that attach the front bezel to the drawer.
 - c. Grasp both sides of the front bezel and pull the bezel off the drawer.
 - d. If you have not already done so, open the rear door of the rack unit.
 - e. If present, remove the two retaining screws at the rear of the drawer.
 - f. Grasp the bar at the rear of the drawer, and pull the drawer to the rear until it is stopped by the two detents on the top of the drawer.

Note: Make sure that you do not damage the cables while pulling out the drawer.

3. Remove the two thumbscrews and remove the top cover from the drawer.
4. See the *PCI Adapter Placement Reference*, order number SA38-0538, for adapter placement information. Then select an appropriate empty PCI slot for the adapter.
5. Turn the locking latch and lift the plastic stop for the adapter you are installing.
6. Remove the blank cover.
7. Carefully grasp the adapter by the edges and align the adapter in the slot guides. Insert the adapter fully into the adapter slot connector. If you are installing a full-length adapter, ensure that both ends of the adapter engage the card guides.
8. Lower the plastic stop over the adapter bracket, and rotate the locking latch clockwise until it clicks into the locked position.
9. Connect appropriate cables to the adapter.
10. Install the covers that you removed earlier, and return the drawer to the normal operating position.
11. Plug in the system unit power cables.
12. Turn on the power.

Installing a Hot-Pluggable PCI Adapter

To install the hot-pluggable adapter, do the following:

1. Refer to “PCI Hot-Plug Manager Access” on page 33 and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
2. From the PCI Hot-Plug Manager menu, select **Add a PCI Hot-Plug Adapter** and press Enter. The Add a Hot-Plug Adapter window displays.
3. Select the appropriate empty PCI slot from the ones listed on the screen, and press Enter.
4. Place the I/O drawer in the rear service position, as follows:
 - a. If you have not already done so, open the front door of the rack unit.
 - b. Loosen the two thumbscrews that attach the front bezel to the drawer.
 - c. Grasp both sides of the front bezel and pull the bezel off the drawer.
 - d. If you have not already done so, open the rear door of the rack unit.
 - e. If present, remove the two retaining screws at the rear of the drawer. See step 6 on page 9.
 - f. Grasp the bar at the rear of the drawer, and pull the drawer to the rear until it is stopped by the two detents on the top of the drawer.

Note: Make sure that you do not damage the cables while pulling out the drawer.

5. Remove the two thumbscrews and remove the top cover from the drawer.
6. See the *PCI Adapter Placement Reference*, order number SA38-0538, for adapter placement information. Then select an empty PCI slot for the adapter.
7. Follow the instructions on the screen to install the adapter until the visual indicator (LED) for the specified PCI slot is set to the action state. See “I/O Drawer PCI Slot LED Definitions” on page 25.
8. Turn the locking latch, lift the plastic stop, and remove the blank cover.
9. When you are instructed to install the adapter in the adapter slot, carefully grasp the adapter by the edges and align the adapter in the slot guides. Insert the adapter fully into the adapter slot connector. If you are installing a full-length adapter, ensure that both ends of the adapter engage the card guides.
10. Lower the plastic stop over the adapter bracket, and rotate the locking latch clockwise until it clicks into the locked position. Some full-length cards can be supported by rotating the blue adapter latch on the right end of the adapter counterclockwise.

11. Connect appropriate cables and devices to the adapter.
12. Continue to follow the screen instructions until you receive a message that the installation is successful. Successful installation is indicated by the OK message displayed next to the **Command** field at the top of the screen.
13. Press the F3 key to return to the PCI Hot-Plug Manager menu.
14. Select **Install/Configure Devices Added After IPL** and press Enter. Then follow the instructions on the screen.
15. Press F10 to exit the Hot-Plug Manager.
If you have added, removed, or replaced any adapters, run the **diag -a** command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.
16. If you have other adapters to install, return to step 2 on page 28.
17. If you do not have other adapters to install, install the covers that you removed earlier and return the drawer to the normal operating position.

Removing PCI Adapters

With this system, you can remove PCI adapters with the power on. These adapters are referred to as *hot-pluggable PCI adapters*. Some adapters are not hot-pluggable and power must be removed from the system for adapter removal.

