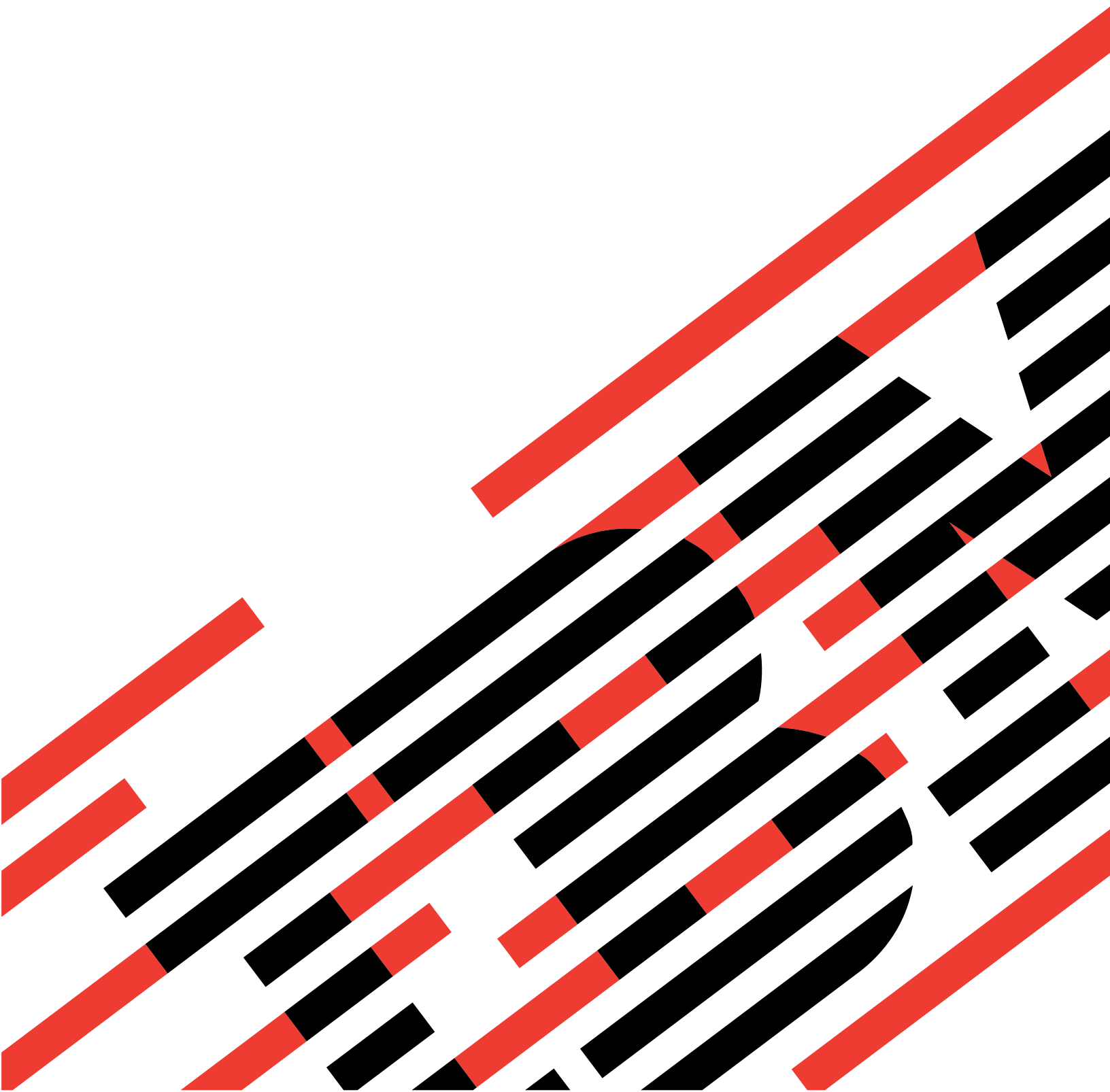# IBM

@server

pSeries 630 Model 6C4 and Model 6E4

User's Guide

SA38-0606-03

IBM

@server

pSeries 630 Model 6C4 and Model 6E4

User's Guide

SA38-0606-03

Contents

iii

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:

- x

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:

- x
- xi
- 29

Note: For a translation of these notices, 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 35 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 any time you are connecting or disconnecting devices attached to the workstation.

When using or servicing your system keep the following in mind:

- The ac power interface connector is considered the main power disconnect device.
- This system has redundant power supply capabilities, meaning that it has the capability of having two power supplies running simultaneously in the same system unit. When instructed to disconnect the power source, ensure that all power cables have been unplugged.

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.
D05

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.
C01

DANGER

To prevent electrical shock hazard, disconnect all power cables from the electrical outlet before relocating the system.
D01

Laser Safety Information

CAUTION:
This product may contain a CD-ROM, DVD-ROM, or laser module on a PCI card, which are class 1 laser products.
C30

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.
C25, C26

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 pSeries 630 Model 6C4 and Model 6E4, specifically how to use the system, use diagnostics and service aids, and verify system operation. In this book, the pSeries 630 Model 6C4 and Model 6E4 are hereafter referred to as the ″system.″

ISO 9000

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

Highlighting

The following highlighting conventions are used in this book:

Bold	Identifies commands, subroutines, keywords, files, structures, directories, and other items whose names are predefined by the system. Also identifies graphical objects such as buttons, labels, and icons that the user selects.
Italics	Identifies parameters whose actual names or values are to be supplied by the user.
`Monospace`	Identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information you should actually type.

Accessing Information

Documentation for the IBM @server pSeries is available online. Visit the IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base.

* To access the pSeries publications, click **Hardware documentation**.
* To view information about the accessibility features of @server pSeries hardware and the AIX operating system, click **AIX and pSeries accessibility**.

References to AIX Operating System

Note: This document may contain references to the AIX operating system. If you are using another operating system, consult the appropriate documentation for that operating system.

This document may describe hardware features and functions. While the hardware supports them, the realization of these features and functions depends upon support from the operating system. AIX provides this support. If you are using another operating system, consult the appropriate documentation for that operating system regarding support for those features and functions.

Related Publications

The following publications provide additional information about your system unit:

- The *@server pSeries 630 Model 6C4 and Model 6E4 Installation Guide*, order number SA38-0605, contains information on how to set up and cable the system, install and remove options, and verify system operation.
- The *@server pSeries 630 Model 6C4 and Model 6E4 Service Guide*, order number SA38-0604, contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.
- The *RS/6000 @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 @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 @server pSeries Diagnostic Information for Multiple Bus Systems*.
- The *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590, contains information on how to set up a hardware management console and how to use it to manage a system.
- The *IBM Hardware Management Console for pSeries Maintenance GuideIBM Hardware Management Console for pSeries Maintenance Guide*, order number SA38-0603, contains information about servicing your HMC, and includes diagnostic and error information.
- The *Site and Hardware Planning Guide*, order number SA38-0508, contains information to help you plan your installation.
- The *System Unit Safety Information*, order number SA23-2652, contains translations of safety information used throughout this book.
- The *PCI Adapter Placement Reference*, order number SA38-0538, contains information regarding slot restrictions for adapters that can be used in this system.

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

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- Electronic Service Agent
- @server
- IBM
- POWER4
- POWER4+
- pSeries
- Service Director

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

Chapter 1. Reference Materials

Note: This document may contain references to the AIX operating system. If you are using another operating system, consult the appropriate documentation for that operating system.

This document may describe hardware features and functions. While the hardware supports them, the implementation of these features and functions depends on support from the operating system. AIX provides this support. If you are using another operating system, consult the appropriate documentation for that operating system regarding support for those features and functions.

This chapter helps you get started with installing and configuring the @server pSeries environment. The following information is included in the chapter:

- @server pSeries Roadmap
- Documentation Overview - Brief description of the printed and softcopy documentation shipped including targeted audience

The @server pSeries Roadmap helps you locate marketing, service, and customer task information. The roadmap guides you through the tasks and the publications that document those tasks.

Marketing and Customer Tasks

Begin

Managed by HMC ?

Yes → Planning

📖 *Site and Hardware Planning Information*
📖 *Planning for Partitioned-System Operations*
📖 *Hardware Management Console
Installation and Operations Guide*

No → Planning

📖 *Site and Hardware Planning Information*

Installer Tasks

Hardware Installation

📖 Hardware Installation Guide
📖 *Hardware Management Console
Installation and Operations Guide*

Hardware Installation

Customer Tasks

📖 *Planning for
Partitioned-System Operations*
📖 *AIX Installation in a
Partitioned Environment*
📖 *AIX Installation Guide
and Reference*
📖 *Operating System Installation:
Getting Started*

Is System Using Partitions ?

Yes → Configuring Partitions

No → Configuring Full System Partition

Installing/Configuring the Operating System

Installing/Configuring the Operating System

Installing/Configuring Applications

📖 *AIX Installation in a Partitioned Environment*
📖 Application Documentation
📖 AIX Documentation Library

Using the System

📖 Hardware User's Guide
📖 AIX Documentation Library
📖 Application Documentation

The publications listed in this section are available online. To access the online books, visit our IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base.

Documentation Overview

This section provides descriptions and target audience information for the @server pSeries and AIX 5L documentation libraries. Some of the documentation may only be available in printed form or in softcopy form. Based on the documentation content, the books are divided into the following categories: **Planning**, **Installing and Configuring**, and **Using the System**.

Table 1. Planning

Documentation Title	Description	Audience	Type
Site and Hardware Planning Information	Contains information to help plan for site preparation tasks, such as floor-planning, electrical needs, air conditioning, and other site-planning considerations.	Marketing, system administrators	softcopy
Planning for Partitioned-System Operations	Describes planning considerations for partitioned systems, including information on dynamic partitioning and Capacity Upgrade on Demand.	System administrators	printed and softcopy
Hardware Management Console for pSeries Installation and Operations Guide	Provides information on how to install, configure, and use a Hardware Management Console (HMC). Logical partition (LPAR) tasks, such as configuring and managing partitions on multiple host servers, are included.	System administrators	printed and softcopy

Table 2. Installing and Configuring

Documentation Title	Description	Audience	Type
Hardware Installation Guide	Provides information on how to install system hardware, cable the system, and verify operations.	System installer	printed and softcopy
Planning for Partitioned-System Operations	Describes planning considerations for partitioned systems, including information on dynamic partitioning and Capacity Upgrade on Demand.	System administrators	printed and softcopy
Hardware Management Console for pSeries Installation and Operations Guide	Provides information on how to install, configure, and use a Hardware Management Console (HMC). Logical partition (LPAR) tasks, such as configuring and managing partitions on multiple host servers, are included.	System administrators	printed and softcopy
AIX Installation in a Partitioned Environment	Provides information on how to install the AIX operating system in an LPAR environment.	System administrators	printed and softcopy
AIX Operating System Installation: Getting Started	Provides information on how to install and configure the AIX operating system on a standalone system using a CD-ROM device.	System administrators	printed and softcopy
AIX 5L Installation Guide and Reference	Provides information on installing the AIX 5L operating system on standalone systems, as well as on client systems using the Network Installation Management (NIM) interface.	System administrators	printed and softcopy
PCI Adapter Placement Reference	Outlines system-specific PCI adapter slot placement and adapter support configurations.	System administrators, service personnel	softcopy
AIX 5L Release Notes	Provides late-breaking information for a specific AIX release.	System administrators	printed and softcopy
AIX 5L Documentation CD	AIX documentation library (system management guides, user guides, application programmer guides, commands and files references, AIX man pages, and so on).	System administrators	softcopy

Table 3. Using the System

Documentation Title	Description	Audience	Type
Hardware Management Console for pSeries Installation and Operations Guide	Provides information on how to install, configure, and use a Hardware Management Console (HMC). Logical partition (LPAR) tasks, such as configuring and managing partitions on multiple host servers, are included.	System administrators	printed and softcopy
Hardware User's Guide	Provides using, problem determination, and service processor information.	System administrators	printed and softcopy
Diagnostic Information for Multiple Bus Systems	Combines operating instructions for hardware diagnostic programs with common MAPs and SRNs (Service Request Numbers).	Service personnel	printed and softcopy
PCI Adapter Placement Reference	Outlines system-specific PCI adapter slot placement and adapter support configurations.	System administrators, service personnel	printed
Hardware Management Console for pSeries Maintenance Guide	Contains MAPs, removal and replacement, error code, and parts information to help diagnose and repair the system.	Service personnel	printed and softcopy
Adapters, Devices, and Cable Information for Multiple Bus Systems	Provides information about adapters, devices, and cables that are attached to or used within the system.	System administrators	printed and softcopy
System Unit Safety Information	Contains the English version of safety notices, as well as translations of those safety notices into other languages.	System administrators, service personnel	printed and softcopy
AIX 5L Documentation CD	AIX documentation library (system management guides, user guides, application programmer guides, commands and files references, AIX man pages, and so on).	System administrators	softcopy

Chapter 2. Introducing the System

This chapter provides information about the system features of the pSeries 630 Model 6C4 and Model 6E4. The Model 6C4 is a rack-mount system and the Model 6E4 is a deskside system.

System Features

Bus Architecture

Depending on your system configuration, four or six PCI-X slots are available. The slots are 64-bit capable at 133 MHz, 3.3 volts. If your system has four PCI-X slots, use slots 3 and 4 with PCI adapters that require high performance. Use slots 1 and 2 with PCI adapters that do not require high performance. All slots are capable of using the full-length PCI-X adapters. The PCI-X slots are numbered on the rear of the chassis, from left to right.

When equipped with POWER4+ processors and a six-slotted PCI riser card, the Model 6C4 and Model 6E4 include six hot-plug PCI-X slots, dual integrated Ultra3 SCSI controllers, dual 10/100 Mbps integrated Ethernet controllers, and four front-accessible disk bays supporting hot-swappable disks. These disk bays can accommodate up to 587.2 GB of disk storage using 146.8 GB Ultra3 SCSI disk drives. Two media bays are used for a CD-ROM, DVD-RAM, DVD-ROM, or another optional media device, such as a tape drive or diskette drive. The Converged Service Processor 2 (CSP), including system power control, is also integrated, along with the basic I/O functions such as serial ports, keyboard, and mouse. Also included is an enhanced I/O subsystem with the implementation of the remote I/O (RIO) interconnect and PCI-X bus protocols.

The Model 6C4 can support up to two high-density 7311 Model D20 I/O drawers to provide additional PCI-X slots and disk drive bays. A fully configured system with two I/O drawers has 20 PCI-X slots and 4.1 TB of disk space. Optionally redundant hot-plug cooling fans and power supplies are available.

All PCI-X slots can run either 64-bit or 32-bit adapters. However, a 32-bit adapter operates in a 32-bit mode and shows no performance advantage while running in a 64-bit slot. The following illustration shows the PCI adapter slot locations when viewing from the rear of the system.
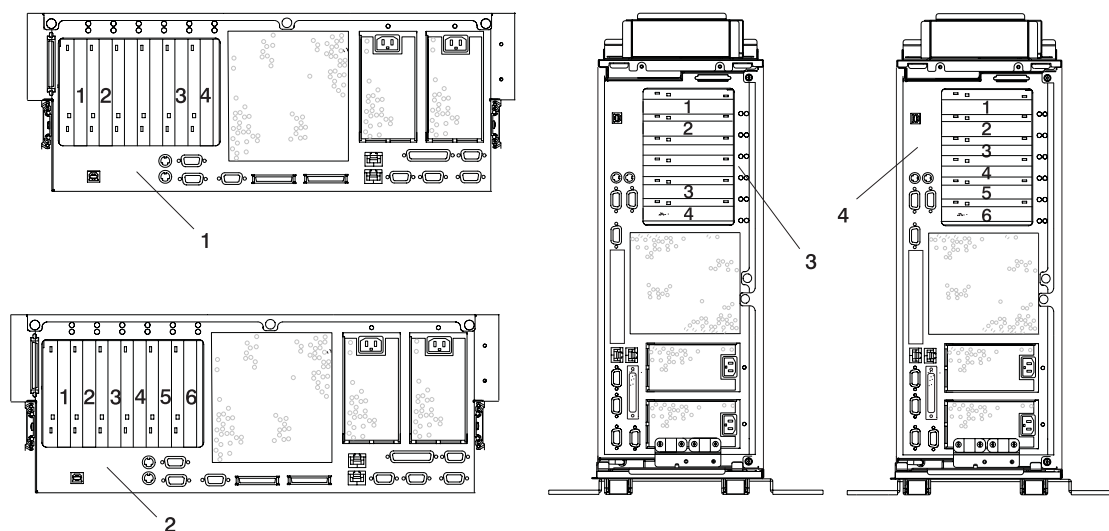
1	Model 6C4 Using a 4-Slotted PCI Riser Card	**3**	Model 6E4 Using a 4-Slotted PCI Riser Card
2	Model 6C4 Using a 6-Slotted PCI Riser Card	**4**	Model 6E4 Using a 6-Slotted PCI Riser Card

Processor Card

The Model 6C4 and Model 6E4 have three processor speeds available.

The GP processor has a processing speed of 1.0 GHz, while the GQ processors have a processing speed of either 1.2 GHz or 1.45 GHz.

Use only processor cards of the same type and speed when adding, replacing, or upgrading processor cards in your system.

Processor cards can be configured in any one of the following combinations:
- One 1-way processor card
- Two 1-way processor cards
- One 2-way processor card
- Two 2-way processor cards

Notes:

1. Feature conversions are available for upgrading from a 1-way to a 2-way processor and when upgrading from a POWER4 to POWER4+ processor.
2. The processor feature conversions must be performed by a service representative.

Memory

- 1 GB to 32 GB ECC (error code correction) DDR (double data rate) SDRAM (synchronous dynamic random-access memory).
- Memory DIMMs plug into the processor cards (8 DIMM slots per card).
- DIMMs must be populated in quads (four DIMMs). A memory feature consists of a quad. Additional quads can consist of any memory size.
- A system with a single processor card (1-way or 2-way) can have a maximum of 16 GB of memory.

Media Drives

Typical system configuration consists of two media bays. One of the media bays can be configured with either IDE CD-ROM or IDE DVD-ROM.
- Media bay 1 can accommodate an IDE CD-ROM or IDE DVD-ROM.
- Media bay 2 can accommodate a SCSI DVD-RAM, diskette drive, or tape drive.

   Note: The SCSI DVD-RAM can read CD-ROM installation media.

   The following media drives are available for the Model 6C4 and Model 6E4:
   – Diskette drive
   – DVD-RAM drive 4.7 GB capacity
   – 650 MB IDE 48x CD-ROM drive
   – 4.7 GB IDE 16x/48x DVD-ROM drive
   – 80/160 GB VXA tape drive
   – 8 mm 60/150 GB tape drive
   – 4 mm 20/40 GB tape drive

Hot-Pluggable Disk Drives

Four hot-plug disk-drive bays:

- 18.2 GB to 587.2 GB of disk storage
- The following disk-drive sizes and speeds are available:
  - 18.2 GB Ultra3 10K RPM 1 inch
  - 36.4 GB Ultra3 10K RPM 1 inch
  - 73.4 GB Ultra3 10K RPM 1 inch
  - 146.8 GB Ultra3 10K RPM 1 inch
  - 36.4 GB Ultra3 15K RPM 1 inch
  - 73.4 GB Ultra3 15K RPM 1 inch

PCI-X Slots and Integrated Adapters

The following devices are included in the Model 6C4 and Model 6E4:

- Six hot-plug PCI-X slots, 64-bit, 133 MHz, 3.3 volt on POWER4+ processor models, four slots on POWER models.
- Integrated ports:
  - Two 10/100 Ethernet (IEEE 802.3 compliant).
  - Two Ultra3 SCSI (one external Ultra3 SCSI with VHDCI 4 mini 68-pin port, and one internal Ultra3 SCSI disk drive backplane). VHDCI may require a mini 68-pin connector or FC 2118 mini 68-pin to 68-pin 0.3 meter cable as an additional feature.
  - Three serial. Serial port 1 (S1) has two physical connectors, one RJ-48 connector located in front on the operator panel and a 9-pin D-shell connector located on the rear of the chassis. The use of the front port disables the rear S1 port.
  - One parallel (the parallel port is not accessible when in partitioned mode).
  - Keyboard and mouse.

I/O Expansion Drawer

Expansion is provided by adding additional 7311 Model D20 I/O drawers (up to a maximum of two) for the Model 6C4. The 7311 Model D20 provides additional PCI-X slots and disk drive bays for the Model 6C4.

- Seven hot-plug PCI-X slots, 64-bit, 133 MHz, 3.3 volt
- Up to 12 hot-pluggable disk drive bays

  The optional disk backplane consists of two 6-pack disk bays and requires SCSI cables to connect a required Ultra3 SCSI PCI adapter or Ultra3 SCSI RAID adapter, in slot 7 to each of the 6-packs, or two SCSI adapters (one in slot 4 and one in slot 7 of the I/O drawer).

Power Supply

Up to two power supplies maximum per system; the second power supply is for redundant power.

- AC input type 120-127 V ac / 200-240 V ac
- Single phase
- Frequency = 47 Hz - 63 Hz

Keyboard

- Standard: 101-key enhanced keyboard
- 101/102 or 106-key enhanced keyboard is also available

Mouse

- Three-button

Operator Panel

- 32-character LED diagnostics display
- LEDs for power on, attention, SCSI activity, and LAN activity
- Buttons for power on and service processor reset
- Pinhole for system reset:

    System Reset
    Dumps AIX (if dump is enabled) and reboots.

    Service Processor Reset
    Resets the service processor (into standby mode). The service processor reset switch is the pinhole located on the operator panel above the system reset button.

Input/Output Ports

- One 25-pin parallel
- Keyboard
- Mouse
- Two Ultra3 SCSI (one to internal 4-pack disk drive backplane, one to external VHDCI mini 68-pin port)
- Integrated Drive Electronics (IDE)
- Two 10/100 Ethernet (IEEE 802.3 compliant)
- Three serial ports. Serial port 1 (S1) has two physical connectors, one RJ-48 connector located in front on the operator panel, and a 9-pin D-shell connector located on the rear of the chassis. The other two serial ports are 9-pin D-shell connectors and are located on the rear of the system chassis.

    Current usage for the serial port connectors is as follows:

Serial Port Number	Location	Applicable Usage Examples
Serial Port 1 (S1 Front)	Operator Panel	Service Agent, PDA System Management Applications (for example, handheld devices, laptop sytems), Service Processor menus, ASCII terminal for the operating system console, and modems
Serial Port 1 (S1 Rear)	Rear of the System	Service Processor menus, Service Agent, PDA System Management Applications (interface cable required), ASCII terminal for the operating system, and modems
Serial Port 2 (S2)	Rear of the System	Service Processor menus, HACMP, ASCII terminal for the operating system, and modems
Serial Port 3 (S3)	Rear of the System	HACMP, UPS (uninterruptible power supply), ASCII terminal for the operating system, and modems

Notes:

1. Serial port 1 is never used to run HACMP or attach a UPS. If you are configuring your system to run HACMP with a UPS attached, you must connect the HACMP cable to serial port 2 and the UPS cable to serial port 3. *Do not* run UPS connected to serial port 2. If you disconnect HACMP, you *must* reset the service processor using the pinhole reset switch before running another application. The service processor pinhole reset switch is located on the operator panel.
2. A modem can be attached to any of the serial ports.