Before you remove the adapter, determine if the PCI adapter you are removing is hot-pluggable. See the *PCI Adapter Placement Reference*, order number SA38-0538.

If you are removing a PCI adapter that is:

- Not hot-pluggable, go to “Removing a Non-Hot-Pluggable PCI Adapter” below.
- Hot-pluggable, go to “Removing a Hot-Pluggable PCI Adapter” on page 31.

Removing a Non-Hot-Pluggable PCI Adapter

To remove a non-hot-pluggable adapter, do the following:

1. Turn off the power and unplug the system unit power cable from the electrical outlet.

If the system is operating under AIX, type shutdown to power off the system.

If you cannot use this method, you can power off the system by using the following operator-panel power button procedure.

Attention: Using the primary I/O drawer operator-panel power button to power off the system may cause unpredictable results in the data files, and the next IPL will take longer to complete.

- a. Open the rack door.
- b. Press the power button on the primary I/O drawer operator panel.
The primary I/O drawer operator panel power LED starts blinking at a fast rate. B0FF appears in the primary operator panel display.

When the power-off sequence is complete, the system will go into Standby mode, as evidenced by:

- 0K displays in the primary operator panel display.
 - The primary I/O drawer operator panel LED will start blinking at a slow rate.
 - The CEC drawer power LED will start blinking at a slow rate.
2. Place the I/O drawer in the rear service position, as follows:
 - a. If you have not already done so, open the front door of the rack unit.
 - b. Loosen the two thumbscrews that attach the front bezel to the drawer.
 - c. Grasp both sides of the front bezel and pull the bezel off the drawer.
 - d. If you have not already done so, open the rear door of the rack unit.
 - e. If present, remove the two retaining screws at the rear of the drawer. See step 6 on page 9.
 - f. Grasp the bar at the rear of the drawer, and pull the drawer to the rear until it is stopped by the two detents on the top of the drawer.

Note: Make sure that you do not damage the cables while pushing in the drawer.

3. Remove the two thumbscrews and remove the top cover from the drawer.
4. Determine the slot from which you are removing the adapter.
5. Disconnect any cables that are connected to the adapter being removed.
6. Turn the locking latch and lift the plastic stop for the adapter.
7. Carefully grasp the adapter by the edges and pull it straight out from the I/O board. Store the adapter in a safe place.
8. Place a blank slot cover in the adapter slot and then lower the plastic stop over the adapter bracket. Rotate the locking latch clockwise until it clicks into the locked position.
9. If you have other adapters to remove, remove them at this time.
10. If you do not have other adapters to remove, install all covers that you removed earlier and return the drawer to the normal operating position.
11. Plug the system unit power cable into an electrical outlet.
12. Turn on the power.

Removing a Hot-Pluggable PCI Adapter

To remove a hot-pluggable adapter, do the following:

1. Ensure that any processes or applications that might use the adapter are stopped.

Note: Removing a hot-pluggable PCI adapter requires the system administrator to take the PCI adapter offline before performing any PCI adapter hot-plug procedures. Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

For additional information about taking an adapter offline or removing it from the system configuration, see the *AIX System Management Guide: Operating System and Devices*. This publication is available at the following Web address: <http://www-1.ibm.com/servers/aix/library/>. Select **Technical Publications**. This publication is also located on the *AIX Documentation* CD. The documentation information is made accessible by loading the documentation CD onto the hard disk or by mounting the CD in the CD-ROM drive.

2. Refer to “PCI Hot-Plug Manager Access” on page 33, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
3. Select **Unconfigure a Device** and press Enter.
4. Press F4 to display the Device Names menu.
5. Select the adapter you are removing from the menu.
6. If you are replacing an adapter with an identical one, answer YES to **Keep Definition**. If you are removing an adapter permanently, use the Tab key to answer NO to **Keep Definition**. Press Enter.
7. The ARE YOU SURE screen displays. Press Enter to verify the information.
8. Press F3 to return to the PCI Hot-Plug Manager.
9. Select **Replace/Remove a PCI Hot-Plug Adapter** and press Enter. The Replace/Remove a PCI Hot-Plug Adapter menu displays.
10. Move the cursor to select the adapter that you are removing and press Enter. (The description entry displays as “unknown”).
11. Press the tab key until the entry field displays the desired operation and then Press the Enter key. Follow the instructions that display on the screen until you are instructed to remove the adapter.

12. Place the I/O drawer in the rear service position, as follows:
 - a. If you have not already done so, open the front door of the rack unit.
 - b. Loosen the two thumbscrews that attach the front bezel to the drawer.
 - c. Grasp both sides of the front bezel and pull the bezel off the drawer.
 - d. If you have not already done so, open the rear door of the rack unit.
 - e. If present, remove the two retaining screws at the rear of the drawer.
 - f. Grasp the bar at the rear of the drawer, and pull the drawer to the rear until it is stopped by the two detents on the top of the drawer.
13. Remove the two thumbscrews and remove the top cover from the drawer.
14. Determine the slot from which you are removing the adapter.
15. When you are instructed to remove the adapter from the adapter slot, disconnect any cables that are connected to the adapter being removed.
16. Turn the locking latch and lift the plastic stop for the adapter.
17. Carefully grasp the adapter by the edges and pull it straight out from the system board. Store the adapter in a safe place.
18. Place a blank slot cover in the adapter slot (only if you are not replacing the adapter) and then lower the plastic stop over the adapter bracket. Rotate the locking latch clockwise until it clicks into the locked position.
19. Continue to follow the screen instructions until you receive a message that the adapter removal is successful. Successful removal is indicated by the OK message displayed next to the **Command** field at the top of the screen.
20. Press F10 to exit the Hot-Plug Manager.
21. If you have added, removed, or replaced any adapters, run the **diag -a** command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.
22. If you have other adapters to remove, return to step 9 on page 31.
23. If you do not have other adapters to remove, install the covers that you removed earlier and return the drawer to the normal operating position.

PCI Hot-Plug Manager Access

The installation instructions for hot-pluggable PCI adapters refer you to these procedures when it is appropriate to perform them.

Note: A PCI adapter is only hot-pluggable if the PCI adapter supports hot-plug applications. See the *PCI Adapter Placement Reference*, order number SA38-0538.

Accessing Hot-Plug Management Functions

Note: Removing or installing a hot-pluggable PCI adapter requires the system administrator to take the PCI adapter offline prior to performing the operation. Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

For additional information about taking an adapter offline or removing it from the system configuration, see the *AIX System Management Guide: Operating System and Devices*. This publication is available at the following Web address: <http://www-1.ibm.com/servers/aix/library/>. Select **Technical Publications**. This publication is also located on the *AIX Documentation* CD. The documentation information is made accessible by loading the documentation CD files onto the hard disk or by mounting the CD in the CD-ROM drive.

Use the following procedure to access the hot-plug menus.

1. Log in as root user.
2. At the command line, type smitty.
3. Select **Devices**.
4. Select **PCI Hot Plug Manager** and press Enter.
5. The PCI Hot-Plug Manager menu displays.
6. Return to the procedure that directed you here.
7. The following section describes the menu options.

PCI Hot-Plug Manager Menu

The following options are available from the PCI Hot Plug Manager menu:

Note: For information about the PCI slot LED states, see “I/O Drawer PCI Slot LED Definitions” on page 25.

List PCI Hot-Plug Slots

Provides a descriptive list of all slots that support PCI hot-plug capability. If the listing for a slot indicates it holds an “Unknown” device, select **Install/Configure Devices Added after IPL** to configure the adapter in that slot.

Add a PCI Hot-Plug Adapter

Allows the user to add a new PCI hot-plug capable adapter to the slot with the system turned on. You will be asked to identify the PCI slot that you have selected prior to the actual operation. The selected PCI slot will go into the Action state and finally into the On state.

Note: The system will indicate the slot holds an “Unknown” device until you perform the **Install/Configure Devices Added After IPL** option to configure the adapter.

Replace/Remove a PCI Hot-Plug Adapter

Allows the user to remove an existing adapter, or replace an existing adapter with an identical one. For this option to work, the adapter must be in the defined state (see “Unconfigure a Device” option below).

You will be asked to identify the PCI slot prior to the actual operation. The selected PCI slot will go into the action state.