Security Features

On the Model 6C4 and Model 6E4, you can set the following types of passwords to limit access to these systems:

- General-access password - Set only from the service processor menus. It provides limited access to the service processor menus and is usually available to all users who are allowed to power on the system.
- Privileged-access password - Set from the service processor menus or from System Management Services (SMS) menus. Used by the system administrator or root user and allows access to all service processor functions.

Front View

Model 6C4
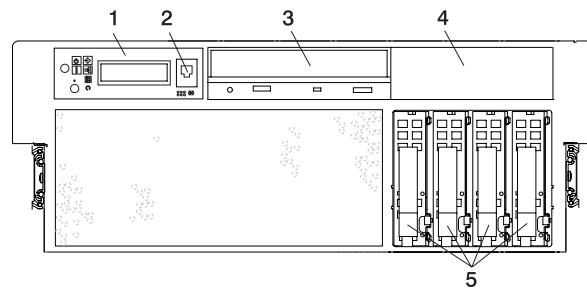
1 Operator Panel		**4** Media Bay	
2 Front Serial Connector		**5** Hot-Plug Disk Drives	
3 IDE CD-ROM Drive			
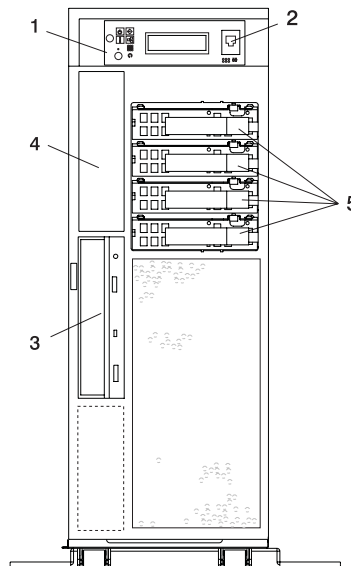
Model 6E4

1 Operator Panel		**4** Media Bay	
2 Front Serial Connector		**5** Hot-Plug Disk Drives	
3 IDE CD-ROM Drive			

Rear View

Model 6C4
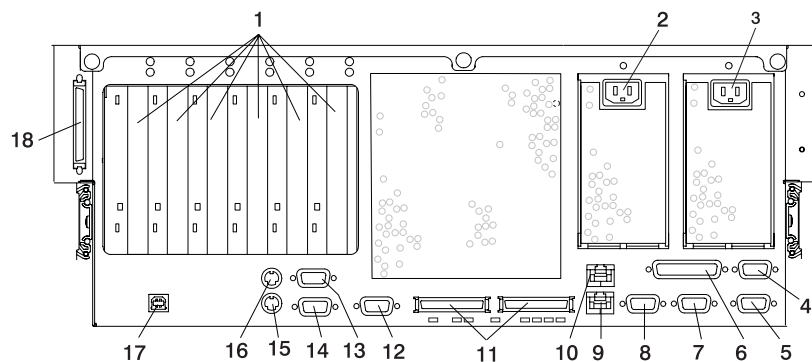
1	PCI-X slots (64-Bit)	**10**	Ethernet Connector 2
2	Redundant Power Cable Receptacle	**11**	RIO 0 and RIO 1 Connectors
3	Primary Power Cable Receptacle	**12**	Serial Connector 2
4	System Power Control Network Connector SPCN2	**13**	Serial Connector 3
5	System Power Control Network Connector SPCN1	**14**	Serial Connector 1
6	Parallel Connector	**15**	Mouse Connector
7	Hardware Management Console Connector HMC2	**16**	Keyboard Connector
8	Hardware Management Console Connector HMC1	**17**	Rack Indicator
9	Ethernet Connector 1	**18**	External SCSI Connector

Model 6E4
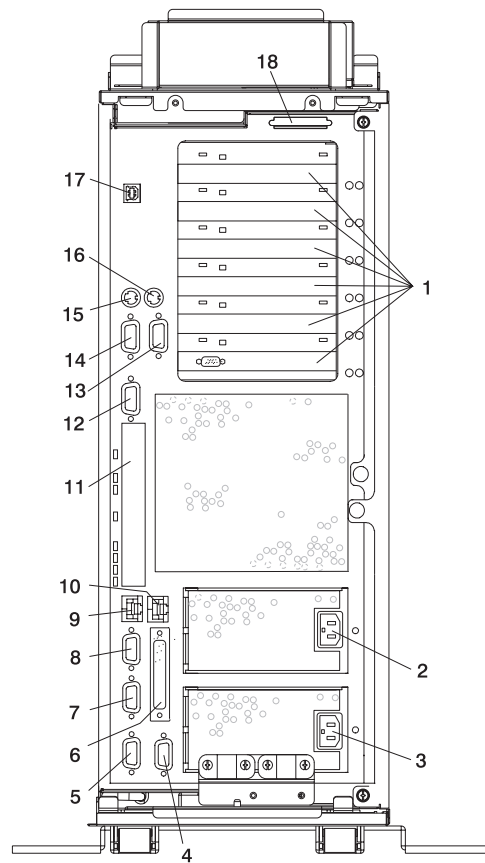
1	PCI- X slots (64-Bit)	**10**	Ethernet Connector 2
2	Redundant Power Cable Receptacle	**11**	RIO Connector Cover (These connectors are not used with your system.)
3	Primary Power Cable Receptacle	**12**	Serial Connector 2
4	System Power Control Network Connector SPCN2	**13**	Serial Connector 3
5	System Power Control Network Connector SPCN1	**14**	Serial Connector 1
6	Parallel Connector	**15**	Mouse Connector
7	Hardware Management Console Connector HMC2	**16**	Keyboard Connector
8	Hardware Management Console Connector HMC1	**17**	Rack Indicator
9	Ethernet Connector 1	**18**	External SCSI Connector

Operator Panel
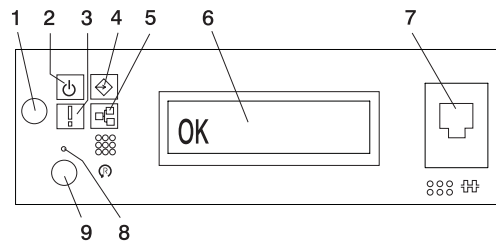
1	Power-On Button	**6**	Operator Panel Display
2	Power-On LED (blinks when in standby)	**7**	(FS1) Front Serial Connector (RJ-48 Connector)
3	Attention LED	**8**	Service Processor Reset Switch (Pinhole)
4	SCSI Port Activity LED	**9**	System Reset Button
5	Ethernet Port Activity LED		

Chapter 3. Using the System

This chapter provides information on how to start and use the system.

Stopping the System without an HMC Attached

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 goes into standby mode when the operating system is shut down. Before removing power from the system, 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. The option-installation procedures in this chapter will direct you here if stopping the system is required.

1. Log in to the system as root user.
2. Have your system administrator stop all applications that are running on the system.
3. At the command line, ask the administrator to type one of the following commands:

    Note: If your system is running AIX, type `shutdown`. If your system is running Linux, type `shutdown now -h`.

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

Stopping the System with an HMC Attached and AIX Installed

Attention: Using the power-on button on the operator panel or commands at the HMC to power off the system can cause unpredictable results in the data files. The next initial program load (IPL) will also take longer to complete if all applications in all partitions are not stopped before hand.

The HMC user interface provides a power-off function to turn off the power to the system. If the system is logically partitioned, AIX in each partition may be stopped individually to make repairs. If the system power must be turned off, all of the logical partitions must be stopped. AIX provides hot-swap procedures for adapters and devices that support hot-swap removal and installation. You do not have to shutdown a partition that controls an adapter or device that supports hot-swap. Individual power components and fans may be serviced with power on for power systems equipped with redundant power and cooling. Check removal and installation procedures before servicing the system.

If the system is operating in a full system partition under AIX, typing the **shutdown** command causes the system to shut down and power off. The **-F** flag shuts down the system without warning system users. Check with the system administrator before using this command. If you cannot use this method, you can power off the system by pressing the power-on button on the operator panel or running the appropriate command at the HMC.

Stopping the System with an HMC Attached and Linux Installed

Attention: Using the power-on button on the operator panel or commands at the HMC to power off the system can cause unpredictable results in the data files. The next IPL will also take longer to complete if all applications in all partitions are not stopped before hand.

The HMC user interface provides a power-off function to turn off the power to the system. If the system is logically partitioned, Linux in each partition may be stopped individually to make repairs. If the system power must be turned off, all of the logical partitions must be stopped. Linux does not provide hot-swap procedures for adapter and device removal and installation. You must shut down all partitions and the system power must be turned off to service an adapter or device. Individual power components and fans

may be serviced with power on for power systems equipped with redundant power and cooling. Check removal and installation procedures before servicing this system.

If the system is operating in a full system partition under Linux, typing the **shutdown now -h** command causes the system to shut down and power off. Check with the system administrator before using this command. If you cannot use this method, you can power off the system by pressing the power-on button on the operator panel or running the appropriate command at the HMC.

Starting the System without an HMC Attached

Power on the system only after all of the following steps are completed:
- Connect all I/O drawer cables
- Connect the base system cables
- Connect all PCI cables to supported subsystems
- Connect the hardware management console (HMC) (if required)
- Connect power the system

To power on the system, perform the following steps:
1. Open any system or rack doors necessary to allow the operator panel to be observed.
2. Connect the power source to the system unit.

    Before you press the power-on button on your operator panel, observe the following:
    - The power LED is slowly blinking.
    - An OK prompt is visible in the operator panel display.
3. Press the power-on button on the operator panel.

    After pressing the power-on button located on the operator panel, observe the following:
    a. The power LED begins to blink visibly faster.
    b. The system cooling fans are activated and accelerate to operating speed.

    Note: There is approximately a 30-second transition period between the time the power-on button is pressed and the power LED remains on solid (no longer blinking).
    c. The power LED stays on solid and progress indicators, also referred to as *checkpoints*, are visible on the operator panel display.
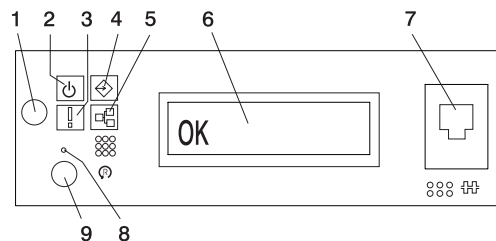
1 Power-On Button	**6** Operator Panel Display
2 Power LED	**7** (FS1) Front Serial Connector (RJ-48 Connector)
3 Attention LED	**8** Service Processor Reset Switch (Pinhole)
4 SCSI Port Activity	**9** System Reset Button
5 Ethernet Port Activity	

Starting the System with an HMC Attached

Power on the system only after all of the following steps are completed:
- Connect all I/O drawer cables
- Connect the base system cables
- Connect all PCI cables to supported subsystems
- Connect the hardware management console (HMC) (if required)
- Connect power the system

After the required cables are installed and the power cables are connected, the HMC user interface provides a power-on function to turn on the power to the system. If a system operator panel is available, the power-on button on the operator panel can be pushed to initialize the system, but the preferred method is to use the HMC if booting logical partitions. Progress indicators, also referred to as *checkpoints*, are visible on the operator panel display (if available) as the system power is turned on. The power LED on the base system stops blinking and stays on, indicating the system power is on.

The base system and I/O subsystems are powered on through the system power control network (SPCN). When power is applied, the power LEDs on the base system go from blinking to continuous, and the power LEDs on the I/O subsystem(s) come on and stay on. This indicates that power levels are satisfactory in the subsystems.

After the system is powered on, all logical partitions will be in a standby or powered on state. Each logical partition must then be booted through the HMC. All logical partitions that have been booted will be in the running state.

Reading the Operator Panel Display

The operator panel display is used to:
- Track the progress of the system unit self-tests and configuration program
- Display codes when the operating system comes to an abnormal end
- Display system messages

Operator Panel
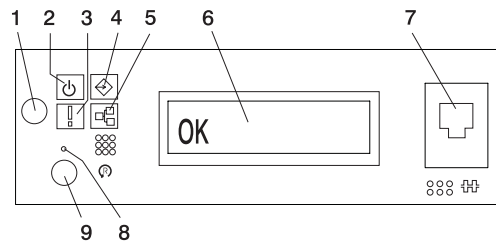
1 Power-On Button		**6** Operator Panel Display
2 Power-On LED		**7** (FS1) Front Serial Connector (RJ-48 Connector)
3 Attention LED		**8** Service Processor Reset Switch (Pinhole)
4 SCSI Port Activity		**9** System Reset Button
5 Ethernet Port Activity		

Number	Component Name	Component Description
1	Power-On Button	Turns the system power on and off.
2	Power-On LED	Blinking - When connected to the power source (system is in standby mode). Solid - When the power-on button has been pressed. **Note:** There is approximately a 30-second transition period from the time the power-on button is pressed until the power LED goes from blinking to on solid. During the transition period, you may observe the blinking intervals accelerate.
3	Attention LED	Normal State - LED is off.
4	SCSI Port Activity	Normal State - LED is on when there is SCSI activity.
5	Ethernet Port Activity	Normal State - LED is on when there is Ethernet activity.
6	Operator Panel Display	Displays current status of system startup, or diagnostic information in the event of a hardware problem.
7	Front Serial Connector (FS1)	Serial port uses RJ-48 connector. Use to plug in external devices at the front of the system unit.
8	Service Processor Reset Switch (Pinhole)	Service personnel use
9	System Reset Button	Resets the system

System Attention LED and Accessing System Log Error Information

The system attention LED, on the operator panel turns on when an entry is made in the service processor error log. When the LED is on, it indicates that user intervention or service is needed. The error entry is transmitted and recorded in the following logs:

- The system-level error logs
- The operating system error log
- The service action event log (such as loss of surveillance from the HMC to a logical partition) in the Service Focal Point application

If the system attention LED is turned on, you can access the system logs to determine the reason. The method used to access your system logs depends on how your system is set up. For more information about how to access the system logs, refer to

Accessing System Log Error Information

Note: The system attention LED can be reset by following the procedures described in "Resetting the System Attention LED".

When an error or potential problem is detected by the system, the attention LED on the operator panel is turned on. Information about the error or potential problem is stored in error logs. The following sections explain how to access the logs that are available on a system. The error logs are accessed from the console that is used to manage the system. From the following console descriptions, go to the instructions under the heading that best describes the system on which you are working:

- "Accessing Errors when a System is Attached to an HMC".
- "Accessing Errors when a System is Running AIX and the Console is Not an HMC".
- "Accessing Errors when a System is Running Linux and the Console is Not an HMC".

Accessing Errors when a System is Attached to an HMC

If the system attention LED comes on and the system is attached to an HMC for its console, do the following to access the error logs:

1. Open the Service Action Event Log in the Service Focal Point application on the HMC.
2. Check the open service events using the procedure described in ″Working with Serviceable Events″ in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*.

Note: For information on these Service Focal Point settings, see ″Setting Up Surveillance and Enabling Surveillance Notifications″ in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*.

Events requiring customer intervention are marked `Call Home Candidate? NO`. For each of these events, examine the description in the serviceable event error details. If actions are listed in the description, perform those actions. If the error indicates a loss of surveillance between the HMC and a partition, check the status of the partition, the network, and the cabling between the HMC and the partition. Correct any problems found. If a surveillance problem is still indicated, call service support.

If the system is not configured to automatically call home, you should place a call to service support.

Accessing Errors when a System is Running AIX and the Console is Not an HMC

If the system attention LED comes on and the system is running AIX and the console is not an HMC, do the following to access the error logs:

1. Check the AIX console for instructions that may have been posted to the console. If there are instructions, perform them. If the problem is resolved, the system attention LED may be turned off by the methods in ″Resetting the System Attention LED″.
2. If there are no instructions on the console, or performing those directions did not resolve the problem, go to Chapter 9, "Hardware Problem Determination", on page 143.
3. If the system is operational, examine the AIX error log to see if user intervention is required.
4. If the system is powered off, examine the service processor error log for entries.
5. If the AIX error log indicates service support is required, or there are entries in the service processor error log, contact your system support organization.

Accessing Errors when a System is Running Linux and the Console is Not an HMC

If the system attention LED comes on and the system is running Linux and is not attached to an HMC, go to Chapter 9, "Hardware Problem Determination", on page 143.

Resetting the System Attention LED

Choose one of the following procedures to reset your attention LED.

Resetting the LED when a System is Attached To an HMC

To reset the system attention LED on HMC-attached systems, do the following:

1. On the HMC graphical interface, click **Service Applications**.
2. Double-click **Service Focal Point**.
3. In the Contents area of the screen, select **Hardware Service Functions**. The LED Management window opens.
4. In the LED Management window, select one or more managed systems from the table.
5. Select **Deactivate LED**. The associated system attention LED is turned off.

For more information about the virtual operator panel on the HMC, see the *Hardware Management Console for pSeries Installation and Operations Guide*.

Resetting the LED when a System is Running AIX and the Console is not an HMC

As a user with root authority, type `diag` on the AIX command line, and do the following:

1. Select **Task Selection**.
2. On the Task Selection Menu, select **Identify and Attention Indicators**.
3. When the list of LEDs displays, use the cursor to highlight **Set System Attention Indicator to Normal**.
4. Press Enter, and then press F7 to commit. This action turns off the LED.

If the system is powered off, access the service processor menus. From the service processor main menu, do the following:

1. Select **System Information Menu**.
2. Select **LED Control Menu**.
3. Select **Clear System Attention Indicator**. This action turns off the LED.

Resetting the LED when a System is Running Linux and the Console is not an HMC

The system must be powered off to access the service processor menus. From the service processor main menu, do the following:

1. Select **System Information Menu**.
2. Select **LED Control Menu**.
3. Select **Clear System Attention Indicator**. This action turns off the LED.

Component LEDs

Individual LEDs are located on or near the failing components. The LEDs are located either on the component itself or on the carrier of the component (for example, memory card, fan, memory module, or CPU). LEDs are either green or amber.

Green LEDs indicate either of the following:

- Electrical power is present.
- Activity is occurring on a link. (The system could be sending or receiving information.)

Amber-colored LEDs indicate a fault or identify condition. If your system or one of the components on your system has an amber-colored LED turned on or blinking, identify the problem and take the appropriate action to restore the system to normal.

The following table identifies the location, color, and status of your system component LEDs.

Unit (FRU)	LED Function	Location	LED Color	OFF	ON	Blink
Power and Packaging LEDs						
Rack Indicator	Drawer Sum	Top of Rack	Amber (1x)	Normal	Fault	Identify
	AC Input		Green (1x)	No Input	AC Good	N/A
System Unit	Attention	Operator Panel + Rear	Amber (2x)	Normal	Fault	Identify
	Power	Operator Panel + Rear	Green (2x)	No AC	System Powered On	• Standby • Transition of Power from Standby to Power-On (Blinking intervals may accelerate before remaining on solid)
Fans	Identify	Fan Top	Amber (4x)	Normal	Fault	N/A
Power Supply (AC)	Input Source	Power Supply Front + Top	Green (1x)	No Input	AC Input Good	N/A
	Fault	Power Supply Front + Top	Amber (1x)	Normal	Fault	Fast Blink - Identify Slow Blink - SPCN communication failure .25 Hz
	DC Output Good	Power Supply Front + Top	Green (1x)	DC Off	DC Good	Standby
Disk Drives (DASD)	Activity	DASD Board	Green (4x)	No Activity	Activity	N/A
	Remove Identify	DASD Board	Amber (4x)	Normal	Action	Identify
Optional Media	No LED					
Electronics Component LEDs						
PCI Adapter Connectors (Slots)	Activity	Chassis Rear, Inside System Next to Adapter	Green	Refer to the PCI Adapter Table on page 23.		
	Identify	Chassis Rear, Inside System Next to Adapter	Amber	Refer to the PCI Adapter Table on page 23.		
Memory DIMMs	Identify	Processor Housing (Top)	Amber (8x)	Normal	Identify	
CEC Backplane	Identify	CEC Backplane	Amber (1x)	Normal	Identify	
Processor Board	Identify	Processor Housing (Top)	Amber (1x)	Normal	Identify	

Unit (FRU)	LED Function	Location	LED Color	OFF	ON	Blink
PCI Riser Card	Identify	PCI Riser Card	Amber (1x)	Normal	Identify	
Disk Drive Backplane	No LED					
Port LED Indicators						
RIO Port	Identify	CEC Backplane	Amber (2x)	Normal	N/A	Identify
SCSI Port	Activity	Operator Panel	Green (1x)	No Activity	Activity	
Ethernet Port Ethernet 1, Ethernet 2	Mode	Chassis Rear	Green (2x)	10 Mbit Mode	100 Mbit Mode	
	Activity	Chassis Rear	Green (2x)	No Activity	Activity	
	Activity	Operator Panel	Green (1x)	No Activity	Activity	

The following illustration shows the Ethernet LED locations on the rear of the Model 6C4 and Model 6E4.
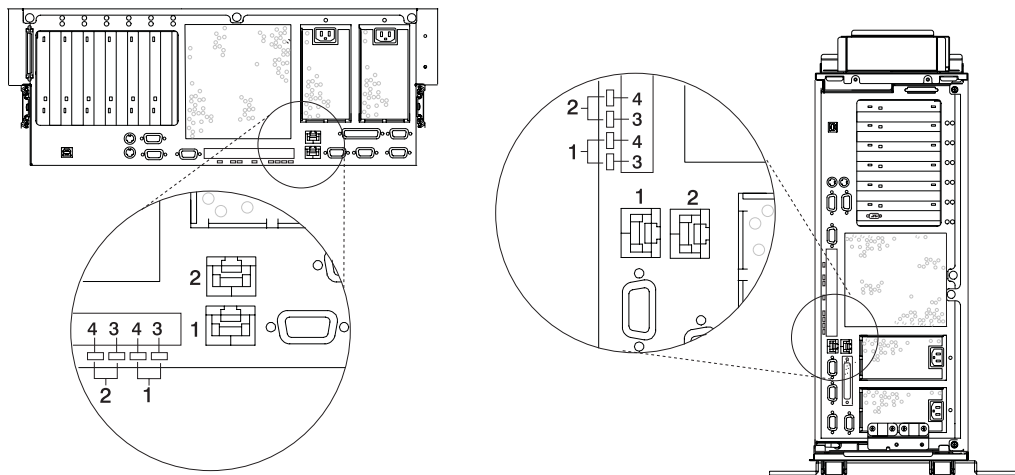
1 Ethernet 1 Connector and LED
2 Ethernet 2 Connector and LED
3 Mode LED
   10 Mbit - Off
   100 Mbit - On
4 Activity LED
   On - Receiving Information
   Off - Not Receiving Information

The following illustration shows the RIO connector LED locations on the rear of the Model 6C4 and Model 6E4.
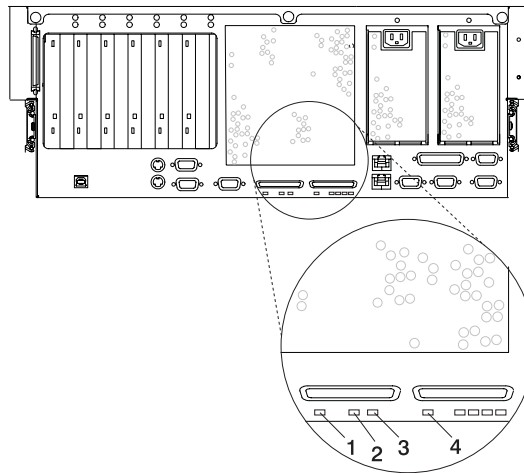
1 RIO-2 0 Identify LED
2 System Drawer Rear Power LED
3 System Drawer Rear Attention LED
4 RIO-2 1 Identify LED

The following table explains the meaning of the on and off status of the PCI-X adapter LEDs.