Identify a PCI Hot-Plug Slot

Allows the user to identify a PCI slot. The selected PCI slot will go into the identify state. See “I/O Drawer PCI Slot LED Definitions” on page 25.

Unconfigure a Device

Allows the user to put an existing PCI adapter into the defined state if the device is no longer in use.

This step must be completed successfully before starting any removal or replacement operation. If this step fails, the customer must take action to release the device.

Configure a Defined Device

Allows a new PCI adapter to be configured into the system if software support is already available for the adapter. The selected PCI slot will go into the on state.

Install/Configure Devices Added After IPL

The system attempts to configure any new devices and tries to find and install any required software from a user-selected source.

The add, remove, and replace functions return information to the user indicating whether the operation was successful. If additional instructions are provided on the screen, complete the recommended actions. If the instructions do not resolve the problem, see the following:

- If the adapter is listed as unknown, perform the **Install/Configure Devices Added After IPL** option to configure the adapter.
- If you receive a warning indicating that required device packages are not installed, the system administrator must install the specified packages before you can configure or diagnose the adapter.
- If you receive a failure message indicating a hardware error, the problem might be either the adapter or the PCI slot. Isolate the problem by retrying the operation in another PCI slot, or trying another adapter in the slot. If you determine that you have failing hardware, call your service representative.

System Firmware Updates

This section provides information and instructions for updating the system firmware. You may need to perform these steps if you are installing an option or if your support representative has instructed you to update your firmware.

Always check the pSeries & RS/6000 Support Web site for the latest firmware images and update instructions. The Web address is: <http://www.rs6000.ibm.com/support/micro>

Downloading the firmware update image and update instructions from the Web is preferred.

If the system is running, but access to the Web is not available, see “System Firmware Update Using a Locally Available Image” on page 37.

If the system cannot be powered on, but the service processor menus are available, see “Updating System Firmware From the Service Processor Menus” on page 37.

If the service processor programming has been corrupted, the service processor will automatically enter recovery mode when power is applied to the system. Recovery mode is described later in this section.

To check the level of firmware that is currently on the system, see “Determining the Level of Firmware on the System” on page 36.

General Information on System Firmware Updates

All the types of system firmware that can be reprogrammed are updated at the same time. They are:

- System power control network programming
- Service processor programming
- IPL programming
- Run-time abstraction services

It is strongly recommended that you create a set of firmware update diskettes from the Web site as soon as possible after a system is installed. As noted below, the diskette images can be downloaded to any personal computer, pSeries, or RS/6000 system with Internet access. This method is the only way to acquire a set of firmware update diskettes; they cannot be created by using the service processor menus or by using AIX.

Retain and store the latest firmware diskettes each time the firmware gets updated in the event that the firmware becomes corrupted and must be reloaded.

Download the detailed instructions, as well as the latest flash images, from this Web site. Before doing a system firmware update, check the Web site for the latest code and images. Do not attempt a firmware update if you are unsure of the image you have, or of the procedure required for the update.

The images are available on the Web site in either DOS format or AIX (backup) format:

- If downloading to a PC, download the DOS image and follow the instructions. The diskettes that are created will be in AIX (backup) format.
- If downloading to a pSeries or RS/6000 system, follow the instructions to create an image on a disk drive or on diskettes.

Determining the Level of Firmware on the System

Note: This information may be superseded by the information that is available on the Web site listed below. Always check the Web site for the latest images and instructions for checking the firmware level. The Web address is:
<http://www.rs6000.ibm.com/support/micro>

The firmware level is denoted by XXYMMDD, where XX = model designation, YY = year, MM = month, and DD = day of the release.

The firmware level can be determined by either of the following methods:

- On the AIX command line, by typing:

```
lscfg -vp|grep -F .CM
```

A line that begins with ROM level (alterable).. displays the firmware level that is currently on the system.

- Looking at the top of the service processor main menu.

System Firmware Update Using a Locally Available Image

To update the system firmware using a locally available image, perform the following steps:

1. Log in as root user.
2. If the directory **/tmp/fwupdate** does not exist, create it by issuing the following command:

```
mkdir /tmp/fwupdate
```
3. The firmware update file must be written into the **/tmp/fwupdate** directory on the system. This can be done by using the **ftp** command to get the image from an ftp server or NFS-mounting the directory on the host server, for example.

The firmware update file can also be transferred to the target system by backing up the image onto diskette from another server and restoring it into the **/tmp/fwupdate** directory.

After the firmware update file has been written into the **/tmp/fwupdate** directory, verify its existence by entering the following command:

```
ls /tmp/fwupdate/CM*.img
```

The update file will have the format CMyyymmdd.img. The CM indicates that this is an update image for a system: yy is the year, mm is the month, and dd is the day of the update file.

4. After the update file has been written to the **/tmp/fwupdate** directory, enter the following commands:

```
cd /usr/lpp/diagnostics/bin
```

```
./update_flash -f /tmp/fwupdate/CMyyymmdd.img
```

Attention: Do not overlook the periods (.) in the commands shown above. AIX commands are case-sensitive. Type them exactly as shown.

You will be asked for confirmation to proceed with the firmware update and the required reboot. If you confirm, the system will apply the new firmware, reboot, and return to the AIX prompt. This may take up to ten minutes depending on the configuration of the system.

Attention: On some systems, the message `Wait for rebooting before stopping` may display on the system console. Do not turn off the system until the system has fully rebooted to the AIX login prompt. If a shutdown is necessary at that time, log in as root user and issue the **shutdown** command.

While the update is in progress, you will see `Rebooting...` on the display for several minutes.

The firmware update is complete.

Updating System Firmware From the Service Processor Menus

This procedure requires a set of firmware update diskettes in backup format.

The service processor menus are available while the system is powered off. As a privileged user, from the service processor main menu, select **Service Processor Setup**, then select **Reprogram Flash EPROM Menu**. The update process requests update diskettes as needed.

Updating System Firmware from the AIX Service Aids

Note: This service aid is supported only in online diagnostics.

Refer to the detailed instructions that are provided on the Web site with the latest image.

Updating System Firmware from the AIX Command Line

Refer to the detailed instructions that are provided on the Web site with the latest image.

Note: The update process can take up to sixty minutes, and the system reboots itself during the update process.

Recovery Mode

If the service processor detects that its programming has been corrupted when it is powering up to standby mode, it will enter recovery mode. In recovery mode, it will ask for the firmware update diskettes by putting eight-digit codes on the operator panel.

The eight-digit codes are as follows:

Code	Action
A1FD 0000	System firmware has been corrupted and must be reflashed.
A1FD 0001	Insert update diskette 1.
A1FD 0002	Insert update diskette 2.
A1FD 0003	Insert update diskette 3.
A1FD 000n	Insert update diskette n.

Notes:

1. If the wrong diskette is inserted at any time, or if the diskette is left in the drive after it has been read, B1FD 001F is displayed, indicating that the wrong diskette is in the drive.
2. If B1FD 001A is displayed at any time during the process, the service processor must be reset by activating the pinhole reset switch on the primary drawer operator panel.

After the update process is complete, the service processor resets itself and goes through a complete reboot.

Appendix A. Communications Statements

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

Federal Communications Commission (FCC) Statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer is 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 60950.

United Kingdom Telecommunications Safety Requirements

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

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

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

VCCI Statement

<p>この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。</p> <p style="text-align: right;">V C C I - A</p>

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

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

Electromagnetic Interference (EMI) Statement - Taiwan

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

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

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

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

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

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

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

Hinweis

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

Appendix B. Environmental Notices

Product Recycling and Disposal

This unit contains materials such as circuit boards and connectors with lead that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. This manual contains specific information on batteries where applicable. This product may contain nickel-cadmium and/or lithium batteries. The battery(s) must be recycled or disposed of properly. Recycling facilities may not be available in your area. In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used sealed lead acid, nickel cadmium and nickel metal hydride batteries and battery packs from IBM equipment. For information on proper disposal of the nickel cadmium batteries in this product, please contact IBM at 1-800-426-4333. For information on battery disposal outside the United States, contact your local waste disposal facility.

Environmental Design

The environmental efforts that have gone into the design of this system signify IBM's commitment to improve the quality of its products and processes. Some of these accomplishments include the elimination of the use of Class I ozone-depleting chemicals in the manufacturing process and reductions in manufacturing wastes. For more information, contact an IBM account representative.