LED	Inactivity	Active	Identify	Action
Green + Amber (2 LEDs)	Green - Off Amber - Off	Green - On Amber - Off	Green - On Amber - Blinking	Green - Off Amber - Blinking

Reporting the Problem

After you have determined which component is failing, report the problem.

1. Record the following information before calling for service:
   - Machine type and model number
   - Server serial number
   - Any error codes that appear in the operator panel display or console
   - The adapter or device containing the lit amber-colored LED

2. Call for service. You will be given the choice to replace the failing component yourself or have a service representative replace it for you. If you decide to replace the failing component, go to "Repair Action" on page 24 for instructions.

Repair Action

After you have determined which component is failing, a repair action is necessary.

Note: If you need instructions on component installation, removal, and replacement, see ″Installing Options in the Model 6C4 and Model 6E4″ in the @server *pSeries 630 Model 6C4 and Model 6E4 Installation Guide*.

1. Run the system verification procedure, see Chapter 8, "Verifying the Hardware Operation", on page 135.
2. Record the following information before calling for service:
   - Machine type and model
   - Server serial number
   - Any error codes that appear in the operator panel display or console
   - Any LEDs that are lit on the operator panel
3. Call for service.
4. After the repair action is completed, go to "Resetting the LEDs".

Resetting the LEDs

After the repair action is complete, do the following:

1. Log in as root user.
2. At the command line, type `diag`.
3. Select **Task Selection**.
4. Select **Log Repair Action**.
5. Select the device that was repaired.
6. Press F10 to exit diagnostics.

If the Attention LED remains on after you have completed the repair action and reset the LEDs, call for service support.

Using the Keyboards

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

The functions of each keyboard depend on the software used. The character sets for the keyboards are contained and explained in the documentation for your operating system.
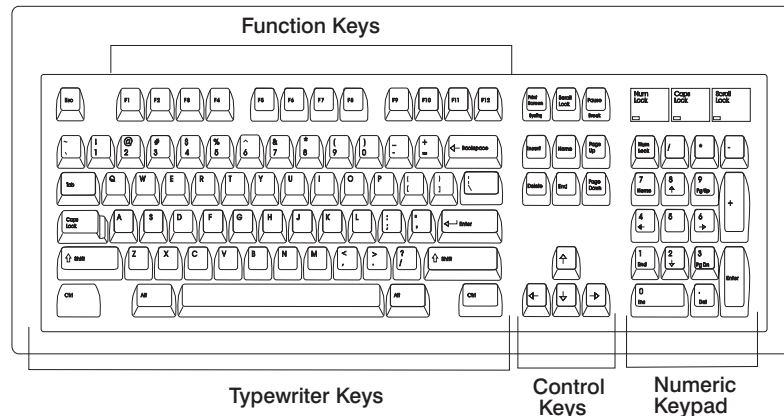
The keyboard is divided into four sections:
- *Function keys* are multipurpose keys and their function is controlled by the operating system.
- *Typewriter keys* are similar to a standard typewriter. Their function is controlled by the software.
- *Control keys* move the cursor on the screen and do programmed control functions. The movement and functions depend upon the application used.
- *Numeric keypad* is arranged like a calculator to help when typing numbers.

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

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

Using the Three-Button Mouse

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

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 cable plugs into the mouse connector at the rear of the system.

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.

Caring for 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. 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. The surface you use should be free from spills, dirt, dust, lint, wax, eraser dust, and other foreign matter.

To care for 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

Use the following steps to clean the mouse:

1. Remove the retaining ring by turning it counterclockwise, in the direction of the arrow, as shown in the illustration.
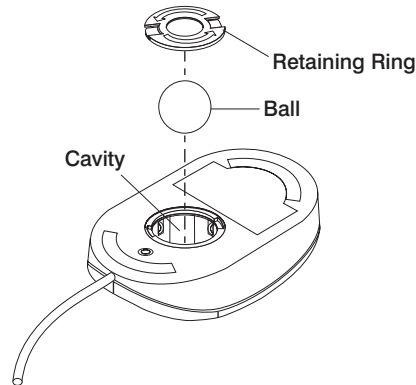
2. Remove the ball.
3. Inspect the ball for contaminants. Wipe it clean with a dry, lint-free cloth.
4. If the ball is dirty, wash it in warm, soapy water. Rinse and wipe the ball with a lint-free cloth until dry.
5. Inspect the ball cavity in the mouse for foreign materials. If there are any foreign 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

A 1.44 MB diskette drive is an optional feature for this system. Contact your sales representative before purchasing a diskette drive for this system.

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

- 1.0 MB diskettes with 720 KB formatted data capacity
- 2.0 MB diskettes with 1.44 MB formatted data capacity (High Density)

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 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, as shown in the illustration.

(Slot Open)
Write-Protect Tab
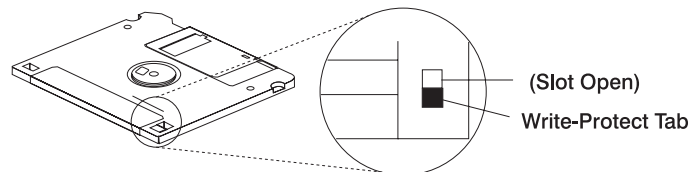
To allow writing onto a diskette, slide the write-protect tab to cover the protect slot, as shown in the illustration.

(Slot Closed)
Write-Protect Tab
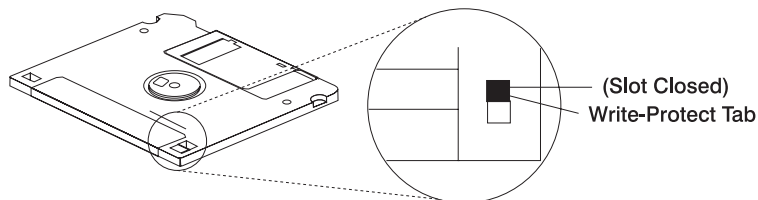
Loading and Unloading the 3.5-Inch Diskette

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

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

Using the CD-ROM Drive

CAUTION:
A class 1 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 replaced as a unit.
C07

This section describes the features of the 40X SCSI-2 CD-ROM drive and provides instructions for handling the drive and CD-ROM discs. The CD-ROM is a half-high, 5.25-inch, 8-bit, single-ended, tray-loading drive. Its features include the following:

- SCSI-2 interface supports both synchronous and asynchronous data transfer
- High-speed data transfer rate of 2100 KB per second (14X) at inner diameter and 4800 KB per second (32X) at outer diameter due to constant RPM spin rate
- High-speed synchronous burst rate of 10 MB per second
- Average random access time of 90 ms
- Loading tray accommodates both 8-cm discs (in the horizontal orientation only) and 12-cm discs
- Reads multi-session discs
- Reads CD-recordable discs
- Reads CD-RW discs
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio
- Headphone output and line output for audio

Front View of CD-ROM Drive
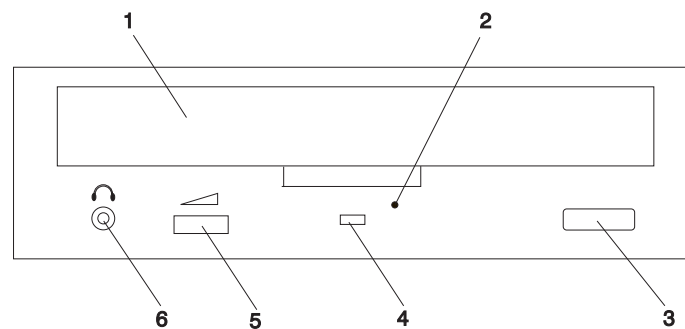
1 Compact Disc Tray
2 Emergency Eject Hole
3 Load/Unload Button
4 Status Light
5 Volume Control
6 Headphone Jack

Understanding the Status Lights

The status lights indicate the operational status of the drive. The various conditions are as follows:

If light is:	Condition is:
Off	Drive is in standby mode with or without a disc loaded.
Blinking (green)	Any of the following: • Drive tray is inserted. The light blinks while the drive completes the initialization checkout. • Drive is reading data. The light blinks while data is being read. • Drive is in Play Audio Mode. The light blinks while the audio is playing.
On (amber)	Hardware error condition found during initialization. **Note:** If this occurs, contact your service representative.

Handling Compact Discs

Compact discs are high-density media that must be handled with care and kept clean to ensure that they remain readable. Use the following precautions to ensure reliability:

• Hold the compact disc by the edges. Do not touch the surface of the compact disc.
• To remove dust or fingerprints, wipe the compact disc from the center to the outside of the compact disc as shown, using a lint-free cloth.
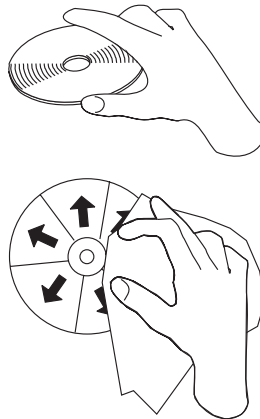
    Attention: Wiping the compact disc in a circular direction can cause loss of data.

• Do not write on the surface.
• Do not store or place the compact disc in direct sunlight.
• Do not use benzene, thinners, or other cleaners to clean the compact disc.
• Do not bend the compact disc.

Other Handling Considerations

Be sure to take the following additional precautions when you use the CD-ROM drive:

- Remove compact discs from the tray before you move the drive anywhere.
- Do not place the drive where any of the following conditions exist:
  - High temperature
  - High humidity
  - Excessive dust
  - Excessive vibration or sudden shock
  - Inclined surface
  - Direct sunlight
- Do not insert foreign objects into the drive.
- Do not remove the drive covers or attempt to service the drive yourself.

Loading a Compact Disc

To load a compact disc into the drive, do the following:

1. Press the Load/Unload button to open the tray. The tray slides out of the drive.
2. Place the compact disc in the tray with the label facing up.
3. Press the Load/Unload button, or gently push in the tray, to close the tray.
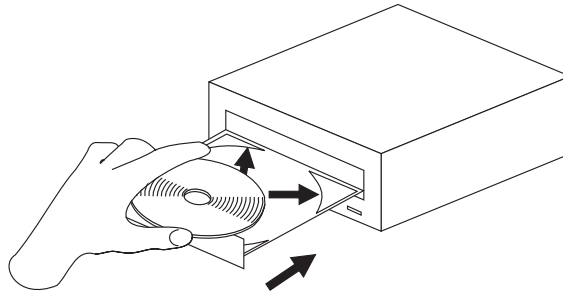
> **Note:** Be sure that none of the vertical retaining tabs are extended when you use the drive in the horizontal position.

Opening the Tray Manually

The compact disc tray automatically opens when you press the Load/Unload button. If it does not automatically open, follow these steps to force it open manually:

1. Shut down and turn off the power to your system.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance. If you are not sure where the emergency eject hole is located, see "Front View of CD-ROM Drive" on page 29.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.
4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

Playing an Audio CD

To play an audio CD, you must have headphones connected to the headphone jack located on the front of the drive, or connected to the line-out connector located on the back of the system. You must also have an audio software application installed.

The headphone jack provides the connection for headphones using a 3.5-mm (1/8 inch) stereo mini-plug. The volume control adjusts the audio output level for the headphones.

Using the Service Processor and Service Director Features

The service processor and service director features protect users against unnecessary system downtime by keeping support personnel (both internal and external) aware of any unexpected changes in the system environment. In combination, the two features provide a flexible solution to automated system maintenance.

Service Processor

The service processor runs on its own power boundary and continually monitors hardware attributes, the AIX operating system, and the environmental conditions within the system. Any system failure which prevents the system from returning to an operational state (a fully functional AIX operating system) is reported by the service processor. The service processor is controlled by firmware and does not require the AIX operating system to be operational to perform its tasks. If any system failures are detected, the service processor has the ability to take predetermined corrective actions. The methods of corrective actions are:

- Surveillance
- Call Home
- AIX operating system monitoring

Surveillance is a function in which the service processor monitors the system through heartbeat communication with the system firmware. The *heartbeat* is a periodic signal that the firmware can monitor. During system startup, the firmware surveillance monitor is automatically enabled to check for heartbeats from the firmware. If a heartbeat is not detected within a default period, the service processor cycles the system power and attempts to restart until the system either restarts successfully, or a predetermined retry threshold is reached. In the event the service processor is unsuccessful in bringing the system online (or in the event that the user asked to be alerted to any service processor-assisted restarts), the system can call home to report the error.

The call home function can be initialized to call either a service center telephone number, a customer administration center, or a digital pager telephone number. The service processor can be configured to stop at the first successful call to any of the numbers listed, or can be configured to call every number provided. If connected to the service center, the service processor transmits the relevant system information (the system's serial number and model type) and service request number (SRN). If connected to a digital pager service, the service processor inputs a customer voice telephone number defined by the customer. An established sequence of digits or the telephone number to a phone near the failed system could be used to signal a system administrator to a potential system failure.

During normal operations, the service processor can also be configured to monitor the AIX operating system. If AIX does not respond to the service processor heartbeat, the service processor assumes the operating system is hung. The service processor can automatically initiate a restart and, if enabled, initiate the call home function to alert the appropriate parties to the system hang. Enabling operating system surveillance also affords AIX the means to detect any service processor failures and report those failures to the service director application.

Unlike the service director, the service processor cannot be configured in a client/server environment where one system can be used to manage all dial-out functionally for a set of systems.

Prior to installing the service director feature, ensure that you have the latest levels of service processor microcode and system firmware. You also need a properly configured modem. For more information on configuring a modem, see "Call-In/Call-Out Setup Menu" on page 57.

Service Director

The Service Director is a software extension to the AIX operating system that monitors the system while the AIX operating system is running. The Service Director monitors and analyzes all recoverable system failures, and, if needed, can automatically place a service call to a service center (without user intervention).

The service center receives the machine type/serial number, host name, SRN, and a problem description. The service center analyzes the problem report and, if warranted, dispatches a service person to the customer site. The service center also determines if any hardware components need to be ordered prior to the service person's arrival.

The Service Director code also gives the user the option to establish a single system as the problem reporting server. A single system, accessible over the user network, can be used as the central server for all the other systems on the local area network (LAN) that are running the Service Director application. If the Service Director application on a remote client decides a service request needs to be placed, the client forwards the information to the Service Director server, which dials the service center telephone number from its locally attached modem. In this scenario, the user only needs to maintain a single analog line for providing call-out capabilities for a large set of servers.

When used in a scalable parallel (SP) environment, a client/server type implementation is configured. The Service Director client code runs on each of the SP nodes. The server component runs on the control workstation. In the event of any system failures, the relevant information is transmitted to the control workstation through the integrated Ethernet. After it has been alerted to the system failure, the control workstation initiates actions to prepare and send the service request.

A modem is required for enabling automated problem reporting to the service center. Configuration files for several types of modems are included as part of the Service Director package. Refer to "Call-In/Call-Out Setup Menu" on page 57 for more information on configuring your modem.

Chapter 4. Using the Service Processor

Notes:

1. On some of the system management services (or service processor) screens, you will see the term *LPAR*. LPAR is equivalent to the term *logical partitioned system* or *partitioned system*.

2. The information in this chapter regarding the configuring of serial ports (and modems attached to those serial ports), applies only to the serial ports (S1 and S2) on the CEC backplane (location U0.1-P1). This information is not applicable to the serial ports (or modems attached to those serial ports), on the HMC.

The service processor runs on its own power boundary and continually monitors hardware attributes and the environmental conditions within the system. The service processor is controlled by firmware and does not require the operating system to be operational to perform its tasks.

The service processor menus allow you to configure service processor options, as well as enable and disable functions.

Service processor menus are available using an ASCII terminal or an HMC virtual terminal window when `OK` is displayed on the operator panel or when the service processor has detected a system problem (such as a surveillance failure).

Service Processor Menus

The service processor menus are divided into the following groups:
- General user menu - the user must know the general-access password.
- Privileged user menus - the user must know the privileged-access password.

If the system is powered off, the service processor menus can be accessed locally or remotely on the following:
- Serial port 1 (S1)
- Serial port 2 (S2)
- HMC

Accessing the Service Processor Menus Locally

Service processor menus can be accessed by opening a virtual terminal window on the HMC, or by attaching an ASCII terminal to serial port 1 (S1) or serial port 2 (S2). After `OK` displays in the operator panel, press any key on the keyboard to signal the service processor.

Note: The service processor menus cannot be accessed simultaneously on a virtual terminal window on the HMC and on an ASCII terminal. Accessing the menus on the HMC prevents access to the ASCII terminals and vice versa.

When you gain access, the service processor prompts you for a password (if one is set), and when verified, displays the service processor menus.

The service processor menu prompt, represented by `0>` or `1>`, indicates the serial port to which the terminal is connected.
- An ASCII terminal can have the following prompts:
  - `0>` indicates serial port 1 (S1)
  - `1>` indicates serial port 2 (S2)
- The HMC always displays a prompt of `0>`

Accessing the Service Processor Menus Remotely

If your system has a modem connected to serial port 1 or serial port 2 and is configured for call-in (see "Modem Configuration Menu" on page 58), the service processor menus can be accessed remotely as follows:

1. With the system powered off, call in from a remote terminal.

2. The service processor detects ring-indicate and prompts you for a password (if one is set). When verified, the service processor menus display remotely.

Saving and Restoring Service Processor Settings

All the settings that you make (except language) from the service processor menus can be backed up either for recovering from a fault that may corrupt these settings, or for replicating these settings to other servers that include a service processor.

The service aid ″Save or Restore Hardware Management Policies″ can be used to save your settings after initial setup or whenever the settings must be changed for system operation purposes.

It is strongly recommended that you use this service aid for backing up service processor settings to protect the usefulness of the service processor and the availability of the system. Refer to "Save or Restore Hardware Management Policies," in Chapter 7, "Introducing Tasks and Service Aids", on page 99.

Menu Inactivity

The service processor exits menu mode after ten minutes of inactivity and displays a message indicating that it has done so. Pressing any key on the virtual terminal window causes the main menu to display.

General User Menu

The menu options presented to the general user are a subset of the options available to the privileged user. The user must know the general-access password, if one is set, to access this menu.

```
        GENERAL USER MENU

  1. Power-on System

  2. Power-off System

  3. Read VPD Image from Last System Boot

  4. Read Progress Indicators from Last System Boot

  5. Read Service Processor Error Logs

  6. Read System POST Errors

 99. Exit from Menus

 0>
```

- **Power-on System**

  Allows the user to start the system using the current virtual terminal window as the active console.

- **Power-off System**

  This option is not available on this system.

- **Read VPD Image from Last System Boot**

  Displays manufacturer vital product data, such as serial numbers, part numbers, and so on, that were stored from the system boot prior to the one in progress now, for the entire system.

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

  Displays a number of the boot progress indicators, which may include service processor checkpoints, IPL checkpoints, or AIX configuration codes, from the previous system boot. This information can be useful in diagnosing system faults.

  Note: If you are running one or more logical partitions, enter the partition ID (0-15) to display progress indicators for that partition since the last system boot. If your system is running in Full System Partition mode, this option automatically displays details from partition 0.

  The progress indicator codes are listed from top (latest) to bottom (oldest).

  This information is not stored in nonvolatile storage. If the system is powered off using the power-on button on the operator panel, this information is retained. If the ac power is disconnected from the system, this information will be lost. For an example, refer to "LCD Progress Indicator Log" on page 74.

- **Read Service Processor Error Logs**

  Displays the service processor error logs. For an example, refer to "Service Processor Error Logs" on page 73.

- **Read System POST Errors**

  Displays additional error log information (this option is only for service personnel).

- **Exit from Menus**

  Selecting this option will exit the service processor menus. You can re-enter the menus by pressing any key on the console.

Privileged User Menus

The following menus are available to privileged users only. The user must know the privileged-access password, if one is set, to access these menus.

Main Menu

A listing at the top of the main menu contains the following:

- Your system's current firmware version
- The firmware copyright notice
- The system name given to your system during setup

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

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

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

```
         Service Processor Firmware
         VERSION: RH011007
         Copyright 2001 IBM Corporation
             SYSTEM NAME


         MAIN MENU

  1. Service Processor Setup Menu

  2. System Power Control Menu

  3. System Information Menu

  4. Language Selection Menu

  5. Call-In/Call-Out Setup Menu

  6. Set System Name

 99. Exit from Menus

 0>
```

- **Service Processor Setup Menu**

  See "Service Processor Setup Menu" on page 39 for more information.
- **System Power Control Menu**

  See "System Power Control Menu" on page 44 for more information.
- **System Information Menu**

  See "System Information Menu" on page 48 for more information.
- **Language Selection Menu**

  See "Language Selection Menu" on page 56 for more information.
- **Call-In/Call-Out Setup Menu**

  See "Call-In/Call-Out Setup Menu" on page 57 for more information.
- **Set System Name**

  Allows setting of the system name.

Service Processor Setup Menu

The following Service Processor Setup Menu is accessed from the Main Menu:

```
        SERVICE PROCESSOR SETUP MENU

  1. Change Privileged Access Password

  2. Change General Access Password

  3. Enable/Disable Console Mirroring:
       Currently Enabled

  4. Start Talk Mode

  5. OS Surveillance Setup Menu
    NOT supported in LPAR mode

  6. Reset Service Processor

  7. Reprogram Flash EPROM Menu

  8. Serial Port Snoop Setup Menu
  NOT supported in LPAR mode

  9. Scan Log Dump Setup Menu:
  Currently As Needed

 98. Return to Previous Menu

 99. Exit from Menus

 0>
```

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

Passwords

Passwords can be any combination of up to eight alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first eight characters. The privileged-access password can be set from service processor menus or from System Management Services (SMS) utilities (see Chapter 5, "Using System Management Services", on page 79). The general-access password can be set only from service processor menus.

For security purposes, the service processor counts the number of attempts to enter passwords. The results of not recognizing a password within this error threshold are different, depending on whether the attempts are being made locally (at the system) or remotely (through a modem). The error threshold is three attempts.

If the error threshold is reached by someone entering passwords at the system, the service processor commands the system to resume the initial program load (IPL). This action is taken based on the assumption that the system is in an adequately secure location with only authorized users having access. Such users must still successfully enter a login password to access the operating system.