Unit Emissions

The unit-related emission value is equal to or lower than 70dB(A).

Der Geräuschpegel der Einheit ist kleiner oder gleich 70 db(A).

Appendix C. Notices

This information was developed for products and services offered in the U.S.A.

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law: THIS MANUAL IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions; therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Information concerning products made by other than the manufacturer was obtained from the suppliers of those products, their published announcements, or other publicly available sources. The manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products made by other than the manufacturer. Questions on the capabilities of products made by other than the manufacturer should be addressed to the suppliers of those products.

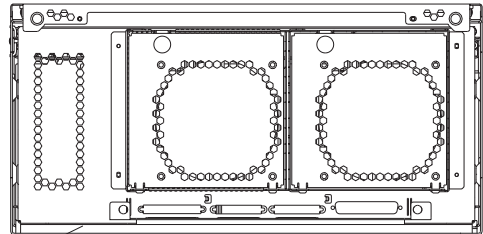
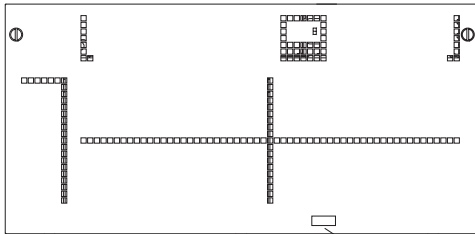
Appendix D. System Records

Record the Serial Numbers

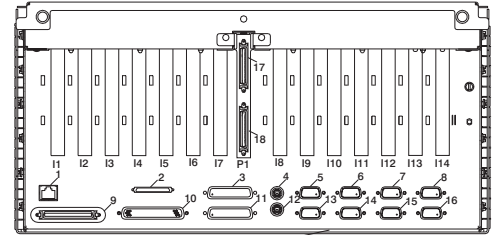
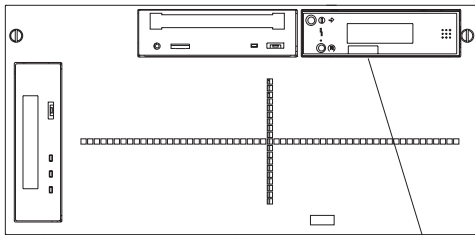
Record and retain the following information.

Product Name:	Model H80 or 660 Models 6H0 and 6H1
CPU Type/Speed:	_____
Serial Number:	_____

The serial number of the model H80, 660 models 6H0 and 6H1 is located on the front cover of the drawers and on the rear of the drawers, as shown in the following figures:



System Serial Number on CEC drawer



System Serial Number on the I/O drawer

Device Records

Use the following tables to keep a record of the options installed in or attached to the model H80, 660 models 6H0 and 6H1. This information can be helpful when you install additional options or if you ever need to have your model H80, 660 models 6H0 and 6H1 serviced.

Memory Riser Card 1 or One-Way Processor Card

Note: If your system has memory on a processor card, use only the left side of this figure.

128MB () 256MB () 512MB () 1GB () A	A 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () B	B 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () C	C 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () D	D 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () D	D 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () C	C 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () B	B 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () A	A 128MB () 256MB () 512MB () 1GB ()

Memory Riser Card 2

128MB () 256MB () 512MB () 1GB () A	A 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () B	B 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () C	C 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () D	D 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () D	D 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () C	C 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () B	B 128MB () 256MB () 512MB () 1GB ()
128MB () 256MB () 512MB () 1GB () A	A 128MB () 256MB () 512MB () 1GB ()