If the error threshold is reached by someone entering passwords remotely, the service processor commands the system to power off to prevent potential security attacks on the system by unauthorized remote users. The following table lists what you can access with the privileged-access password and the general-access password.

Privileged Access Password	General Access Password	Resulting Menu
None	None	Service processor MAIN MENU displays.
Set	None	Users with the password see the service processor MAIN MENU. Users without password cannot log in.
Set	Set	Users see menus associated with the entered password.

- **Change Privileged-Access Password**

  Set or change the privileged-access password. It provides the user with the capability to access all service processor functions. This password is usually used by the system administrator or root user.

- **Change General-Access Password**

  Set or change the general-access password. It provides limited access to service processor menus, and is usually available to all users who are allowed to power on the system, especially remotely.

  Note: The general-access password can be set or changed only after the privileged-access password is set.

- **Enable/Disable Console Mirroring**

  Note: Console mirroring is disabled in partitioned systems.

  Console mirroring is supported on serial port 1 (S1) and serial port 2 (S2). When console mirroring is enabled, the service processor sends information to all serial ports. The serial port from which console mirroring is enabled is referred to as the *active port*. The *mirror port* is determined when keyboard input is detected from one of the other ports. From this point on, the service processor sends information only to the active port and the mirror port. This capability can be enabled by local or remote users, providing local users with the capability to monitor remote sessions. Console mirroring can be enabled for the current session only. For more information, see "Console Mirroring" on page 72.

- **Start Talk Mode**

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

- **OS Surveillance Setup Menu**

  Note: This option is disabled in partitioned systems.

  This menu can be used to set up operating system (OS) surveillance.

```
        OS Surveillance Setup Menu

  1. Surveillance:
       Currently Enabled

  2. Surveillance Time Interval:
       2 minutes

  3. Surveillance Delay:
       2 minutes


 98. Return to Previous Menu

 0>
```

– **Surveillance**

Can be set to Enabled or Disabled.

– **Surveillance Time Interval**

Can be set to any number from 2 through 255.

– **Surveillance Delay**

Can be set to any number from 0 through 255.

Refer to "Service Processor System Monitoring - Surveillance" on page 70 for more information about surveillance.

- **Reset Service Processor**

  If this option is selected, entering Y causes the service processor to reboot.

- **Reprogram Flash EPROM Menu**

  This option requires a diskette drive to be installed in the system. If this option is selected, and no diskette drive is present in the system, the service processor will indicate ″Not Supported″ on the screen.

  This option updates the system EPROMs. After entering Y to indicate that you want to continue, you are prompted to enter the update diskettes. Follow the instructions on the screen. When the update is complete, the service processor reboots.

  All system EPROMs that can be reprogrammed are updated at the same time and are as follows:
  – System power control network programming
  – Service processor programming
  – System firmware programming
  – Run-Time Abstraction Services

- **Serial Port Snoop Setup Menu**

  Note: This option is disabled in partitioned systems.

  This menu can be used to set up serial port snooping, in which the user can configure serial port 1 as a ″catch-all″ reset device.

  From the service processor main menu, select option 1, service processor setup menu, then select option 8 (Serial Port Snoop Setup Menu).

```
         SERIAL PORT SNOOP SETUP MENU

   1. System reset string:
        Currently Unassigned

   2. Snoop Serial Port:
        Currently Unassigned

  98. Return to Previous Menu

1>
```

Use the **Snoop Serial Port** option to select the serial port to snoop.

Note: Only serial port 1 is supported.

Use the system reset string option to enter the system reset string, which resets the machine when it is detected on the main console on Serial Port 1.

After serial port snooping is correctly configured, at any point after the system is booted to the operating system, whenever the reset string is typed on the main console, the system uses the service processor reboot policy to restart.

Because pressing Enter after the reset string is not required, make sure that the string is not common or trivial. A mixed-case string is recommended.

- **Scan Log Dump Policy**

  A scan dump is the collection of chip data that the service processor gathers after a system malfunction, such as a checkstop or hang. The scan dump data may contain chip scan rings, chip trace arrays, and SCOM contents.

  The scan dump data are stored in the system control store. The size of the scan dump area is approximately 4 MB.

  During the scan log dump, A8xx (in the range A810 to A8FF) displays in the operator panel. The xx characters will change as the scan log dump progresses. If the xx characters do not change after five minutes, the service processor is hung and must be reset.

  When the scan log dump is complete, depending on how the reboot policy is set, the system will either:
  - Go to the standby state (and the service processor menus will be available), indicated by OK or STBY in the operator panel

  OR
  - Attempt to reboot.

```
Scan Log Dump Setup Menu

     1.  Scan Log Dump Policy:
            Currently As Needed

     2.  Scan Log Dump Content:
            Currently As Requested

     3.  Immediate Dump

    98.  Return to Previous Menu

0> 1
   Select from the following options:
   (As Needed=2, Always=3)

   Enter New Option:

0>
```

The scan log dump policy can be set to the following:

2 = As Needed
    The processor run-time diagnostics record the dump data based on the error type. This is the default value.

3 = Always
    Selecting this option allows the service processor to record a scan log dump for all error types.

The scan log dump policy can also be set from the Tasks menu in the AIX service aids.

Option 2 displays the following screen:

```
              Scan Log Dump Setup Menu

     1.  Scan Log Dump Policy:
            Currently As Needed

     2.  Scan Log Dump Content:
            Currently As Requested

     3.  Immediate Dump

    98.  Return to Previous Menu

0> 2
   Select from the following options:
   (As Requested=1, Optimum=2, Complete=3, Minimum=4)

   Enter New Option:

0>
```

The scan log dump content can be set to the following:

1 = As Requested
> The processor run-time diagnostics will select the contents of the dump file based on the type of error that occurs. This is the default.

2 = Optimum
> The dump will include the smallest amount of information to diagnose a hardware error.

3 = Complete
> The dump will include as much information as possible to allow the complete analysis of hardware and software errors.

4 = Minimum
> The dump will include the smallest amount of information possible (a minimum number of hardware scan log rings).

The complete dump will take the longest time to finish; it may take as long as 1.5 hours on a fully configured system.

Option 3, **Immediate Dump**, can only be used when the system is in the standby state with power on. It is used to dump the system data after a checkstop or machine check occurs when the system firmware is running, or when the operating system is booting or running.

The scan log dump content can also be set from the Tasks menu in the AIX diagnostic service aids.

If a valid dump file already exists, the dump control code will stop because the contents of the prior dump must be protected.

System Power Control Menu

This menu is used to set power control options. Other menus that control boot options are available from this menu.

```
        SYSTEM POWER CONTROL MENU

  1. Enable/Disable Unattended Start Mode:
        Currently Enabled

  2. Ring Indicate Power-On Menu

  3. Reboot/Restart Policy Setup Menu

  4. Power-On System

  5. Power-Off System

  6. Enable/Disable Fast System Boot
        Currently Fast Boot

  7. Boot Mode Menu

 98. Return to Previous Menu

 99. Exit from Menus

 0>
```

- **Enable/Disable Unattended Start Mode**

  Use this option to instruct the service processor to restore the power state of the system after a temporary power failure. Unattended start mode can also be set through the System Management Services (SMS) menus. This option is intended to be used on systems that require automatic power-on after a power failure. For more information, see "System Power-On Methods" on page 62.

- **Ring Indicate Power-On Menu**

```
        RING INDICATE POWER-ON MENU

  1. Ring indicate power-on :
      Currently Enabled

  2. Number of rings:
      Currently  3

 30. Refresh Modem Settings

 98. Return to Previous Menu
```

Ring indicate power-on is enabled by default on both serial port 1 (S1) and serial port 2 (S2). When ring indicate power-on is enabled, call-in is disabled.

If ring indicate power-on is enabled and call-in is already enabled, you will be asked to confirm your choice. Refer to the message displayed on your screen.

If the ring indicate power-on setting is changed, you must select option 30, **Refresh Modem Settings** to update the modem settings. If **Refresh Modem Settings** is selected, and the modem(s) have not been configured, you will be asked to configure the modems first. See "Call-In/Call-Out Setup Menu" on page 57 for information on configuring modems.

Option 2 is used to set the number of rings.

- **Reboot/Restart Policy Setup Menu**

    The following menu controls the Reboot/Restart Policy:

```
        Reboot/Restart Policy Setup Menu

    1. Number of reboot attempts:
        Currently 1

    2. Use OS-Defined restart policy?
        Currently No

    3. Enable supplemental restart policy?
        Currently Yes

    4. Call-Out before restart:
        Currently Disabled

   98. Return to Previous Menu

   0>
```

Reboot is the process of bringing up the system hardware; for example, from a system reset or power on. *Restart* is activating the operating system after the system hardware is reinitialized. Restart must follow a successful reboot.

- **Number of reboot attempts** - If the system fails to successfully complete the boot process, it attempts to reboot the number of times specified. Entry values equal to or greater than 0 are valid. Only successive failed reboot/restart attempts are counted.

- **Use OS-Defined restart policy** - In a full system partition, this allows the service processor to react in the same way that the operating system does to major system faults by reading the setting of the operating system parameter **Automatically Restart/Reboot After a System Crash**. This parameter might already be defined, depending on the operating system (or its version or level). If the operating system automatic restart setting is defined, it can be set to respond to a major fault by restarting or by not restarting. See your operating system documentation for details on setting up operating system automatic restarts. The default value is No.

- **Enable supplemental restart policy** - The default setting is Yes. When set to Yes in a full system partition, the service processor restarts the system when the system loses control as detected by service processor surveillance, and either:

    The **Use OS-Defined restart policy** is set to No.
  OR

    The **Use OS-Defined restart policy** is set to Yes, and the operating system has no automatic restart policy.

- **Call-Out before restart (Enabled/Disabled)** - If a restart is necessary due to a system fault, and you are running a full system partition, you can enable the service processor to call out and report the event. This option can be valuable if the number of these events becomes excessive, which might signal a bigger problem.

    This setting is ignored on a partitioned system.

- **Power-On System**

  Allows immediate power-on of the system.
- **Power-Off System**

  This option is not available on this system.
- **Enable/Disable Fast System Boot**

  Allows the user to select the IPL type, mode, and speed of the system boot.

  Attention: Selecting the fast IPL results in several diagnostic tests being skipped and a shorter memory test being run.
- **Boot Mode Menu**

  Your system is setup as either a partitioned or a non-partitioned system. Select the boot mode section that reflects yours system's setup.

  Partitioned systems:
  > If the system is partitioned, also called running in LPAR mode, the Linux compatibility mode is set using the boot mode menu:

  ```
          Boot Mode Menu

    1. Linux compatibility mode:
          Currently Disabled

    98. Return to previous menu

    0>1
  ```
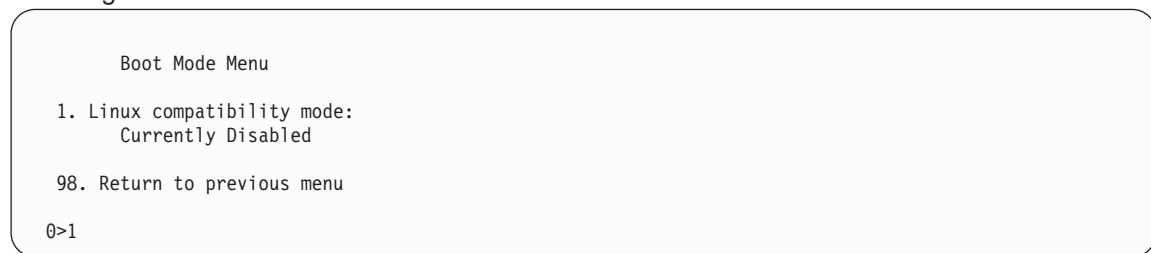
  > Selecting option 1 toggles the Linux compatibility mode between enabled and disabled.

  > The Linux compatibility mode should be set because your 7028 Model 6C4 system platform firmware level 3R0305dd inadvertently introduces an incompatibility with the SuSE Linux SLES8 GA kernel and the SLES8 service pack 1 (SP1) kernel. This incompatibility will be removed with the SLES8 service pack 2 (SP2) kernel which is scheduled to be available in the fourth quarter of 2003.

  > This incompatibility only exists on 7028 Model 6C4 systems when operating in logical partitioning mode. For logical partitioning operation with 3R0305dd and later levels of platform firmware, and SuSE Linux SLES8 GA or SP1, there is a service processor menu option that provides compatibility between these versions of Linux and platform firmware. The Linux compatibility mode should be enabled for these configurations. The Linux compatibility mode is found in the boot mode submenu, which is option 7 under the service processor system power control menu.

  > If Linux compatibility is not enabled in these configurations, the system may experience boot time or run time failures due to the inability to access I/O adapters. Such I/O adapter access failures may prevent the system from booting or cause loss of adapter use during run time. After SLES8 SP2 is installed, the Linux compatibility mode can again be disabled; in fact, it is recommended that this mode be disabled when SLES8 SP2 is installed. This Linux compatibility mode is saved in nonvolatile RAM (NVRAM) of the system, so it only needs to be enabled once.

  > This 7028 Model 6C4 incompatibility specifically relates to the CEC I/O group, Group_128, which contains the following devices in the 7028 Model 6C4 system drawer: PCI slots 1 and 2 (U0.1-P2-I1 and U0.1-P2-I2), one integrated ethernet (U0.1-P2/E2), both ports on the integrated dual-port SCSI controller (U0.1-P2/Z1 and U0.1-P2/Z2), and the ISA bus (which is shown as U0.1-P1 on the HMC) and subsidiary devices (the integrated serial ports and the IDE controller).

If this CEC I/O group is assigned to a logical partition that's not running Linux, or not assigned to any partition, setting the Linux compatibility mode is not required.

Note: In the list of devices under Group_128 on the HMC, port two on the integrated SCSI controller (U0.1-P2/Z2) is not shown, but is included in Group_128.

Non-partitioned systems:
When the 7028 Model 6C4 system is not partitioned (also known as not running in LPAR mode), the boot mode menu allows you to select a boot mode.

```
        Boot Mode Menu

   1. Boot to SMS Menu:
        Currently Disabled

   2. Service Mode Boot from Saved List:
        Currently Disabled

   3. Service Mode Boot from Default List:
        Currently Disabled

   4. Boot to Open Firmware Prompt:
        Currently Disabled

  98. Return to Previous Menu

  0>
```

To select a boot mode, select a number and press Enter. The item corresponding to the selected number toggles between Disabled to Enabled. If a boot mode is Enabled, the boot mode selected is performed, and the Disabled/Enabled selection is reset to Disabled. The following describes each boot mode:

– **Boot to SMS Menu**

   When this selection is enabled, the system boots to the System Management Services (SMS) Menu.

– **Service Mode Boot from Saved List**

   This selection causes the system to perform a service mode boot using the service mode boot list saved in NVRAM. If the system boots AIX from the disk drive and AIX diagnostics are loaded on the disk drive, AIX boots to the diagnostics menu.

   Using this option to boot the system is the preferred way to run online diagnostics.

– **Service Mode Boot from Default List**

   This selection is similar to *Service Mode Boot from Saved List*, except the system boots using the default boot list that is stored in the system firmware. This is normally used to try to boot customer diagnostics from the CD-ROM drive.

   Using this option to boot the system is the preferred way to run standalone diagnostics.

– **Boot to Open Firmware**

   This option should only be used by service personnel to obtain additional debug information. When this selection is enabled, the system boots to the open firmware prompt.

System Information Menu

This menu provides access to system configuration information, error logs, system resources, and processor configuration.

```
          SYSTEM INFORMATION MENU

  1. Read VPD Image from Last System Boot

  2. Read Progress Indicators from Last System Boot

  3. Read Service Processor Error Logs

  4. Read System POST Errors

  5. Read NVRAM

  6. Read Service Processor Configuration

  7. Processor Configuration/Deconfiguration Menu

  8. Memory Configuration/Deconfiguration Menu

  9. Power Control Network Utilities Menu

 10. LED Control Menu

 11. MCM/L3 Interposer Plug Count Menu
       Not Supported

 12. Performance Mode Setup Menu

 13. L3 Mode Menu
       Not Applicable

 14. Remote I/O (RIO) Link Speed Set Up Menu

 98. Return to Previous Menu

 99. Exit from Menus

 0>
```

- **Read VPD Image from Last System Boot**

  Displays manufacturer's vital product data (VPD), such as serial numbers, part numbers, and so on, that was stored from the system boot prior to the one in progress now. VPD from all devices in the system is displayed.

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

  Displays a number of the boot progress indicators, which may include Service Processor checkpoints, IPL checkpoints, or AIX configuration codes, from the previous system boot. This information can be useful in diagnosing system faults.

  Note: If you are running from a partitioned system, enter the partition ID (0-15) to display progress indicators for that partition since the last system boot. In a full system partition, this option automatically displays details from partition 0.

  The progress indicator codes are listed from top (latest) to bottom (oldest).

  This information is not stored in nonvolatile storage. If the system is powered off using the power-on button on the operator panel, this information is retained. If the ac power is disconnected from the system, this information will be lost. For an example, refer to "LCD Progress Indicator Log" on page 74.

- **Read Service Processor Error Logs**

  Displays error conditions detected by the service processor. Refer to "Service Processor Error Logs" on page 73 for an example of this error log.

- **Read System POST Errors**

  This option should only be used by service personnel to obtain additional debug information.

- **Read NVRAM**

  Displays Non Volatile Random Access Memory (NVRAM) content.

- **Read Service Processor Configuration**

  Displays current service processor configuration.

- **Processor Configuration/Deconfiguration Menu**

  Enable/Disable CPU Repeat Gard

  CPU repeat gard will automatically deconfigure a CPU during a system boot if a processor has failed BIST (built-in self-test), caused a machine check or check stop, or has reached a threshold of recoverable errors. The processor will remain deconfigured until repeat gard is disabled or the processor is replaced.

  The default is enabled.

  For more information, see "Configuring and Deconfiguring Processors or Memory" on page 69.

  Dynamic Processor Sparing

  This option is not available on this system.

This menu allows the user to change the system processor configuration. If it is necessary to take one of the processors offline, use this menu to deconfigure a processor, and then reconfigure the processor at a later time. An example of this menu follows:

```
        PROCESSOR CONFIGURATION/DECONFIGURATION MENU

 77. Enable/Disable CPU Repeat Gard: Currently Enabled
 78. Enable/Disable Dynamic Processor Sparing (if available): Currently Disabled

  1.  0   3.0  (00)  Configured by system    2.  1   3.1  (00)  Deconfigured by system
  3. 24   4.0  (00)  Configured by system    4. 25   4.1  (00)  Configured by system




 98. Return to Previous Menu

 0>
```

Note: This table is built from vital product data collected during the last boot sequence. The first time the system is powered on, or after the system's nonvolatile RAM (NVRAM) has been erased, this table may be empty. The table is rebuilt during the next boot into the operating system.

The fields of the previous table represent the following:

Column 1

(1.) Menu selection index.

Column 2

(0) Logical processor device number assigned by AIX. If the system is running AIX, you can display these logical device numbers by issuing the following command on the AIX command line:

`lsdev -C | grep proc`

Column 3

(3.0) Processor address list used by the service processor.

Column 4

(00) Error status of the processors.

The error status of each processor is indicated by AB, where B indicates the number of errors and A indicates the type of error according to the following:

1. Bring-up failure
2. Run-time non-recoverable failure
3. Run-time recoverable failure
4. Group integrity failure
5. Non-repeat-gardable error. The resource may be reconfigured on the next boot.

A status of 00 indicates that the CPU has not had any errors logged against it by the service processor.

To enable or disable CPU repeat gard, use menu option 77. CPU repeat gard is enabled by default.

If CPU repeat gard is disabled, processors that are in the ″deconfigured by system″ state will be reconfigured. These reconfigured processors are then tested during the boot process, and if they pass, they remain online. If they fail the boot testing, they are deconfigured even though CPU repeat gard is disabled.

The failure history of each CPU is retained. If a processor with a history of failures is brought back online by disabling repeat gard, it remains online if it passes testing during the boot process. However, if repeat gard is enabled, the processor is taken offline again because of its history of failures.

Notes:

1. The processor numbering scheme used by the service processor is different from the numbering scheme used by the operating system. Consult the operating system documentation before configuring or deconfiguring a processor to ensure that the correct processor is selected.
2. To determine the number of processors available to AIX, run the following command on the AIX command line: `bindprocessor -q`
3. The number of processor available to Linux can be determined by issuing the following command on the Linux command line:

   `cat /proc/cpuinfo | grep POWER`

- **Memory Configuration/Deconfiguration Menu**

   Enable/Disable Memory Repeat Gard
   Memory repeat gard will automatically deconfigure a quad of memory during a system boot if a memory DIMM has failed BIST (power-on self-test), caused a machine check or check stop, or has reached a threshold of recoverable errors. The quad will remain deconfigured until repeat gard is disabled or the memory is replaced.

   The default is enabled.

   For more information, see "Configuring and Deconfiguring Processors or Memory" on page 69.

   Runtime Recoverable Error Repeat Gard
   The runtime recoverable error repeat gard flag controls the deallocation of the memory if a recoverable error occurs during runtime. If a recoverable memory error occurs, and runtime recoverable error repeat gard is disabled, the system will continue running with no change in the memory configuration. If a recoverable memory error occurs, and runtime recoverable error repeat gard is enabled, the memory quad in which the error occurred will be garded out (taken offline).

   The default is disabled.

These menus allow the user to change the system memory configuration. If it is necessary to take one of the memory DIMMs offline, this menu allows you to deconfigure a DIMM, and then reconfigure the DIMM at a later time.

When this option is selected, a menu displays. The following is an example of this menu:

```
        MEMORY CONFIGURATION/DECONFIGURATION MENU

 77. Enable/Disable Memory Repeat Gard: Currently Enabled

 78. Runtime Recoverable Error Repeat Gard: Currently Disabled

  1. Memory card

 98. Return to Previous Menu
```

After you select the memory card option by entering 1, a menu displays, allowing the selection of a memory DIMM. The following is an example of this menu.

```
        MEMORY CONFIGURATION/DECONFIGURATION MENU


  1. 3.16(00)  Configured by system   2. 3.17(00) Configured by system
  3. 3.18(00)  Configured by system   4. 3.19(00) Configured by system
  5. 4.24(00)  Configured by system   6. 4.25(00) Configured by system
  7. 4.26(00)  Configured by system   8. 4.27(00) Configured by system


 98. Return to Previous Menu
```

Note: This table is built from vital product data collected during the last boot sequence. The first time the system is powered on, or after the system's nonvolatile RAM (NVRAM) has been erased, this table may be empty. The table is rebuilt during the next boot into the operating system.

The fields in the previous table represent the following:

Column 1
   1. Menu selection index/DIMM number

Column 2
   xx.xx : DIMM address used by service processor

Column 3
   (00) Error status

The error status of the each memory DIMM is indicated by AB, where B indicates the number of errors and A indicates the type of error according to the following table:

1. Bring-up failure

2. Run-time non-recoverable failure

3. Run-time recoverable failure

4. Group integrity failure

5. Non-repeat-gardable error. The resource may be reconfigured on the next boot.

An error status of 00 (for example, 3.16(00)) indicates that the memory DIMM has not had any errors logged against it by the service processor.

To change the memory configuration, select the number of the memory DIMM. The memory DIMM state will change from `configured` to `deconfigured` or from `deconfigured` to `configured`.

In the previous example menu, each line shows two DIMMs and indicates whether they are configured.

To enable or disable Memory Repeat Gard, use menu option 77 of the Memory Configuration/Deconfiguration Menu.

To enable or disable runtime recoverable error repeat gard, use option 78 of the memory configuration/deconfiguration menu.

The failure history of each DIMM is retained. If a DIMM with a history of failures is brought back online by disabling Repeat Gard, it remains online if it passes testing during the boot process. However, if Repeat Gard is enabled, the DIMM is taken offline again because of its history of failures.

- **Power Control Network Utilities Menu**

```
        POWER CONTROL NETWORK UTILITIES MENU

  1. Lamp Test for all Operator Panels

  2. Display I/O Type

  3. Change I/O Type

  4. Collect & display SPCN trace data

98. Return to Previous Menu

 0>
```

- **Lamp Test for All Operator Panels**

  Selecting this option tests the media drawer operator panel's indicators by causing them to blink on and off for approximately 30 seconds.

- **Display I/O Type**

  This option is not available on this system.

- **Change I/O Type**

  Use this option to change the I/O type after a service action or configuration change, if the I/O type is incorrect. If this option is chosen, you will be asked to make the following entries:

  1. For the I/O drawer address, type `1`.
  2. If a 4-slot PCI riser has been replaced, or is present in the system, type `A6` for the I/O type. If a 6-slot PCI riser has been replaced, or is present in the system, type `A3` for the I/O type.

  If either value is not valid, a failure message displays on the console. Press Enter to return to the Power Control Network Utilities Menu.

- **L3 Mode Menu**

  This function is not available on this system.

- **Collect & display SPCN trace data**

  This option is used by service personnel to dump the SPCN trace data from the system unit or an I/O subsystem to gather additional debug information.

  To dump the SPCN trace data for the processor subsystem (CEC drawer), enter `0` when prompted for the SPCN drawer number and enter `d0` when prompted for the unit address.

  To dump the SPCN trace data for an I/O subsystem, the drawer number must be determined. This can be done by either:

  - If the system is booted into AIX, use the ″Identify and System Attention Indicators″ task to correlate a drawer and its physical location code (for example, U0.2). Due to the drawer addressing scheme that is used by the SPCN firmware, the drawer numbers may not match the cabling in a particular

RIO loop. For example, do not assume that the first drawer in the loop will be drawer number 2 (which corresponds to a physical location code of U0.2).

– If the system can be booted to the open firmware prompt, enter `FRU-LER-MENU` at the prompt. Use the menu to flash the identify indicator on a drawer.

To dump the data for an I/O drawer, enter the drawer number when prompted, then enter `10` for the unit address as shown in the example below:

```
Enter the SPCN drawer number:    3

Enter the Unit Address:  10
```

Note: It may take up to 5 minutes for the trace data to be dumped to the screen.

The SPCN trace data will be displayed on the screen. An example of this output follows.

```
Please wait....

***** Power Trace Data Start *****    00000000ffffffffffff0006158800a00
0061574a00000060200353700060210031300060242000000060241040b0006110a004
00006110902000006110208040000000000061102080b0006041000000006d0e385000
0061103000000006110902000006040200000006040200010006041000010006d0e3850
100060410000200000000000006d0e3850200060410000300006d0e385030006158010000
0061540031800061011160000006101116010006158010010007158156a000071100001
00000000000091012000000910120001
***** Power Trace data End *****

        (Press Return to Continue)
```

- **LED Indicator Menu**

This menu displays the state of the processor subsystem disturbance/system attention LED and the fault/identify LED on the I/O subsystem(s). Use this menu to toggle the attention/fault LEDs between identify (blinking) and off. Option 1 is only available when the system is in the error state (the CEC is powered on and the service processor menus are available). It is not available when the system is in standby. An example of this menu follows:

```
        LED Indicator


  1. Set/Reset Identify LED state

  2. Clear System Attention Indicator

 98. Return to Previous Menu

  Enter LED index

0 >
```

If Option 1 is selected, a list of location codes of the I/O subsystems and the system unit drawer is shown. The screen is similar to the following:

```
  1. U0.2-P1

  2. U0.3-P1


  Enter number corresponding to the location code, or
  press Return to continue, or 'x' to return to the menu
```

If one of the devices is selected using the index number, the present state of its LED is displayed, and you are given the option to toggle it as shown in the following example screen. The final state of the LED is then displayed whether or not its state was changed.

```
U0.2-P1 is currently in the off state

Select from the following (1=IDENTIFY ON, 2=IDENTIFY OFF)
0>2
Please wait

U0.2-P1 is currently in the OFF state
        (Press Return to continue)
```

Option 2, **Clear System Attention Indicator**, clears the attention indicator on the operator panel.

The processor subsystem disturbance/LED is on the operator panel. The I/O drawer fault/identify LED is located on the front of each I/O subsystem.

- **MCM/L3 Interposer Plug Count Menu**

  This option is not available on this system.

- **Performance Mode Setup Menu**

  If certain types of processor cards are installed in the system, this menu is not available. For other types of processor cards, this menu is active after the first boot.

  Note: The first time the system is booted after NVRAM is cleared, Not Applicable displays under **Performance Mode Setup Menu** on the screen. This might also happen if the service processor is replaced, or the processor cards are upgraded.

  If **Performance Mode Setup Menu** is selected when Not Applicable displays the screen, the system responds with Not Applicable and redisplays the system information menu. The setup menu can be displayed after the performance mode is set, which occurs when the system is rebooted for the first time.

The default performance mode is set by the firmware during IPL. The default mode provides the optimum performance for the hardware configuration of the system. The performance mode is systemwide; it cannot be set on a per-partition basis.

You can override the default setting by using the Default Performance Mode menu, which will be similar to the following:

```
                 Default Performance Mode:  Standard Operation

 1. Current Performance Mode:
    Standard Operation


98. Return to Previous Menu

0>1
```

Selecting option 1 displays the following performance modes:

```
Select from the following options:

1. Large Commercial System optimization
2. Standard Operation
3. Turbo Database Mode

0>
```

Notes:

1. Some processor card changes cause the default performance mode to change. This new setting is not reflected in the menu until after the system is rebooted with the new configuration.

2. If the NVRAM has been cleared, the default performance mode and the current performance mode will indicate `uninitialized`.

If you want to override the default setting, a brief description of each performance mode follows:

Large Commercial System Optimization
   Is the setting for systems that do not fall into the other two categories, standard operation and turbo database mode. This setting provides the optimum performance for most applications.

Standard Operation
   Optimizes the system for large memory bandwidth applications where minimal sharing of data occurs and the likelihood of significant hardware data-prefetching exists.

Turbo Database Mode
   Optimizes system operation for environments where there is a large amount of data sharing among processes running concurrently on the system.

- **L3 Mode Menu**

  This function is not applicable to this system.

- **Remote I/O (RIO) Link Speed Set Up Menu**

  This option is used to change the speed of the RIO interface to external drawers. On this system, setting this speed will have no effect on the system.

  The hardware capability is detected and set by the system firmware during the boot process. If the hardware capability is uninitialized (after NVRAM is cleared), it will be set during the first boot and remain set during subsequent boots.

  The maximum RIO speed setting will remain uninitialized until set by the user.

  The user can set the speed lower than or equal to the hardware capability, but not higher. If the hardware capability is 1000 Mbps, the user can set the link speed to 500 Mbps, and the RIO link will run at 500 Mbps. However, if the hardware capability is 500 Mbps and the user selects 1000 Mbps, the user's selection will be ignored by the system.

If this option is chosen, the menu similar to the following is displayed:

```
Remote I/O (RIO) Link Speed Set Up Menu

  Hardware Capability (internal and external):  1000 Mbps

  1.  Maximum RIO speed setting (internal and external):
      Currently Uninitialized

  98. Return to previous menu.

0>1
```

If option 1 is selected, the RIO interface speed can be set as shown below:

```
Enter new value for this option:  (1 = 1000 MBPS, 2 = 500 Mbps)   0>
```

This setting will remain in effect until it is changed or NVRAM is cleared.

Language Selection Menu

The service processor menus and messages are available in various languages. This menu allows selecting languages in which the service processor and system firmware menus and messages are displayed.

```
        LANGUAGE SELECTION MENU

  1. English

  2. Francais

  3. Deutsch

  4. Italiano

  5. Espanol

 98. Return to Previous Menu

 99. Exit from Menus

 0>
```

Note: Your virtual terminal window must support the ISO-8859 character set to correctly display languages other than English.

Call-In/Call-Out Setup Menu

Note: The information in this section regarding the configuring of serial ports, and modems attached to those serial ports, applies only to the serial ports (S1 and S2) on the CEC backplane (location U0.1-P1). These serial ports are normally used for call-in and call-out.

Call-out is disabled in partitioned systems. The call-out function is normally handled by the Service Focal Point application running on the HMC.

None of these menus are applicable to the serial ports, or modems attached to those serial ports, on the HMC.

```
      CALL-IN/CALL-OUT SETUP MENU

 1. Modem Configuration Menu

 2. Serial Port Selection Menu

 3. Serial Port Speed Setup Menu

 4. Telephone Number Setup Menu

 5. Call-Out Policy Setup Menu

 6. Customer Account Setup Menu

 7. Call-Out Test
 NOT supported in LPAR mode

98. Return to Previous Menu

99. Exit from Menus

0>
```

- **Modem Configuration Menu**, see "Modem Configuration Menu" on page 58.
- **Serial Port Selection Menu**, see "Serial Port Selection Menu" on page 58.
- **Serial Port Speed Setup Menu**, see "Serial Port Speed Setup Menu" on page 59.
- **Telephone Number Setup Menu**, see "Telephone Number Setup Menu" on page 59.
- **Call-Out Policy Setup Menu**, see "Call-Out Policy Setup Menu" on page 60.
- **Customer Account Setup Menu**, see "Customer Account Setup Menu" on page 61.
- **Call-Out Test** tests the configuration after the modem is installed and configured correctly (disabled in partitioned systems).

Modem Configuration Menu

Note: This option applies only to a modem attached to serial port 1 (S1) or serial port 2 (S2) on the CEC backplane.

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

```
        Modem Configuration Menu

   Port 1 Modem Configuration File Name:
   Port 2 Modem Configuration File Name:

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

Modem Ports:
   1. Serial port 1
   2. Serial port 2

Modem Configuration File Name:
   5. none9. modem_z_sp
   6. modem_f_sp          10. modem_m1_sp
   7. modem_f0_sp         11. modem_m0_sp
   8. modem_f1_sp         12. modem_m1_sp

  30. Save configuration to NVRAM and Configure modem
  98. Return to Previous Menu

  0>
```

For information on choosing a modem configuration file, see "Sample Modem Configuration Files" on page 163 and "Transfer of a Modem Session" on page 167.

Serial Port Selection Menu

This menu allows you to enable or disable the call-in and call-out functions of each serial port in any combination.

Note: Call-out is disabled in partitioned systems.

```
        Serial Port Selection Menu

   1. Serial Port 1 Call-Out:
      Currently Disabled
    NOT supported in LPAR mode

   2. Serial Port 2 Call-Out:
       Currently Disabled
    NOT supported in LPAR mode

   3. Serial Port 1 Call-In:
       Currently Disabled

    4. Serial Port 2 Call-In:
       Currently Disabled
  98. Return to Previous Menu

  0>
```

Call-in and ring indicate power-on cannot be enabled at the same time. If ring-indicate power-on is already enabled and you try to enable call-in, a message prompts you for confirmation. Refer to the message displayed on the screen.

Serial Port Speed Setup Menu

This menu allows you to set serial port speed to enhance terminal performance or to accommodate modem capabilities.

```
        Serial Port Speed Setup Menu

   1. Serial Port 1 Speed:
        Currently 9600

   2. Serial Port 2 Speed:
        Currently 9600

  98. Return to Previous Menu

  0>
```

A serial port speed of 9600 baud or higher is recommended. The following are valid serial port speeds:

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

Telephone Number Setup Menu

Note: These menus are available, however, the function of calling out to report a system failure is normally handled by the Service Focal Point application running on the HMC.

Use this menu to set or change the telephone numbers for reporting a system failure.

```
        Telephone Number Setup Menu

   1. Service Center Telephone Number:
       Currently Unassigned

   2. Customer Administration Center Telephone Number:
       Currently Unassigned

   3. Digital Pager Telephone Number:
       Currently Unassigned

   4. Customer Voice Telephone Number:
       Currently Unassigned

   5. Customer System Telephone Number:
       Currently Unassigned

  98. Return to Previous Menu

  0>
```

- **Service Center Telephone Number** is the number of the service center computer. The service center usually includes a computer that takes calls from servers with call-out capability. This computer is referred to as the *catcher*. The catcher expects messages in a specific format to which the service processor conforms.

  For more information about the format and catcher computers, refer to the readme file in the AIX **/usr/samples/syscatch** directory. Contact your service provider for the correct service center telephone number to enter. Until you have that number, leave this field unassigned.

- **Customer Administration Center Telephone Number** is the number of the System Administration Center computer (catcher) that receives problem calls from servers. Contact your system administrator for the correct telephone number to enter here. Until you have that number, leave this field unassigned.

- **Digital Pager Telephone Number** is the number for a numeric pager carried by someone who responds to problem calls from your system. Contact your administration center representative for the correct telephone number to enter. For test purposes, use a test number, which you can change later (see the note on page 71).

  Note: If the system is running in partitioned mode, call-out is disabled. However, if the system is booted in full system partition mode, at least one of the preceding three telephone numbers must be assigned in order for the call-out test to complete successfully.

- **Customer Voice Telephone Number** is the telephone number of a phone near the system or answered by someone responsible for the system. This is the telephone number left on the pager for callback. For test purposes, use a test number, which you can change later.

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

Call-Out Policy Setup Menu

Note: Call-out is disabled on partitioned systems.

Call out settings can be set using the following menu:

```
        CALL-OUT POLICY SETUP MENU

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

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

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

  4. Number of retries:
     Currently 2

 98. Return to Previous Menu

  0>
```

- **Call-Out policy** can be set to `first` or `all`. If call-out policy is set to `first`, the service processor stops at the first successful call-out to one of the following numbers in the order listed:
  1. Service Center
  2. Customer Administrative Center
  3. Pager

  If call-out policy is set to `all`, the service processor attempts a call-out to all of the following numbers in the order listed:
  1. Service Center
  2. Customer Administrative Center
  3. Pager
- **Remote timeout** and **remote latency** are functions of your service provider's catcher computer. Either use the defaults or contact your service provider for recommended settings.
- **Number of retries** is the number of times you want the system to retry calls that failed to complete.

Customer Account Setup Menu

This menu allows users to enter information that is specific to their account.

```
        Customer Account Setup Menu

  1. Customer Account Number:
       Currently Unassigned

  2. Customer RETAIN Login userid:
       Currently Unassigned

  3. Customer RETAIN login password:
       Currently Unassigned

 98. Return to Previous Menu

 0>
```

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

Call-out Test Menu

Note: Call-out test is disabled in partitioned systems.

Use this menu to test the configuration after the modem is installed and configured. To execute this test successfully, at least one of the following numbers must be assigned:
- Service center telephone number
- Customer administration center telephone number
- Digital pager telephone number

Service Processor Parameters in Service Mode (Full System Partition)

When the system is in service mode, the following service-processor parameters are suspended:

- Unattended Start Mode
- Reboot/Restart Policy
- Call-Out
- Surveillance

When service mode is exited, the service processor functions are reactivated.

System Power-On Methods

This section discusses the following system power-on methods:

- Power-on Switch
- Service Processor Menus

  Privileged users can power on the system by selecting the **System Control Power Menu** option from the main menu and then selecting the **Power-on System** option from the System Power Control Menu. General users should select **Power-on System** on the General User Menu.

- Remote Power-on via Ring-Indicate Signal

  The system automatically powers on when it detects a ″ring indicate″ signal from a modem attached to serial port 1 (S1) or serial port 2 (S2).

  A remote user can call the system to activate ring detection by the modem. Listen for a few more rings than the threshold number for starting the system. The system powers on without answering the call.

- Unattended start mode - refer to **Enable/Disable Unattended Start Mode** on page 44.

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

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

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

  Note: If an ac power loss is in progress when the timed power-on attempt occurs, the system cannot power on when ac power is restored.

- Follow-up to a Failed Boot Attempt

  The service processor initiates a power-on sequence if a failed boot attempt is detected (due to a hardware or software failure).

- Fast or Slow Boot (IPL)

  Using the service processor menus, you can select the IPL type, mode, and speed of your system.

  Attention: Selecting fast IPL results in several diagnostic tests being skipped and a shorter memory test being run.

Service Processor Reboot/Restart Recovery

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

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

Boot (IPL) Speed

When the system enters reboot recovery, slow IPL is automatically started, which gives the POST an opportunity to locate and report any problems that might otherwise be unreported.

Failure During Boot Process

During the boot process, either initially after system power-on or upon reboot after a system failure, the service processor monitors the boot progress. If progress stops, the service processor can reinitiate the boot process (reboot) if enabled to do so. The service processor can re-attempt this process according to the number of retries selected in the Reboot/Restart Policy Setup Menu.

Failure During Normal System Operation

When the boot process completes and control transfers to the operating system (OS), the service processor can monitor operating system activity (see the Set Surveillance Parameters option in the SERVICE PROCESSOR SETUP MENU). If OS activity stops due to a hardware- or software-induced failure, the service processor can initiate a reboot/restart process based on the settings in the Service Processor Reboot/Restart Policy Setup Menu and the OS automatic restart settings (see the operating system documentation), if you are running in a full system partition. Operating system surveillance is disabled in partitioned systems.

If you are using the AIX operating system, the menu item under SMIT for setting the restart policy is **Automatically Reboot After Crash**. The default is false. When the setting is true, and if the service processor parameter ″Use OS-Defined Restart Policy″ is yes (the default), the service processor takes over for AIX to reboot/restart after a hardware or surveillance failure.

Service Processor Reboot/Restart Policy Controls

The operating system's automatic restart policy (see operating system documentation) indicates the operating system response to a system crash. The service processor can be instructed to refer to that policy by the Use OS-Defined Restart Policy setup menu.

If the operating system has no automatic restart policy, or if it is disabled, then the service processor-restart policy can be controlled from the service processor menus. Use the Enable Supplemental Restart Policy selection.

Use OS-Defined restart policy - The default setting is no. In a full-system partition, this causes the service processor to refer to the OS Automatic Restart Policy setting and take action (the same action the operating system would take if it could have responded to the problem causing the restart).

When this setting is no, or if the operating system did not set a policy, the service processor refers to enable supplemental restart policy for its action.

Enable supplemental restart policy - The default setting is yes. When set to yes in a full system partition, the service processor restarts the server when the operating system loses control and either:
- The **Use OS-Defined restart policy** is set to No.

OR
- The **Use OS-Defined restart policy** is set to Yes and the operating system has no automatic restart policy.

If set to Yes on a full-system partition, the service processor restarts the system when the system loses control and it is detected by service processor surveillance. Refer to "Service Processor Reboot/Restart Recovery" on page 63.

The following table describes the relationship among the operating system and service processor restart controls in a full system partition:

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

[1] Service processor default
[2] AIX default

Note: In a partitioned system, the service processor's supplemental restart policy is the only setting that is used.

Firmware Updates

The following topics provide 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.

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

Always check the pSeries and RS/6000 Support Web site for the latest firmware images and update instructions. The Web address is http://techsupport.services.ibm.com/server/mdownload2

If you cannot download from the Web, do the following:
- If the system is running, but access to the Web is not available, see "System Firmware Update in AIX Using a Locally Available Image" on page 67.

- 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 68.
- If the service processor programming has been corrupted, the service processor will automatically enter recovery mode when power is applied to the system. For more information on recovery mode, go to "Recovery Mode" on page 69.

To check the level of firmware that is currently on the system, see "Determining the Level of Firmware on the System" on page 66.

General Information on System Firmware Updates

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

- 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. The diskette images can be downloaded to any personal computer, pSeries, or RS/6000 system with Internet access. This method and contacting your service representative are the only two ways to acquire a set of firmware update diskettes; they cannot be created by using the service processor menus or by using the operating system.

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 the following Web address: http://techsupport.services.ibm.com/server/mdownload2. 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. Always check the Web site for the latest images and instructions for checking the firmware level. The Web address is http://techsupport.services.ibm.com/server/mdownload2

The firmware level can be denoted in either of the following forms:

- RRyymmdd, where RR = the pSeries 630's firmware designation, yy = year, mm = month, and dd = day of the release.
- vRyymmdd, where v = version number, R = the pSeries 630's firmware designation, yy = year, mm = month and dd = day of the release.

If your system is running AIX, the platform firmware level can be determined by either of the following methods:

- On the AIX command line, by typing:

  ```
  lscfg -vp|grep -p Platform
  ```

  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.

If the system is running Linux, the platform firmware level can be determined by any one of the following methods:

- If the system was installed prior to May of 2003, and has not had a firmware update in May 2003 or later, type the following on the Linux command line:

  ```
  /usr/sbin/ibmras/nvram --print-vpd | grep RR
  ```
- If the system was installed in May of 2003 or later, or the system has firmware on it that was released in May 2003 or later, type the following on the Linux command line:

  ```
  /usr/sbin/ibmras/nvram --print-vpd | grep 3R
  ```

  A line similar to `Alterable ROM Level RR021114` or `Alterable ROM Level 3R030509` displays the firmware level that is currently on the system.
- Looking at the top of the service processor main menu.

System Firmware Update in AIX 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 **/tmp/fwupdate** directory does not exist, create it by issuing the following command:

   ```
   mkdir /tmp/fwupdate
   ```
3. The firmware update file must be downloaded or copied 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 system.

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

   After the firmware update file has been downloaded or copied into the **/tmp/fwupdate** directory, verify its existence by entering either of the following commands, depending on the name of the update image:

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

   OR

   ```
   ls /tmp/fwupdate/3R*.img
   ```

   The update file will have either the RRyymmdd.img format or the 3Ryymmdd.img format. In both cases, the R in the second position indicates that this is an update image for your 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
   ```

   then either of these commands, depending on the name of the update file:

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

   OR

   ```
   ./update_flash -f /tmp/fwupdate/3Ryymmdd.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 diskette drive to be installed in the system. This procedure also 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

Attention: This method is not recommended for partitioned systems, but if the device resources are allocated properly, the firmware update can be done using the AIX service aid.

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

If the firmware on a partitioned system is being updated:
- One partition running AIX must have service authority.
- All other partitions except the one with service authority must be shut down.
- The partition with service authority must own the device from which the firmware update image will be read.
- It is recommended that the partition with service authority have a hard disk.