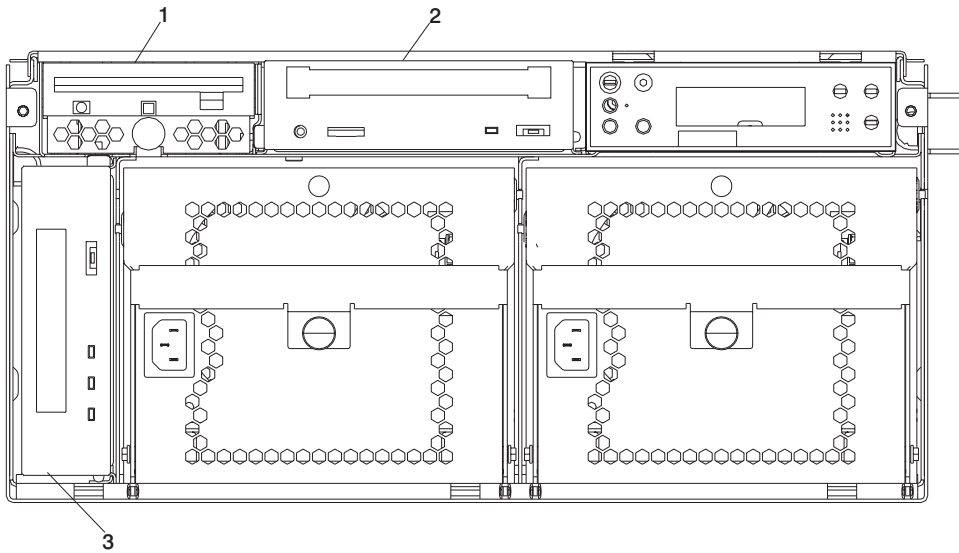
Primary I/O Drawer Records

Location	Option Description
Mouse Connector	IBM Mouse <input type="checkbox"/> Other: _____
Keyboard Connector	Space Saving <input type="checkbox"/> Enhanced <input type="checkbox"/> Other: _____
Ethernet Connector	Space Saving <input type="checkbox"/> Enhanced <input type="checkbox"/> Other: _____
SCSI Connector	Space Saving <input type="checkbox"/> Enhanced <input type="checkbox"/> Other: _____
Expansion Slot 1	_____
Expansion Slot 2	_____
Expansion Slot 3	_____
Expansion Slot 4	_____
Expansion Slot 5	_____
Expansion Slot 6	_____
Expansion Slot 7	_____
Expansion Slot 8	_____
Expansion Slot 9	_____
Expansion Slot 10	_____
Expansion Slot 11	_____
Expansion Slot 12	_____
Expansion Slot 13	_____
Expansion Slot 14	_____
Parallel Port	_____
Serial Port 1	_____
Serial Port 2	_____
Serial Port 3	_____
Serial Port 4	_____

Secondary I/O Drawer Records

Location	Option Description
Expansion Slot 1	_____
Expansion Slot 2	_____
Expansion Slot 3	_____
Expansion Slot 4	_____
Expansion Slot 5	_____
Expansion Slot 6	_____
Expansion Slot 7	_____
Expansion Slot 8	_____
Expansion Slot 9	_____
Expansion Slot 10	_____
Expansion Slot 11	_____
Expansion Slot 12	_____
Expansion Slot 13	_____
Expansion Slot 14	_____

Refer to the following diagram of the bays for the model H80, 660 models 6H0 and 6H1 when completing the table below.



- 1 Bay A1 - Diskette
- 2 Bay A2 - CD-ROM
- 3 Bay B1 - Optional Media

Notes:

1. If you attach a drive or other device to an adapter, record the expansion slot number for that adapter in the Adapter field of Table 1.
2. The SCSI bus IDs in bays B1 and B2 are the recommended values. They are also the IDs that were set when the system was shipped from the factory. Field installations may not comply with these recommendations.

Adapter	Location	SCSI ID	Drive Description
Integrated	Bay A1	Non-SCSI	<u>Diskette Drive</u>
Integrated	Bay A2	1	<u>CD-ROM Drive</u>
Integrated	Bay B1	0	<u>Optional Media</u>

Appendix E. General Attributes Required When Using a TTY Terminal

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

Note: Set these attributes before the diagnostic programs are loaded.

General Setup Attributes	3151 /11/31/41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
Machine mode	3151	3151 PC	3161 or 3164	The diagnostic programs are set to emulate use of the 3161 ASCII Display Terminal. If your terminal can emulate a 5085, 3161 or 3164 terminal, use these attribute settings. Otherwise, refer to your operator's manual, compare the 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.
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 screen contents display again.