If the required devices are not in the partition with service authority, the customer or system administrator must reassign the appropriate resources to it. This requires rebooting the partition with service authority. To avoid the resource allocation issues, it is recommended that the service processor menus be used to update the firmware.

If the firmware on a full system partition is being updated, no special steps are required to perform the firmware update using the service aid.

For information about updating system firmware, refer to the instructions that are provided on the web site with the latest image.

Note: Because the system always reboots itself during this type of firmware update process, the update process can take from 20 to 60 minutes.

Updating System Firmware from a NIM Server

Refer to "Running Standalone Diagnostics from a Network Installation Management (NIM) Server" on page 97.

Recovery Mode

If the service processor detects that its programming has been corrupted when it is powering on to standby mode, it will enter recovery mode. In recovery mode, it prompts for the firmware update diskettes by putting eight-digit codes on the operator panel display, as shown in the following table. After the update process is complete, the service processor resets itself and performs a complete reboot.

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.

Updating System Firmware from the AIX Command Line

For information about updating system firmware, refer to the Web site for detailed instructions on the latest image provided.

Note: The update process can take up to 60 minutes, and the system reboots itself during the update process.

Configuring and Deconfiguring Processors or Memory

All failures that crash the system with a machine check or check stop, even if intermittent, are reported as a diagnostic callout for service repair. To prevent the recurrence of intermittent problems and improve the availability of the system until a scheduled maintenance window, processors and memory DIMMs with a failure history are marked ″bad″ to prevent their being configured on subsequent boots. This function is called *repeat gard*.

A processor or memory DIMM is marked ″bad″ under the following circumstances:

- A processor or memory DIMM fails built-in self-test (BIST) or power-on self-test (POST) testing during boot (as determined by the service processor).
- A processor or memory DIMM causes a machine check or check stop during runtime, and the failure can be isolated specifically to that processor or memory DIMM (as determined by the processor runtime diagnostics in the service processor).
- A processor or memory DIMM reaches a threshold of recovered failures that results in a predictive callout (as determined by the processor run-time diagnostics in the service processor).

During boot time, the service processor does not configure processors or memory DIMMs that are marked "bad."

If a processor or memory DIMM is deconfigured, the processor or memory DIMM remains offline for subsequent reboots until it is replaced or memory repeat gard is disabled. The repeat gard function also provides the user with the option of manually deconfiguring a processor or memory DIMM, or re-enabling a previously deconfigured processor or memory DIMM.

For information about configuring or deconfiguring a processor, see the Processor Configuration/Deconfiguration Menu on page 49. For information on configuring or deconfiguring a memory DIMM, see the Memory Configuration/Deconfiguration Menu on page 50. Both of these menus are submenus under the System Information Menu. You can enable or disable CPU Repeat Gard or Memory Repeat Gard using the Processor Configuration/Deconfiguration Menu.

Run-Time CPU Deconfiguration (CPU Repeat Gard)

L1 instruction cache recoverable errors, L1 data cache correctable errors, and L2 cache correctable errors are monitored by the processor runtime diagnostics (PRD) code running in the service processor. When a predefined error threshold is met, an error log with warning severity and threshold exceeded status is returned to AIX. At the same time, PRD marks the CPU for deconfiguration at the next boot. AIX will attempt to migrate all resources associated with that processor to another processor and then stop the defective processor.

Service Processor System Monitoring - Surveillance

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

Surveillance is available during the following phases:
- System firmware bringup (automatic)
- Operating system runtime (optional)

   Note: Operating system surveillance is disabled in partitioned systems.

System Firmware Surveillance

System firmware surveillance is automatically enabled during system power-on. It cannot be disabled by the user, and the surveillance interval and surveillance delay cannot be changed by the user.

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

Operating System Surveillance

Note: Operating system surveillance is disabled in partitioned systems.

Operating system surveillance provides the service processor with a means to detect hang conditions, as well as hardware or software failures, while the operating system is running. It also provides the operating system with a means to detect a service processor failure caused by the lack of a return heartbeat.

Operating system surveillance is not enabled by default, allowing you to run operating systems that do not support this service processor option.

For operating system surveillance to work correctly, you must set these parameters:

- Surveillance enable/disable
- Surveillance interval

  The maximum time the service processor should wait for a heartbeat from the operating system before timeout.

- Surveillance delay

  The length of time to wait from the time the operating system is started to when the first heartbeat is expected.

Surveillance does not take effect until the next time the operating system is started after the parameters have been set.

If desired, you can initiate surveillance mode immediately from service aids. In addition to the previously discussed options, another option allows you to select immediate surveillance, and rebooting of the system is not necessarily required.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and the service processor does not detect any heartbeats from the operating system, the service processor assumes the system is hung and takes action according to the reboot/restart policy settings. See "Service Processor Reboot/Restart Recovery" on page 63.

If surveillance is selected from the service processor menus that are only available at bootup, surveillance is enabled by default as soon as the system boots. From service aids, the selection is optional.

Call-Out (Call-Home)

Note: Call-out is disabled on partitioned systems. The call-out function is handled by the Service Focal Point application on the Hardware Management Console (HMC).

The service processor can call out (call-home) when it detects one of the following conditions:

- System firmware surveillance failure
- Operating system surveillance failure (if supported by operating system)
- Restarts
- Critical hardware failure
- Abnormal operating system termination

To enable the call-out feature, do the following:

1. Connect a modem to any serial port.
2. Set up the following using the service processor menus or diagnostic service aids:
   - Enable call-out for the serial port where the modem is connected.
   - Enter the modem configuration file name.
   - Set up site-specific parameters (phone numbers for call-out, call-out policy, number of call-out retries, and so on).

3. To call out before restart, set **Call-out before restart** to ENABLED from the Reboot/Restart Policy Setup menu.

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

Console Mirroring

Console mirroring allows a user on one serial port to monitor the service processor activities on another serial port. This can be done on the locally attached HMC virtual terminal window or windows remotely attached through modems. Console mirroring is supported on any combination of locally or remotely attached monitors.

The serial port from which console mirroring is enabled is called the *primary port*. The mirror port is determined when keyboard input is detected from one of the other two serial ports. From this point forward, the service processor sends information to the active port and the mirror port only. Console mirroring ends when the service processor releases control of the serial ports to the system firmware.

Console mirroring is supported on serial port 1 (S1), serial port 2 (S2), and serial port 3 (S3). Remote attachment through modem is supported on serial port 1 (S1) and serial port 2 (S2).

System Configuration

The following describes the configuration for console mirroring:
- Service processor
- Modem connected to one serial port and enabled for incoming calls
- Local HMC virtual terminal window connected to the other serial port. This local terminal can be connected directly to your system or connected through another modem.

Console mirroring can be started by either of the following methods:
- Remote session first, then local session added:
    1. Remote session is already in progress.
    2. Remote user uses service processor menus to enable console mirroring, allowing both consoles to be active.
- Local session first, then remote session added:
    1. Local session is already in progress.
    2. The service processor receives a call from the remote user.
    3. The local user selects the option to enable console mirroring. The service processor immediately begins mirroring service processor menus.

Service Processor Error Logs

The service processor error logs, an example of which follows, contain error conditions detected by the service processor.

```
                      Error Log

1. 11/30/99    19:41:56 Service Processor Firmware Failure
   B1004999

   Enter error number for more details.
   Press Return to continue, or 'x' to return to menu.
     Press "C" to clear error log, any other key to continue. >
```

Note: The time stamp in this error log is coordinated universal time (UTC), which is also referred to as Greenwich mean time (GMT). Operating system error logs have additional information available and can time stamp with local time.

Entering an error number provides nine words of system reference code (SRC) data; an example menu follows.

```
Detail:    6005

SRC
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
word11:B1004999      word12:0110005D      word13:00000000
word14:00000000      word15:00001111      word16:00000000
word17:B1004AAA      word18:0114005D      word19:A4F1E909

B1004999

   Press Return to continue, or 'x' to return to menu.
```

If Return is pressed, the contents of NVRAM will be dumped 320 bytes at a time, starting at address 0000.

LCD Progress Indicator Log

The following is an example of the LCD progress indicator log. It shows the types of entries that can appear in the log, and is for example purposes only.

The progress indicator codes are listed from top (latest) to bottom (oldest).

```
                   LCD Progress Indicator Log
         B0FF
         0539..17
         0538..17
         0539..17
         0538..17
         0539..17
         0581
         0538..17
         0539..12
         0538..12
         0539..
         0821..01-K1-00
         0539..
         0728..01-R1-00-00
         0539..
         0664..40-60-00-1,0
         0539..
         0777..U0.1-P2-I1/E1
         0539..
         0742..U0.1-P2-I2/E1
         0539..
         0776..U0.1-P2-I3/T1
         E139
         E1FB
         E139
         E183
Press Return to continue, or 'x' to return to menu. >
         EAA1..U0.1-P1-I4
         E172..U0.1-P1
         E172..U0.1-P1-I4
         E172..U0.1-P1
         94BB
         9109
         9380
         9108
         9107
         9106
         9105
         9118
         9104
         9103
         9102
         90FD
```

Service Processor Operational Phases

This section provides a high-level flow of the phases of the service processor.

```
                    SP Power Applied
                          |
                          v
                  Pre-Standby Phase
                          |
      +------------+      v
      |     Standby Phase   SP Menus Available
      |                     |
      |                     v
      |     Bring-Up Phase  SMS Menus Available
      |                     |
      |                     v
      |     Run-time Phase  Operating System Login Prompt  Available
      |            |
      +------------+
```
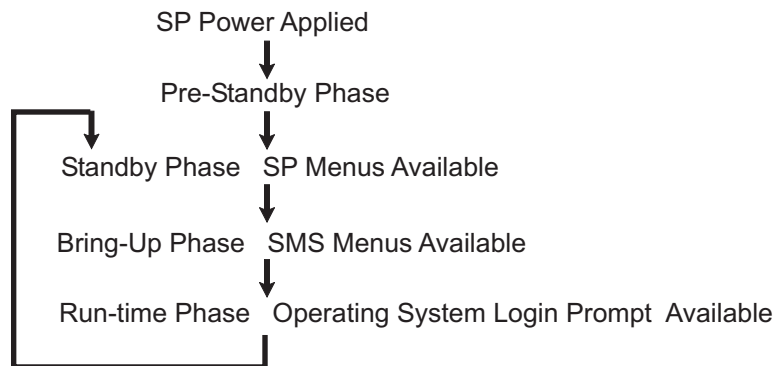
Pre-Standby Phase

This phase is entered when the system is connected to a power source. The system may or may not be fully powered on. This phase is exited when the power-on self-tests (POSTs) and configuration tasks are completed.

The pre-standby phase components are:

- Service Processor Initialization - Service processor performs any necessary hardware and software initialization.
- Service Processor POST - Service processor conducts Power-on self-tests on its various work and code areas.
- Service Processor Unattended Start Mode Checks - To assist fault recovery. If unattended start mode is set, the service processor automatically reboots the system. The service processor does not wait for user input or power-on command, but moves through the phase and into the bring-up phase. Access the SMS menus or the service processor menus to reset the unattended start mode.

Standby Phase

The standby phase can be reached in either of the following ways:

- With the system off and power connected (the normal path), recognized by `OK` in the LCD display.

  OR
- With the system on after an operating system fault, recognized by an 8-digit code in the LCD display.

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

The standby phase components are as follows:

- Modem Configuration

  The service processor configures the modem (if installed) so that incoming calls can be received, or outgoing calls can be placed.

- Dial In

  Monitor incoming phone line to answer calls, prompt for a password, verify the password, and remotely display the standby menu. The remote session can be mirrored on the local HMC virtual terminal window if the system is so equipped and if the user enables this function.

- Menus

  The service processor menus are password-protected. Before you can access them, you need either the general user-password or privileged-user password.

  Service processor menus are available on ASCII terminals attached to the serial ports on the system, and on terminal emulators. On HMC-managed systems, service processor menus are also available on the HMC interface.

Bring-Up Phase

On a system that is powered-on to full system partition, this phase is entered upon power-on, and exited upon loading of the operating system.

On a system that is powered-on to partition standby, this phase is entered upon power-on, and exited when the partition manager and hypervisor have been loaded and become fully operational in system memory. The end of this phase is indicated by `LPAR` on the operator panel. At this point, the server can start multiple logical partitions that would be activated through the HMC interface.

The bring-up phase components are as follows:

- Retry Request Check

  The service processor checks to see if the previous boot attempt failed. If the specified number of failures are detected, the service processor displays an error code and places an outgoing call to notify an external party if the user has enabled this option.

- Dial Out

  The service processor can dial a preprogrammed telephone number in the event of an IPL failure. The service processor issues an error report with the last reported IPL status indicated and any other available error information.

- Update Operator Panel

  The service processor displays operator panel data on the HMC virtual terminal window if a remote connection is active.

- Environmental Monitoring

  The service processor provides expanded error recording and reporting.

- System Firmware Surveillance (Heartbeat Monitoring)

  The service processor monitors and times the interval between system firmware heartbeats.

- Responding to System Processor Commands

  The service processor responds to any command issued by the system processor.

Runtime Phase

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

- Environmental Monitoring

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

- Responding to System Processor Commands

  The service processor responds to any command issued by the system processor.

- Run-Time Surveillance (not supported on partitioned systems)

  If the device driver is installed and surveillance enabled, the service processor monitors the system heartbeat. If the heartbeat times out, the service processor places an outgoing call. This is different from the bring-up phase scenario, where the specified number of reboot attempts are made before placing an outgoing call.

- HMC surveillance

  On an HMC-managed system, the service processor monitors the communication link between the managed system and the HMC. If the service processor detects that this communication link has been broken, it will post an error to the operating system running on the managed system.

Chapter 5. Using System Management Services

Use the system management services menus to view information about your system or partition, and to perform tasks such as setting a password, changing the boot list, and setting the network parameters.

Notes:

1. On some of the system management services (or service processor) screens, you will see the term *LPAR*. LPAR is equivalent to the term *logically partitioned system* or *partitioned system*.

2. In a partitioned system, only those devices that are assigned to the partition that is being booted display in the SMS menus. In a full system partition, all devices in the system display in the SMS menus.

To start the system management services, do the following:

1. For a partitioned system, use the Hardware Management Console for pSeries (HMC) to restart the partition.

   For a full system partition, restart the system.

2. For a partitioned system, watch the virtual terminal window on the HMC.

   For a full system partition, watch the firmware console.

3. Look for the POST indicators **memory, keyboard, network, scsi, speaker**, which appear across the bottom of the screen. Press the numeric 1 key after the word **keyboard** appears, and before the word **speaker** appears.

After the system management services starts, the following screen displays:

```
Main Menu

  1    Select Language
  2    Change Password Options NOT available in LPAR mode
  3    View Error Log
  4    Setup Remote IPL (Initial Program Load)
  5    Change SCSI Settings
  6    Select Console NOT available in LPAR mode
  7    Select Boot Options



----------------------------------------------------------------------------------------------
Navigation keys:


                                                     X = eXit System Management Services

----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Note: The system management services can also be started using the Service Processor Boot Mode Menu. See page 46.

On all menus except the Main Menu, there are several navigation keys:

M   Return to the main menu.

ESC   Return to the previous menu.

X   Exit the system management services and start the operating system.

            If X is entered, you are asked to confirm your choice to exit the SMS menus and start the operating system.

When there is more than one page of information to display, there are two additional navigation keys:

N   Display the next page of the list.

P   Display the previous page of the list.

Note: The lowercase navigation key has the same effect as the uppercase key that is shown on the screen. For example, **m** or **M** returns you to the main menu.

On each menu screen, you are given the option of choosing a menu item and pressing Enter (if applicable), or selecting a navigation key.

Select Language

Note: Your TTY must support the ISO-8859 character set to properly display languages other than English.

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

```
 SELECT LANGUAGE

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




 -------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                   X = eXit System Management Services
 -------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

Change Password Options

The Change Password Options menu enables you to select from password utilities.

Note: This option is not available in partitioned systems.

```
 Password Utilities

  1 Set Privileged-Access Password
  2 Remove Privileged-Access Password



 -----------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                        X = eXit System Management Services
 -----------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

The privileged-access password protects against the unauthorized starting of the system programs.

Note: If the privileged-access password has been enabled, you are asked for the privileged-access password at startup every time you boot your system.

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

View Error Log

Use this option to view or clear your system's error log. A menu similar to the following displays when you select this option.

```
 Error Log

         Date       Time       Error Code      Location
 Entry 1. 01/04/96   12:13:22   25A80011        00-00
 Entry 2. no error logged

 1. Clear error log



 -----------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                        X = eXit System Management Services
 -----------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

Note: The time stamp in his error log is coordinated universal time (UTC), which is also referred to as Greenwich mean time (GMT). The operating system error logs have more information available and can time stamp with your local time.

Setup Remote IPL (Initial Program Load)

This option allows you to enable and set up the remote startup capability of your system or partition. A list of NIC (network interface card) adapters in the system displays first. An example of this screen is shown below:

Attention: In a partitioned system, only those network adapters that have been assigned to the partition being booted display in the IP Parameters menu. In a full system partition, all network adapters in the system are listed in the adapter parameters menu.

```
NIC Adapters
        Device                       Slot            Hardware Address
1.    10/100 Mbps Ethernet PCI Adapt   Integ: U0.1-P1/E1      00096baeac10
2.    IBM 10/100/1000 Base-TX PCI      U0.1-P2-I1/E1          0009cbce0fde




-----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                     X = eXit System Management Services
-----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

When an adapter is selected, the network parameters menu displays:

```
Network Parameters
10/100 Mbps Ethernet PCI Adapter II:  U0.1-P1/E1
 1. IP Parameters
 2. Adapter Parameters
 3. Ping Test



-----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                     X = eXit System Management Services
-----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Selecting the IP (Internet Protocol) parameters option displays the following menu:

```
IP Parameters
10/100 Mbps Ethernet PCI Adapter II:  U0.1-P1/E1
 1. Client IP Address     [000.000.000.000]
 2. Server IP Address     [000.000.000.000]
 3. Gateway IP Address    [000.000.000.000]
 4. Subnet Mask           [255.255.255.000]




-----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                     X = eXit System Management Services
-----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

To change IP parameters, type the number of the parameters for which you want to change the value. Entering IP parameters on this screen will automatically update the parameters on the ping test screen.

Attention: If the client system and the server are on the same subnet, set the gateway IP address to [0.0.0.0].

Selecting the **Adapter Configuration** allows the setting of the network speed, enabling or disabling spanning tree, and setting the protocol as shown in the following menu example:

```
 Adapter Configuration
 10/100 Mbps Ethernet PCI Adapter II:  U0.1-P1/E1
1.   Speed, Duplex
2.   Spanning Tree Enabled
3.   Protocol




 -----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                       X = eXit System Management Services
 -----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Selecting the **Speed, Duplex** option allows you to set the interface speed at which the card will run and half versus full duplex. The current setting is indicated by ″<===″.

```
Adapter Configuration
10/100 Mbps Ethernet PCI Adapter II:  U0.1-P1/E1

1.   auto, auto
2.   10,half
3.   10,full
4.   100,half
5.   100,full




 -----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                       X = eXit System Management Services
 -----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Selecting the **Spanning Tree Enabled** menu allows you to enable or disable the spanning tree flag. If this flag is enabled (because the network the system is being attached to supports spanning trees), the firmware will impose a waiting period of 60 seconds before the adapter is allowed to communicate with the network. If this flag is disabled, the network adapter will be able to access the network immediately after the system is connected.

```
Spanning Tree Enabled
10/100 Mbps Ethernet PCI Adapter II:  U0.1-P1/E1

1.  Yes  <===
2.  No




-----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                       X = eXit System Management Services
-----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

The **Protocol** option allows you to set the appropriate protocol for your network as shown below.

```
Protocol
10/100 Mbps Ethernet PCI Adapter II:  U0.1-P1/E1

 1. Standard  <===
 2. IEEE802.3




-----------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                       X = eXit System Management Services
-----------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Select the **ping test** option from the network parameters menu to test an adapter's network connection to a remote system. After the ping test option is selected, the same series of screens will take you through setting up the IP parameters and the adapter configuration before attempting the ping test.

Notes:

1. After the ping test is initiated, it may take 60 seconds or longer to return a result.
2. If the ping test passes or fails, the firmware will stop and wait for a key to be pressed before continuing.

Change SCSI Settings

This option allows you to view and change the addresses of the SCSI controllers attached to your system.

```
SCSI Utilities

  1. Hardware Spin Up Delay
  2. Change SCSI Id




-------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                      X = eXit System Management Services
-------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Select Console

Note: This option is not available in partitioned systems.

The Select Console utility allows the user to select which console to use to display the SMS menus. This selection is only for the SMS menus and does not affect the display used by the operating system.

Follow the instructions that display on the screen. The firmware automatically returns to the SMS main menu.

Select Boot Options

Use this menu to view and set various options regarding the installation devices and boot devices.

```
   1. Select Install or Boot a Device
   2. Select Boot Devices
   3. Multiboot Startup




 -----------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                     X = eXit System Management Services
 -----------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

Select Install or Boot a Device
> Allows you to select a device from which to boot or install the operating system. This option is for the current boot only.

Select Boot Devices
> Allows you to set the boot list.

Multiboot Startup
> Toggles the multiboot startup flag, which controls whether the multiboot menu is invoked automatically on startup.

If **Select Install or Boot a Device** is selected, the following menu displays:

```
  Select Device Type
 1.  Diskette
 2.  Tape
 3.  CD/DVD
 4.  IDE
 5.  Hard Drive
 6.  Network
 7.  None
 8.  List All Devices




 -----------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                     X = eXit System Management Services
 -----------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

If a device is selected that is not in the system, a menu with the following message displays:

```
      .---------------------------------------------------------.
      | THE SELECTED DEVICES WERE NOT DETECTED IN THE SYSTEM !  |
      | Press any key to continue.                              |
      '---------------------------------------------------------'
```

If **Hard Drive** is selected, the following menu displays:

```
  Select Hard Drive Type
  1.  SCSI
  2.  SSA
  3.  SAN
  4.  None
  5.  List All Devices




  -------------------------------------------------------------------------------------------
  Navigation keys:
  M = return to main menu
  ESC key = return to previous screen                    X = eXit System Management Services
  -------------------------------------------------------------------------------------------
  Type the number of the menu item and press Enter or Select a Navigation key: _
```

If **List All Devices** is selected, a menu similar to the following displays, depending on the devices that are installed in the system:

```
  Select Device
 Device  Current  Device
 Number  Position Name
  1.        1       SCSI 18200 MB Harddisk (loc=U0.1-P2/Z1-A8,0)
  2.        -       SCSI 18200 MB Harddisk (loc=U0.1-P2/Z1-A9,0)
  3.        -       SCSI 18200 MB Harddisk (loc=U0.1-P2/Z1-Aa,0)
  4.    None
  5.  List all devices



  -------------------------------------------------------------------------------------------
  Navigation keys:
  M = return to main menu
  ESC key = return to previous screen                    X = eXit System Management Services
  -------------------------------------------------------------------------------------------
  Type the number of the menu item and press Enter or Select a Navigation key: _
```

The appropriate device can then be selected for this boot or installation.