General Setup Attributes	3151 /11/31/41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
Line wrap	On	On	On	The cursor moves to the first character position of the next line in the page after it reaches the last character position of the current line in the page.
Forcing insert	Off	Off		
Tab	Field	Field	Field	The column tab stops are ignored, and the tab operation depends on the field attribute character positions.
Trace			All	Both inbound data (data to the system unit) and outbound data (data from the system unit) to and from the main port can be transferred to the auxiliary port without disturbing communications with the system unit when the Trace key is pressed.

Additional Communication Attributes

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

Communication Setup Attributes	3151/11 /31/41) Settings	3151 /51/61, Settings	3161 /3164 Settings	Description
Operating mode	Echo	Echo	Echo	Data entered from the keyboard on the terminal is sent to the system unit for translation and then sent back to the display screen. Sometimes called <i>conversational mode</i> .
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).

Communication Setup Attributes	3151/11 /31/41) Settings	3151 /51/61, Settings	3161 /3164 Settings	Description
Turnaround character	CR	CR	CR	Selects the carriage return (CR) character as the line turnaround character.
Interface	EIA-232	EIA-232	EIA-232	Uses the EIA-232 interface protocol.
Line control	IPRTS	IPRTS	IPRTS	Uses the 'permanent request to send' (IPRTS) signal to communicate with system unit.
Break signal (ms)	500	500	500	The terminal sends a break signal to the system unit within 500 ms after the Break key is pressed.
Send null suppress	On	On		Trailing null characters are not sent to the system unit.
Send null			On	Trailing null characters are sent to the system unit.
Response delay (ms)	100	100	100	The terminal waits for 100 ms 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			View port	
Print EOL			Off	
Print null			Off	

Index

A

about this book xiii
adapters 26
attributes required for TTY terminal 53

B

battery
disposal, recycling 43

C

cables
JTAG 11
RIO 12
SPCN 12, 15
VS/COMM 11
connecting
power 18
customer outlets 3

D

device records 48
internal files and devices 51
devices, handling static-sensitive 24
diagnostics
loading 19
diskette 51
drawer installation 9
drawer rail installation 5

E

ergonomic information xiv

F

firmware 36
level 36
update 36
firmware updates
system 35

H

handling static-sensitive devices 24
hot-pluggable PCI adapter installation overview 33

I

installing
adapters 26
drawer rails 5
options 23

J

JTAG, cable connection 11

L

laser compliance statement ix
laser safety information ix
LED definitions 25

O

online publications xiii
options
installing 23
outlets 3
overview, hot-pluggable PCI adapter 33

P

PCI adapters
installing 26
removing 29
power, connecting 18
product disposal 43
publications, online xiii

R

records, device 48
recycling 43
related publications xiii
removing
PCI adapters 29

S

safety notices vii
electrical vii
laser compliance statement ix
setting devices
devices, attached 17
setting up
system 1
slot LEDs 25
SPCN cabling 15
starting
operating system 18
stopping the system unit 24
system firmware updates 35
system records 47
machine type/model 47
serial number 47
system set up 1
system unit
stopping 24
system verification
verification, system 18

T

trademarks xiv

TTY terminal attributes
 general 53
TTY terminal attributes required for diagnostics 53

V

verifying hardware operation 19
VS/COMM, cable connection 11

W

web sites
 ergonomic information xiv
Web sites
 firmware updates 35, 36
 microcode updates 35, 36

Readers' Comments — We'd Like to Hear from You

RS/6000 Enterprise Server Model H80
@server pSeries 660 Models 6H0 and 6H1
Installation Guide

Publication No. SA38-0575-03

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applicable to your tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? Yes No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name

Address

Company or Organization

Phone No.

Readers' Comments — We'd Like to Hear from You
SA38-0575-03



Cut or Fold
Along Line

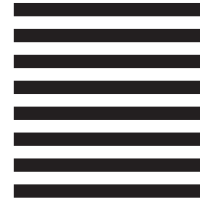
Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

Information Development
Department H6DS-9561
11400 Burnet Road
Austin, TX 78758-3493



Fold and Tape

Please do not staple

Fold and Tape

SA38-0575-03

Cut or Fold
Along Line



Part Number: 09P4055

Printed in U.S.A.

June 2001

SA38-0575-03



(1P) P/N: 09P4055