When a device is selected for installing the operating system, or to boot from, the Select Task menu allows you to get more information about the device, or to boot from that device in normal mode or service mode. The following is an example of this menu.

```
  Select Task

 SCSI 18200 MB Harddisk (loc=U0.1-P2/Z1-A8,0)

  1.  Information
  2.  Normal Mode Boot
  3.  Service Mode Boot




  -------------------------------------------------------------------------------------------
  Navigation keys:
  M = return to main menu
  ESC key = return to previous screen                    X = eXit System Management Services
  -------------------------------------------------------------------------------------------
  Type the number of the menu item and press Enter or Select a Navigation key: _
```

If either **Normal Mode Boot** or **Service Mode Boot** is selected, the next screen will ask, `Are you sure?`. If you answer yes, the device will be booted in the appropriate mode. If you answer no, the firmware will return to the Select Task menu.

Select Boot Devices

Attention: In a partitioned system, only those devices from which an operating system can be booted that are assigned to the partition that is being booted display on the select boot devices menu. In a full system partition, devices from which an operating system can be booted display on the Select Boot Devices menu.

Select this option to view and change the customized boot list, which is the sequence of devices read at startup.

```
 Configure Boot Device Order
 1.  Select 1st Boot Device
 2.  Select 2nd Boot Device
 3.  Select 3rd Boot Device
 4.  Select 4th Boot Device
 5.  Select 5th Boot Device
 6.  Display Current Setting
 7.  Restore Default Setting




 ---------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                          X = eXit System Management Services
 ---------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

When any of the options 1-5 is selected, the Select Device Type screen will be displayed, which is similar to the following:

```
 Select Device Type
 1.  Diskette
 2.  Tape
 3.  CD/DVD
 4.  IDE
 5.  Hard Drive
 6.  Network
 7.  None
 8.  List All Devices



 ---------------------------------------------------------------------------------------------
 Navigation keys:
 M = return to main menu
 ESC key = return to previous screen                          X = eXit System Management Services
 ---------------------------------------------------------------------------------------------
 Type the number of the menu item and press Enter or Select a Navigation key: _
```

When a device type is selected, such as item 5, a Select Task menu is displayed. The following is an example of that menu for a hard disk.

```
 Select Task

SCSI 18200 MB Harddisk (loc=U0.1-P2/Z1-A8,0)

 1.  Information
 2.  Set Boot Sequence: Configure as 1st Boot Device




--------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                    X = eXit System Management Services
--------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Selecting **Information** displays a menu similar to the following for a hard disk.

```
 Device Information
    /pci@3fffdf0a000/pci@2,4/scsi@1/sd@8,0
                 : (Integrated)    (Bootable)
DEVICE           : SCSI 18200 MB Harddisk ( loc=U0.1-P2/Z1-A8,0)
NAME             : sd
DEVICE-TYPE      : block




--------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                    X = eXit System Management Services
--------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

The **Set Boot Sequence** option allows you to set the location of the device in the boot list.

Display Current Settings

This option displays the current setting of the customized boot list. An example of this menu, with one device in the boot list, follows.

```
 Current Boot Sequence
 1.  SCSI 18200 MB Harddisk (loc=U0.1-P1/Z1-A8,0)
 2.   None
 3.   None
 4.   None
 5.   None




--------------------------------------------------------------------------------------------
Navigation keys:
M = return to main menu
ESC key = return to previous screen                    X = eXit System Management Services
--------------------------------------------------------------------------------------------
Type the number of the menu item and press Enter or Select a Navigation key: _
```

Restore Default Settings

This option restores the boot list to the default boot list. The default boot list will vary depending on the devices that are installed in the system.

The default boot list is as follows:

1. Primary diskette drive (if installed)
2. CD-ROM drive (if installed)
3. Tape drive (if installed)
4. Hard disk drive (if installed)
5. Network adapter

Multiboot Startup

Multiboot Startup toggles the multiboot startup flag, which controls whether the multiboot menu is invoked automatically on startup.

Exiting System Management Services

After you have finished using the system management services, type **x** (for exit) to boot your system or partition.

Chapter 6. Using the Online and Standalone Diagnostics

The AIX diagnostics consist of online diagnostics and standalone diagnostics.

Attention: To run online diagnostics on a partition, the AIX operating system must be installed on that partition. If the AIX operating system is not installed, use the standalone diagnostic procedures.

Online diagnostics, when they are installed, reside with AIX in the file system. They can be booted:
* In single user mode (referred to as *service mode*)
* To run in maintenance mode (referred to as *maintenance mode*)
* To run concurrently with other applications (referred to as *concurrent mode*)

Standalone diagnostics must be booted before they can be run. If booted, the diagnostics have no access to the AIX error log or the AIX configuration data.

Does the system have AIX diagnostics preinstalled?

Yes If there is an HMC attached to the system, go to "Operating Considerations for Online and Standalone Diagnostics".

If an HMC is not attached to the system, go to "Running the Online Diagnostics in Service Mode with No HMC Attached" on page 93.

No If there is an HMC attached to the system, go to "Standalone Diagnostics Operations" on page 95.

If an HMC is not attached to the system, go to "Running the Standalone Diagnostics from CD-ROM with No HMC Attached" on page 96.

If standalone diagnostics will be run from a NIM server, go to "Running Standalone Diagnostics from a Network Installation Management (NIM) Server" on page 97. If an HMC is not attached to the system, follow the directions for a full system partition.

Operating Considerations for Online and Standalone Diagnostics

Note: When possible, run online diagnostics in service mode. Online diagnostics perform additional functions compared to standalone diagnostics. Running online diagnostics in service mode ensures that the error state of the system that has been captured in NVRAM is available for your use in analyzing the problem. The AIX error log and certain SMIT functions are available only when diagnostics are run from the disk drive.

Consider the following items before using the diagnostics:
* Standalone diagnostics can run on systems configured for either a full (or single) system partition or a multiple partitioned system. When running in a multiple partitioned system, the device from which you are booting standalone diagnostics must be made available to the partition dedicated to running standalone diagnostics. This might require moving the device from the partition that currently contains the boot device (for example, the CD-ROM or network adapter connected to the NIM server that has a standalone diagnostic image) to the partition used to run standalone diagnostics. For partitions running AIX levels lower that 5.2, if you move devices, reboot both source and destination partitions. For more information, see "Standalone Diagnostics Operations" on page 95.
* When diagnostics are installed, the device support for some devices might not get installed. If this is the case, that device does not display in the diagnostic test list when running disk-based diagnostics.
* When running diagnostics in a partitioned system, diagnostics will work only with the resources that were assigned to that partition. You must run diagnostics in the partition containing the resource that you want to test.

Identifying the Terminal Type to the Diagnostics

When you run diagnostics, you must identify which 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.

Undefined Terminal Types

If you specify an undefined terminal type from the DEFINE TERMINAL option menu, the menu prompts the user to enter a valid terminal type. The menu redisplays until either a valid type is entered or you exit the DEFINE TERMINAL option. For a system attached to an HMC use VT320 emulation. If the AIX operating system is being used, from the command line, type: `export term=vt320`

Resetting the Terminal

If you enter a terminal type that is valid (according to the DEFINE TERMINAL option menu) but is not the correct type for the Hardware Management Console for pSeries (HMC) virtual terminal window being used, you may be unable to read the screen, use the function keys, or use the Enter key. To pass these difficulties, press Ctrl-C to reset the terminal. The screen display that results from this reset depends on the mode in which the system is being run:

- Online Normal or Maintenance Mode - The command prompt displays.
- Standalone Mode or Online Service Mode - The terminal type is reset to `dumb`, the Diagnostic Operating Instruction screen displays, and you are required to go through the DEFINE TERMINAL process again.

Online Diagnostics Modes of Operation

Notes:

1. When running online diagnostics on a partition in a partitioned system, diagnostics can be run only on resources that are allocated to that partition.
2. Online diagnostics can only be run in a partition with AIX installed.

The online diagnostics can be run in the following modes:

- Service Mode
- Concurrent Mode
- Maintenance Mode

Service Mode

Service mode provides the most complete checkout of the system resources. This mode also requires that no other programs be running on the partition or on a full system partition. Except for the SCSI adapter and the disk drives used for paging, resources on all partitions or systems on a full system partition can be tested. However, note that the memory and processor are only tested during POST, and the results of the POST tests are reported by diagnostics.

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

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.
- The diagnostics cannot be loaded on a system (client) from a server if that system is not set up to boot from a server over a network. When the system is set up to boot from a server, the diagnostics are run in the same manner as they are from disk.

- On a full system partition, if the diagnostics are loaded from disk or a server, you must shut down the AIX operating system before turning off the system unit to prevent possible damage to disk data. Do this in either of the following ways:
  - If the diagnostics were loaded in standalone mode, press the F3 key until `DIAGNOSTIC OPERATING INSTRUCTIONS` displays. Then press the F3 key once again to shut down the AIX operating system.
  - If the diagnostics were loaded in maintenance or concurrent mode, type the `shutdown -F` command.
- Under some conditions, the system might stop, with instructions displayed on attached displays and terminals. Follow the instructions to select a console display.

Running the Online Diagnostics in Service Mode with an HMC Attached to the System

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

1. From the HMC, select **Partition Manager**.
2. Right-click on the mouse and select **Open Terminal Window**.
3. From the Service Processor Menu on the virtual terminal, select Option 2 **System Power Control**.
4. Select option 6. Verify that the state changes to `currently disabled`. Disabling fast system boot automatically enables slow boot.
5. Select Option 98 to exit the system power control menu.
6. Use the HMC to power on the managed system in a full system partition by selecting the managed system in the Contents area.
7. Right-click or select the desired system in the Contents area. Next, on the menu, choose **Selected**.
8. Select **Power On**.
9. Select the **Power on Diagnostic Stored Boot list** option. For more information about full system partitions, see "Full System Partition" in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590.
10. Make sure that there are no media in the devices in the media subsystem.
11. Enter any passwords, if requested.

Running the Online Diagnostics in Service Mode with No HMC Attached

Online diagnostics can be loaded by booting from a hard file in the custom boot list by pressing the numeric 6 key on the keyboard.

To boot from the devices listed in the service mode 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.

   Note: If AIX is running, type the `shutdown` command.
3. Wait until the Power-on LED stops flashing and remains off, then press the power button to turn the system on.
4. When the **keyboard** indicator appears during startup, press the numeric 6 key on the keyboard.
5. Enter any requested passwords.

After any requested passwords have been entered, 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 restarts. This action gives the user the opportunity to start the System Management Services (by pressing the number 1 key on a directly attached keyboard or the number 1 on an ASCII terminal) before the system attempts to boot again.

Concurrent Mode

Running the online diagnostics in concurrent mode is started by entering **diag** at an AIX prompt. Use concurrent mode to run online diagnostics on some of the system resources while the system is running normal activity.

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

- SCSI adapters connected to paging devices
- Disk drive used for paging
- Some display adapters and graphics related devices
- Memory (tested during POST)
- Processor (tested during POST)

The following levels of testing exist 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 might 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 **Problem Determination** on the DIAGNOSTIC MODE SELECTION menu.

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

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, do the following:

1. Log in to the AIX operating system as root user or use CE Login.
2. Enter the **diag** command.
3. When the DIAGNOSTIC OPERATING INSTRUCTIONS display, follow the instructions to check out the desired resources.
4. When testing is complete, press the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS. Press the F3 key again to return to the AIX operating system prompt. Be sure to vary on any resource that you had varied to off.
5. Press Ctrl-D to log off from root user or CE Login.

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 partition running the AIX operating system be stopped so that 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 **Problem Determination** on the DIAGNOSTIC MODE SELECTION menu.

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

Documentation for the AIX operating system is available from the IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base. Select **AIX documentation**. The *AIX Documentation* CD contains the base set of publications for the operating system, including system-management and end-user documentation.

Running the Online Diagnostics in Maintenance Mode
To run the online diagnostics in maintenance mode, do the following:

1. Stop all programs running on the partition except the AIX operating system (if help is needed, see the system operator).
2. Log in to the AIX operating system as root user or use CE Login.
3. Type the `shutdown -m` command.
4. When a message indicates the system is in maintenance mode, enter the **diag** command.

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

5. When DIAGNOSTIC OPERATING INSTRUCTIONS screen displays, follow the displayed instructions to check out the desired resources.
6. When testing is complete, press the F3 key to return to DIAGNOSTIC OPERATING INSTRUCTIONS. Press the F3 key again to return to the AIX operating system prompt.
7. Press Ctrl-D to log off from root user or CE Login.

Standalone Diagnostics Operations

Use standalone diagnostics to test the system when the online diagnostics are not installed and as a method of testing the disk drives that cannot be tested by the online diagnostics.

Note: No error log analysis is done by the standalone diagnostics. The CD-ROM drive and the controller that controls it cannot be tested by the standalone diagnostics. Standalone diagnostics:

- Are resident on CD-ROM or a Network Installation Management (NIM) server
- Provide a method to test the system when the online diagnostics are not installed or cannot be loaded from the disk drive
- Allow testing of the disk drives and other resources that cannot be tested by the online diagnostics
- Do not have access to the AIX configuration data
- Do not have access to the AIX error log
- Do not allow for running of error log analysis

Considerations for Running Standalone Diagnostics on a Partitioned System

To run standalone diagnostics on a full system partition, you must reboot the entire system. However, for a partition in a partitioned system, you can boot standalone diagnostics either in a given partition or on the entire system (which is the same procedure as a full system partition). When running in a multiple partitioned system, the device from which you are booting standalone diagnostics must be made available to the partition dedicated to running standalone diagnostics. This might require moving the device from the partition that currently contains the boot device (for example, the CD-ROM or network adapter connected to the NIM server that has a standalone diagnostic image) to the partition used to run standalone diagnostics. Reboot both partitions if you move a device. Devices on a partitioned system are moved on an I/O-slot basis.

The CD-ROM is attached to an integrated adapter in the base system. All integrated devices must be moved together from partition to partition.

Considerations for Running Standalone Diagnostics from CD-ROM

Consider the following when you run standalone diagnostics:

- The diagnostic CD must remain in the CD-ROM drive for the entire time that diagnostics are running.
- The diagnostic CD cannot be ejected from the CD-ROM drive after the diagnostics have loaded. The CD can only be ejected after the system has been turned off and then turned on (standalone mode) or after the diagnostics program has terminated (online concurrent mode).
- The CD-ROM drive from which diagnostics were loaded cannot be tested.
- The adapter (or circuitry) controlling the CD-ROM drive from which diagnostics were loaded cannot be tested.

Loading the Standalone Diagnostics from CD-ROM Using an HMC

To run standalone diagnostics in service mode from CD-ROM, do the following:

1. Stop all programs, including the operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROMs.
3. Power off the system. For more information about full system partitions, see "Full System Management Tasks" in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590.
4. Right-click the mouse and select **Open Terminal Window**.
5. From the service processor menu on the virtual terminal, select option 2, **System Power Control Menu**.
6. Select option 6. Verify that the state changes to `currently disabled`. Disabling fast system boot automatically enables slow boot.
7. Select option 98 to exit the system power control menu.
8. Use the HMC to power on the managed server in a full system partition. Select the **Power on Diagnostic Default Boot List**. For more information about full system partitions, see "Full System Partition" in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590.
9. Insert the CD-ROM into the system's CD-ROM drive (not into the HMC's CD-ROM drive).

Running the Standalone Diagnostics from CD-ROM with No HMC Attached

To 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.

    Note: If AIX is running, type the `shutdown` command. If Linux is running, type the `shutdown now -h` command.
3. Wait until the Power-on LED stops flashing and remains off, then press the power button to turn on the system.
4. Immediately insert the diagnostic CD-ROM into the CD-ROM drive.
5. When or after the word **keyboard** appears during startup, press the numeric 5 key on the keyboard.
6. Enter any requested passwords.

Running Standalone Diagnostics from a Network Installation Management (NIM) Server

A client system connected to a network with a Network Installation Management (NIM) server can boot standalone diagnostics from the NIM server if the client-specific settings on both the NIM server and client are correct.

Notes:

1. All operations to configure the NIM server require root user authority.
2. If you replace the network adapter in the client, the network-adapter hardware-address settings for the client must be updated on the NIM server.
3. The **Cstate** for each standalone diagnostics client on the NIM server should be kept in the *diagnostic boot has been enabled* state.
4. On the client system, the NIM server network adapter should be put in the bootlist after the boot disk drive. This allows the system to boot in standalone diagnostics from the NIM server if there is a problem booting from the disk drive. For information about setting the bootlist, see the **Multiboot** section under "SMS" in the client system's service guide.

NIM Server Configuration

Refer to the "Advanced NIM Configuration Tasks" chapter of the *AIX Installation Guide and Reference*, order number SC23-4389, for information on doing the following:

- Registering a client on the NIM server
- Enabling a client to run diagnostics from the NIM server

Documentation for the AIX operating system is available from the IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base. Select **AIX documentation**. The *AIX Documentation* CD contains the base set of publications for the operating system, including system-management and end-user documentation.

To verify that the client system is registered on the NIM server and the diagnostic boot is enabled, run the **lsnim -a Cstate -Z *ClientName*** command from the command line on the NIM server. Refer to the following table for system responses.

Note: The *ClientName* is the name of the system on which you want to run standalone diagnostics.

System Response	Client Status

`#name:Cstate:`
`ClientName:diagnostic boot has been`
`enabled:`
	The client system is registered on the NIM server and enabled to run diagnostics from the NIM server.

`#name:Cstate:`
`ClientName:ready for a NIM operation:`
 	
or
 	
`#name:Cstate:`
`ClientName:BOS installation has been`
`enabled:`
	The client is registered on the NIM server but not enabled to run diagnostics from the NIM server.
	Note: If the client system is registered on the NIM server but Cstate has not been set, no data will be returned.

`0042-053 lsnim: there is no NIM object` `named "ClientName"`	The client is not registered on the NIM server.

Booting Standalone Diagnostics from the NIM Server on a System with or without an HMC Attached

To run standalone diagnostics on a client from the NIM server, do the following:

1. Remove any removable media (tape or CD-ROM disc).
2. Stop all programs including the operating system (get help if needed).
3. If you are running standalone diagnostics in a full system partition, verify with the system administrator and system users that the system unit can shut down. Stop all programs, including the operating system. Refer to the operating system documentation for **shutdown** command information.

   In a partitioned system, make the CD-ROM drive available to the partition used to run standalone diagnostics (refer to the *IBM Hardware Management Console for pSeries Maintenance Guide*, order number SA38-0590for more information). Verify with the system administrator and system users using that partition that all applications on that partition must be stopped, and that the partition will be rebooted. Stop all programs on that partition, including the operating system.
4. If you are in a full system partition, power on the system unit to run standalone diagnostics. In a partitioned system, reboot the partition to run standalone diagnostics.
5. When the keyboard indicator is displayed (the word **keyboard**), press the number 1 key on the keyboard to display the SMS menu.
6. Enter any requested passwords.
7. Select **Setup Remote IPL (Initial Program Load)**.
8. Enter the client address, server address, gateway address (if applicable), and subnet mask. Exit to the Network Parameters screen.
9. If the NIM server is set up to allow pinging from the client system, use the **ping** utility in the RIPL utility to verify that the client system can ping the NIM server. Under the **ping** utility, choose the network adapter that provides the attachment to the NIM server to do the ping operation. If the ping returns with an `OK` prompt, the client is prepared to boot from the NIM server. If ping returns with a `FAILED` prompt, the client cannot proceed with the NIM boot.

   Note: If the ping fails, contact your service representative.

To do a one-time boot of the network adapter attached to the NIM server network, do the following:

1. Exit to the SMS Main screen.
2. Select **Select Boot Options**.
3. Select **Install or Boot a Device**.
4. On the Select Device Type screen, select **Network**.
5. Set the network parameters for the adapter from which you want to boot.
6. Exit completely from SMS. The system starts loading packets while doing a **bootp** from the network.

Follow the instructions on the screen to select the system console.

- If `Diagnostics Operating Instructions Version x.x.x` displays, standalone diagnostics have loaded successfully.
- If the operating system login prompt displays, standalone diagnostics did not load. Check the following items:
  - The network parameters on the client may be incorrect.
  - Cstate on the NIM server may be incorrect.
  - Network problems might be preventing you from connecting to the NIM server.

Verify the settings and the status of the network. If you continue to have problems, contact your service representative.

Chapter 7. Introducing Tasks and Service Aids

The AIX Diagnostic Package contains programs that are called *Tasks*. Tasks can be thought of as performing a specific function on a resource; for example, running diagnostics or performing a service aid on a resource.

Notes:

1. Many of these programs work on all system model architectures. Some programs are only accessible from Online Diagnostics in Service or Concurrent mode, while others might be accessible only from Standalone Diagnostics.

2. If the system is running on a logically partitioned system, the following tasks can be executed only in a partition with service authority:

   * Configure Reboot Policy
   * Configure Remote Maintenance Policy
   * Configure Ring Indicate Power On
   * Configure Ring Indicate Power-On Policy
   * Update System or Service Processor Flash
   * Save or Restore Hardware Management Policies
   * Configure Scan Dump Policy

To perform one of these tasks, use the **Task Selection** option from the FUNCTION SELECTION menu.

After a task is selected, a resource menu may be presented showing all resources supported by the task.

A fast-path method is also available to perform a task by using the **diag** command and the **-T** flag. By using the fast path, the user can bypass most of the introductory menus to access a particular task. The user is presented with a list of resources available to support the specified task. The fast-path tasks are as follows:
* Certify - Certifies media
* Chkspares - Checks for the availability of spare sectors
* Download - Downloads microcode to an adapter or device
* Disp_mcode - Displays current level of microcode
* Format - Formats media
* Identify - Identifies the PCI RAID physical disks
* IdentifyRemove - Identifies and removes devices (Hot Plug)

To run these tasks directly from the command line, specify the resource and other task-unique flags. Use the descriptions in this chapter to understand which flags are needed for a given task.

Tasks

The following tasks are described in this chapter:
* Add Resource to Resource List
* AIX Shell Prompt
* Analyze Adapter Internal Log
* Backup and Restore Media
* Certify Media
* Change Hardware Vital Product Data
* Configure Dials and LPF Keys
* Configure ISA Adapters
* Configure Reboot Policy
* Configure Remote Maintenance Policy
* Configure Ring Indicate Power-On Policy

- Configure Scan Dump Policy
- Configure Surveillance Policy
- Create Customized Configuration Diskette
- Delete Resource from Resource List
- Disk Maintenance
- Display Configuration and Resource List
- Display Firmware Device Node Information
- Display Hardware Error Report
- Display Hardware Vital Product Data
- Display Machine Check Error Log
- Display Microcode Level
- Display Multipath I/O (MPIO) Device Configuration
- Display or Change Bootlist
- Display or Change Diagnostic Run Time Options
- Display Previous Diagnostic Results
- Display Resource Attributes
- Display Service Hints
- Display Software Product Data
- Display System Environmental Sensors
- Display Test Patterns
- Display USB Devices
- Download Microcode
- Fibre Channel RAID Service Aids
- Flash SK-NET FDDI Firmware
- Format Media
- Gather System Information
- Generic Microcode Download
- Hot Plug Task
- Identify Indicators
- Identify and System Attention Indicators
- Local Area Network Analyzer
- Log Repair Action
- Periodic Diagnostics
- PCI RAID Physical Disk Identify
- Process Supplemental Media
- Run Diagnostics
- Run Error Log Analysis
- Run Exercisers
- Save or Restore Hardware Management Policies
- SCSI Bus Analyzer
- SCSI RAID Physical Disk Status and Vital Product Data
- SCSD Tape Drive Service Aid
- Spare Sector Availability
- SSA Service Aid
- System Fault Indicator
- System Identify Indicator
- Update Disk-Based Diagnostics
- Update System or Service Processor Flash
- 7135 RAIDiant Array Service Aids
- 7318 Serial Communication Network Server

Add Resource to Resource List

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

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

AIX Shell Prompt

Note: Use this service aid in Online Service Mode only.

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

Note: Do not use this task to install code or to change the configuration of the system. This task is intended to view files, configuration records, and data. Using this service aid to change the system configuration or install code can produce unexplained system problems after exiting the diagnostics.

Analyze Adapter Internal Log

The PCI RAID adapter has an internal log that logs information about the adapter and the disk drives attached to the adapter. Whenever data is logged in the internal log, the device driver copies the entries to the AIX system error log and clears the internal log.

The Analyze Adapter Internal Log service aid analyzes these entries in the AIX system error log. The service aid displays the errors and the associated service actions. Entries that do not require any service actions are ignored.

When running this service aid, a menu is presented to enter the start time, the end time, and the file name. The start time and end time have the following format: [*mmddHHMMyy*]. (where *mm* is the month (1-12), *dd* is the date (1-31) *HH* is the hour (00-23) *MM* is the minute (00-59), and *yy* is the last two digits of the year (00-99). The file name is the location where the user wants to store the output data.

To invoke the service aid task from the command line, type:

```
diag -c -d devicename -T "adapela [-s start date -e end date]
```

Flag	Description
-c	Specifies not console mode.
-d *devicename*	
	Specifies the device whose internal log you want to analyze (for example, SCRAID0)
-s *start date*	Specifies all errors after this date are analyzed.
-e *end date*	Specifies all errors before this date are analyzed.
-T	Specifies the Analyze Adapter Internal Log task

Note: To specify a file name from the command line, use the redirection operator at the end of the command to specify where the output of the command is to be sent, for example > `filename` (where `filename` is the name and location where the user wants to store the output data (for example, `/tmp/adaptlog`).

Backup and Restore Media

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 selecting the desired device. It then presents a menu of available backup formats and prompts for selecting the desired format. The supported formats are **tar**, **backup**, and **cpio**. After the device and format are selected, the service aid backs up a known file to the selected device, restores that file to **/tmp**, and compares the original file to the restored file. The restored file remains in **/tmp** to allow for visual comparison. All errors are reported.

Certify Media

This task allows the selection of diskette, DVD-RAM media, or hard files to be certified. Normally, this is done under the following conditions:

- To determine the condition of the drive and media
- To verify that the media is error free after a Format Service Aid has been run on the media

Normally, run certify if after running diagnostics on a drive and its media, no problem is found, but you suspect that a problem still exists.

Hard files can be connected either to a SCSI adapter (non-RAID) or a PCI SCSI RAID adapter. The usage and criteria for a hard file connected to a non-RAID SCSI adapter are different from those for a hard file connected to a PCI SCSI RAID adapter.

Certify Media can be used in the following ways:

- Certify Diskette

  This selection enables you to verify the data written on a diskette. When you select this service aid, 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.

- Certify DVD-RAM media

  This selection reads all of the ID and data fields. It checks for bad data and counts all errors encountered. If an unrecovered error occurs, or recovered errors exceed the threshold value, the data on the media should be transferred to other media and the original media should be discarded.

  The Certify service aid will display the following information:

  – Capacity in bytes
  – Number of Data Errors Not Recovered
  – Number of Equipment Check Errors
  – Number of Recovered Errors

  If the drive is reset during a certify operation, the operation is restarted.

  If the drive is reset again, the certify operation is terminated, and the user is asked to run diagnostics on the drive.

  This task can be run directly from the AIX command line. See the following command syntax: `diag -c -d -T certify`

Flag	Description
-c	No console mode
-d	Specifies a device
-T	Specifies the certify task

- Certify Hardfile Attached to a Non-RAID SCSI Adapter

  This selection reads all of the ID and data fields. It checks for bad data and counts all errors encountered. If there are unrecovered data errors that do not exceed the threshold value, the hard file must be formatted and certified. If the unrecovered data errors, recovered data errors, recovered and unrecovered equipment errors exceed the threshold values, the disk must be replaced.

  It also makes 2000 random seeks after the read certify of the surface completes. If a disk times out before finishing the random seeks, then the disk needs to be replaced. The random seeks also count all errors encountered.

  The Certify service aid will display the following information:

  – Drive capacity in megabytes.
  – Number of Data Errors Recovered.
  – Number of Data Errors Not Recovered.

– Number of Equipment Checks Recovered.

– Number of Equipment Checks Not Recovered.

This task can be run directly from the AIX command line. See the following command syntax: `diag -c -d` *deviceName* `-T "certify"`

Flag   **Description**
-c   No console mode
-d   Specifies a device
-T   Specifies the certify task

- Format and/or Erase Hardfile Attached to a Non-RAID SCSI Adapter

  Attention: The following commands *will* change the content of the hardfile. Be sure to back up data prior to running the command, and take care in choosing the hardfile upon which you run this task.

  – Hardfile Format

  Writes all of the disk. The pattern written on the disk is device-dependant; for example, some drives may write all 0s, while some may write the hexadecimal number 5F. No bad-block reassignment occurs.

  – Hardfile Format and Certify

  Performs the same function as Hardfile Format. After the format is completed, Certify is run. Certify then reassigns all bad blocks encountered.

  – Hardfile 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. 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 **Write Random Pattern**.

  Note: The Erase Disk service aid has not been certified as meeting the Department of Defense or any other organization's security guidelines.

  To overwrite the data on the drive, use the following steps:

  1. Select **Erase Disk**.
  2. Do a format without certify.
  3. Select **Erase Disk** to run it a second time.

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

  1. Format the drive.
  2. Check the defect MAP by running the Erase Disk selection.

     Note: If you use 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 you 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 selection which was used in step 2.

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

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

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

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

This task can be run directly from the AIX command line. See the command syntax: `diag -c -d` *deviceName* `-T "format [-s* fmtcert | erase -a {read | write}] [-F]*`

Flag	Description
fmtcert	Formats and certifies the disk.
erase	Overwrites the data on the disk.
*	Available in no-console mode only.
-F	Force the disk erasure even if all blocks cannot be erased due to errors accessing the grown defect map.

   Note: The Erase Disk option in command line mode uses default values. To selectively read or write, use the **diag** command in console mode.

- Certify Hardfile attached to a PCI SCSI RAID Adapter

  This selection is used to certify physical disks attached to a PCI SCSI RAID adapter. Certify reads the entire disk and checks for recovered errors, unrecovered errors, and reassigned errors. If these errors exceed the threshold values, the user is prompted to replace the physical disk.

  This task can be run directly from the AIX command line. See the following command syntax: `diag -c -d` *RAIDadapterName* `-T "certify {-l` *chID* `| -A}"`

Flag	Description
-c	No console mode
-d	Specifies the RAID adapter to which the disk is attached
-T	Specifies the certify task and its parameters
-l	Specifies physical Disk channel/ID (for example: -l 27)
-A	All disks

Change Hardware Vital Product Data

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

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

Configure Dials and LPF Keys

Note: The Dials and LPF Keys service aid is not supported in standalone mode (CD-ROM and NIM) on systems with 32 MB or less memory. If you have problems in standalone mode, use the hardfile-based diagnostics.

This service aid provides a tool for configuring and removing dials and LPF keys to the asynchronous serial ports.

This selection invokes the SMIT utility to allow Dials and LPF keys configuration. A TTY must be in the available state on the async port before the Dials and LPF keys can be configured on the port. The task allows an async adapter to be configured, then a TTY port defined on the adapter. Dials and LPF keys can then be defined on the port.

Before configuring Dials or LPF keys on a serial port, you must remove all defined TTYs. To determine if there are any defined TTYs, select **List All Defined TTYs**. Once all defined TTYs have been removed, then add a new TTY and configure the Dials or LPF keys.

Configure ISA Adapter

This task uses SMIT to identify and configure ISA adapters on systems that have an ISA bus and adapters.

Diagnostic support for ISA adapters not shown in the list may be supported from a supplemental diskette. You can use the Process Supplemental Media task to add ISA adapter support from a supplemental diskette.

Whenever an ISA adapter is installed, this service aid must be run and the adapter configured before the adapter can be tested. You must also run this service aid to remove an ISA adapter from the system 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 because the system cannot detect the ISA adapter.

Configure Reboot Policy

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

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

Note: Because of system capability, some of the following settings might not be displayed by this service aid.

- Maximum Number of Reboot Attempts

   Enter a number that is 0 or greater.

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

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

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

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

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

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

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

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

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

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

- Call-Out Before Restart (on/off)

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

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

  When enabled, 'Unattended Start Mode' allows the system to recover from the loss of ac power.

  If the system was powered-on when the ac loss occurred, the system reboots when power is restored. If the system was powered-off when the ac loss occurred, the system remains off when power is restored.

You can access this service aid directly from the AIX command line, by typing:
`/usr/lpp/diagnostics/bin/uspchrp -b`

Configure Remote Maintenance Policy

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

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

Note: Because of system capability, some of the following settings might not be displayed by this service aid.

- Configuration File for Modem on serial port 1 (S1)

  Configuration File for Modem on serial port 2 (S2).

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

- Modem file currently loaded on S1

  Modem file currently loaded on S2

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

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

- Call In Authorized on S1 (on/off)

  Call In Authorized on S2 (on/off)

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

- Call Out Authorized on S1 (on/off)

  Call Out Authorized on S2 (on/off)

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

- S1 Line Speed

  S2 Line Speed

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

- Service Center Phone Number

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

- Customer Administration Center Phone Number

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

- Digital Pager Phone Number In Event of Emergency

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

- Customer Voice Phone Number

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

- Customer System Phone Number

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

- Customer Account Number

  This number is available for service providers to use for record-keeping and billing.

- Call Out Policy Numbers to call if failure

  This is set to either First or All. If the call-out policy is set to First, call out stops at the first successful call to one of the following numbers in the order listed:
  1. Service Center
  2. Customer Administration Center
  3. Pager

  If Call Out Policy is set to All, call-out attempts to call all of the following numbers in the order listed:
  1. Service Center
  2. Customer Administration Center
  3. Pager

- Customer RETAIN Login ID Customer RETAIN Login Password

  These settings apply to the RETAIN service function.

- Remote Timeout, in seconds Remote Latency, in seconds

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

- Number of Retries While Busy

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

- System Name (System Administrator Aid)

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

  Note: Knowing the system name aids the support team in quickly identifying the location, configuration, history, and so on of your system.

You can access this service aid directly from the AIX command line, by typing:
`/usr/lpp/diagnostics/bin/uspchrp -m`

Configure Ring Indicate Power-On Policy

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

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

Because of system capability, some of the following settings might not be displayed by this service aid.
- Power On Via Ring Indicate (on/off)
- Number of Rings Before Power On

You can access this service aid directly from the AIX command line, by typing:
`/usr/lpp/diagnostics/bin/uspchrp -r`

Configure Scan Dump Policy

Configure Scan Dump Policy allows the user to set or view the scan dump policy (scan dump control and size) in NVRAM. Scan Dump data is a set of chip data that the service processor gathers after a system malfunction. It consists of chip scan rings, chip trace arrays, and Scan COM (SCOM) registers. This data is stored in the scan-log partition of the system's Nonvolatile Random Access Memory (NVRAM).

Use this service aid to display and change the following settings for the Scan Dump Policy at run time:
* Scan Dump Control (how often the dump is taken)
* Scan Dump Size (size and content of the dump)

The Scan Dump Control (SDC) settings are as follows:
* As Needed: This setting allows the platform firmware to determine whether a scan dump is performed. This is the default setting for the dump policy.
* Always: This setting overrides the firmware recommendations and always performs a dump after a system failure.

The Scan Dump Size (SDS) settings are as follows:
* As Requested - Dump content is determined by the platform firmware.
* Minimum - Dump content collected provides the minimum debug information, enabling the platform to reboot as quickly as possible.
* Optimum - Dump content collected provides a moderate amount of debug information.
* Complete - Dump data provides the most complete error coverage at the expense of reboot speed.

You can access this service aid directly from the AIX command line by typing:

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

Configure Surveillance Policy

Note: This service aid is supported only for systems running in full machine partition.

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

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

Note: Because of system capability, some of the following settings might not be displayed by this service aid:
* Surveillance (on/off)
* Surveillance Time Interval - This is the maximum time between heartbeats from the operating system.
* Surveillance Time Delay - This is the time to delay between when the operating system is in control and when to begin operating system surveillance.
* Changes are to Take Effect Immediately - Set this to Yes if the changes made to the settings in this menu are to take place immediately. Otherwise, the changes take effect beginning with the next system boot.

You can access this service aid directly from the AIX command line, by typing:
`/usr/lpp/diagnostics/bin/uspchrp -s`

Create Customized Configuration Diskette

This selection invokes the Diagnostic Package Utility Service Aid, which allows the user to 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 low function terminal (LFT)

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

- Different async terminal console

  You can create a console configuration file that allows a terminal attached to any RS232 or RS422 adapter to be selected as a console device. The default device is an RS232 TTY device attached to the first standard serial port (S1).

Delete Resource from Resource List

Use this task to delete resources from the resource 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.

Disk Maintenance

This service aid provides the following options for the fixed-disk maintenance:
- Disk to Disk Copy
- Display/Alter Sector

Disk to Disk Copy

Notes:

1. This service aid cannot be used to update to a different size drive. The service aid only supports copying from a SCSI drive to another SCSI drive of similar size.

2. Use the **migratepv** command when copying the contents to other disk drive types. This command also works when copying SCSI disk drives or when copying to a different size SCSI disk drive. Refer to *System Management Guide: Operating System and Devices* for a procedure on migrating the contents of a physical volume.

   This publication is 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.

This selection allows you to recover data from an old drive when replacing it with a new drive. The service aid recovers all logical volume manager (LVM) software reassigned blocks. To prevent corrupted data from being copied to the new drive, the service aid stops if an unrecoverable read error is detected. To help prevent possible problems with the new drive, the service aid stops if the number of bad blocks being reassigned reaches a threshold.

To use this service aid, both the old and new disks must 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 use and the drive be installed in an empty location. If there are no empty locations, then one of the other drives must be removed. When the copy is complete, only one drive can 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 can occur when running this service aid from disk, it is suggested that this service aid be run, when possible, from the diagnostics that are loaded from removable media.

Display/Alter Sector

Note: Use caution when you use this service aid because inappropriate modification to some disk sectors can result in the total loss of all data on the disk.

This selection allows the user to display and alter information on a disk sector. Sectors are addressed by their decimal sector number. Data is displayed both in hex and in ASCII. To prevent corrupted data from being incorrectly corrected, the service aid does not display information that cannot be read correctly.

Display Configuration and Resource List

If a device is not included in the Test List or if you think a Diagnostic Package for a device is not loaded, check by using the Display Configuration and Resource List task. If the device you want to test has a plus (+) sign or a minus (-) sign preceding its name, the Diagnostic Package is loaded. If the device has an asterisk (*) preceding its name, the Diagnostic Package for the device is not loaded or is not available.

This service aid displays the item header only for all installed resources. Use this service aid when there is no need to see the vital product data (VPD). (No VPD is displayed.)

Display Firmware Device Node Information

This task displays the firmware device node information. This service aid is intended to gather more information about individual or particular devices on the system. The format of the output data may differ depending on which level of the AIX operating system is installed.

Display Hardware Error Report

This service aid uses the **errpt** command to view the hardware error log.

The Display Error Summary and Display Error Detail selection provide the same type of report as the **errpt** command. The Display Error Analysis Summary and Display Error Analysis Detail selection provide additional analysis.

Display Hardware Vital Product Data

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

Display Machine Check Error Log

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 an 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 the hard disk, LAN, or standalone media. When booting from Standalone Diagnostics, this service aid converts the logged information 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 the **sysplanar0** diagnostics are running in Problem Determination Mode.

Display Microcode Level

This task is used to display the microcode or firmware levels of currently installed resources. When the **sys0** resource is selected, the task displays the levels of both the system firmware and service processor firmware. **sys0** may not be available in all cases.

You can display the current level of the microcode on an adapter, the system, or a device by using the AIX **diag** command. See the following command syntax: `diag -c -d` *device* `-T "disp_mcode"`

Flag	Description
-c	No console mode.
-d	Used to specify a device.
-T	Use the disp_mcode option to display microcode.

The AIX **lsmcode** command serves as a command line interface to the Display Microcode Level task. For information on the **lsmcode** command, refer to the *AIX Commands Reference* manual.

Display MultiPath I/O (MPIO) Device Configuration

This service aid displays the status of MPIO devices and their connections to their parent devices.

This service aid is capable of sending SCSI commands on each available path regardless of the default MPIO path algorithm. Therefore, it is useful for testing the unused path for integrity.

Run this service aid if it is suspected that there is a problem with the path between MPIO devices and their parent devices.

This service aid is capable of:
- Listing MPIO devices
- Listing the parents of MPIO devices
- Displaying the status and location of specified MPIO devices
- Displaying the hierarchy of MPIO adapters and devices.

If there are no devices with multiple paths, this service aid will not be shown on the "Task Selection" menu.

Access this service aid directly from the AIX command line, by typing:

`/usr/lpp/diagnostics/bin/umpio`

Display or Change Bootlist

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

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

Display or Change Diagnostic Run-Time Options

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 selecting the Run Diagnostic task.

The run-time options are:

*   Display Diagnostic Mode Selection Menus

    This option allows the user to turn on or off displaying the DIAGNOSTIC MODE SELECTION MENU (the default is on).

*   Run Tests Multiple Times

    This option allows the user to turn on or off, or specify a loop count, for diagnostic loop mode (the default is off).

    Note: This option is only displayed when you run the Online Diagnostics in Service Mode.

*   Include Advanced Diagnostics

    This option allows the user to turn on or off including the Advanced Diagnostics (the default is off).

*   Include Error Log Analysis (not available in diagnostics 5.2.0 or later)

    This option allows the user to turn on or off including the Error Log Analysis (ELA) (the default is off).

*   Number of Days Used to Search Error Log

    This option allows the user to select the number of days for which to search the AIX error log for errors when running the Error Log Analysis. The default is seven days, but it can be changed from one to sixty days.

*   Display Progress Indicators

    This option allows the user to turn on or off the progress indicators when running the Diagnostic Applications. The progress indicators, in a box at the bottom of the screen, indicate that the test is being run (the default is on).

*   Diagnostic Event Logging

    This option allows the user to turn on or off logging information to the Diagnostic Event Log (the default is on).

*   Diagnostic Event Log File Size

    This option allows the user to select the maximum size of the Diagnostic Event Log. The default size for the Diagnostic Event Log is 100 KB. The size can be increased in 100 KB increments to a maximum of 1 MB.

Use the **diaggetrto** command to display one or more diagnostic run-time options. Use the following AIX command line syntax:

```
/usr/lpp/diagnostics/bin/diaggetrto [-a] [-d] [-l] [-m] [-n] [-p] [-s]
```

Use the **diagsetrto** command to change one or more diagnostic run-time options. Use the following AIX command line syntax:

```
/usr/lpp/diagnostics/bin/diagsetrto [-a on|off] [-d on|off] [-l size]
[-m on|off] [-n days] [-p on|off]
```

Flag descriptions for the **diaggetrto** and **diagsetrto** commands are as follows:

Flag   Description

-a   Displays or changes the value of the Include Advanced Diagnostics option.

-d   Displays or changes the value of the Diagnostic Event Logging option.

-l   Displays or changes the value of the Diagnostic Event Log File Size. Allowable size are between 100K and 1000K in increments of 100K. The size may never be decreased.

-m   Displays or changes the value of the Display Diagnostic Mode Selection Menu option.

-n   Displays or changes the value of the Number of Days Used To Search the Error Log option. Allowable values are between 1 and 60 days. 7 days is the default.

-p   Displays or changes the value of the Display Progress Indicators option.

-s   Displays all of the diagnostic run-time options.

Display Previous Diagnostic Results

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

This service aid allows a service representative to display results from a previous diagnostic session. When the Display Previous Diagnostic Results option is selected, the user can view up to 25 no trouble found (NTF) and service request number (SRN) results.

This service aid displays Diagnostic Event Log information. You can display the Diagnostic Event Log in a short version or a long version. The Diagnostic Event Log contains information about events logged by a diagnostic session.

This service aid displays the information in reverse chronological order.

This information is not from the AIX operating system error log. This information is stored in the **/var/adm/ras** directory.

You can run the command from the AIX command line by typing: `/usr/lpp/diagnostics/bin/diagrpt`
`[[-o] | [-s mmddyy] | [-a] | [-r]]`

Flag	Description
-o	Displays the last diagnostic results file stored in the **/etc/lpp/diagnostics/data** directory
-s *mmddyy*	Displays all diagnostic result files logged since the date specified
-a	Displays the long version of the Diagnostic Event Log
-r	Displays the short version of the Diagnostic Event Log

Display Resource Attributes

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

Display Service Hints

This service aid reads and displays the information in the CEREADME file from the diagnostics media. This file contains information that is not contained in the publications for this version of the diagnostics. The file also contains information about using this particular version of diagnostics.

Display Software Product Data

This task uses SMIT to display 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 System Environmental Sensors

This service aid displays the environmental sensor information for the system. The information displayed is the sensor name, physical location code, literal value of the sensor status, and the literal value of the sensor reading.

The sensor status can be any one of the following:
- **Normal** - The sensor reading is within the normal operating range.
- **Critical High** - The sensor reading indicates a serious problem with the device. Run diagnostics on sysplanar0 to determine what repair action is needed.
- **Critical Low** - The sensor reading indicates a serious problem with the device. Run diagnostics on sysplanar0 to determine what repair action is needed.
- **Warning High** - The sensor reading indicates a problem with the device. This could become a critical problem if action is not taken. Run diagnostics on sysplanar0 to determine what repair action is needed.
- **Warning Low** - The sensor reading indicates a problem with the device. This could become a critical problem if action is not taken. Run diagnostics on sysplanar0 to determine what repair action is needed.
- **Hardware Error** - The sensor could not be read because of a hardware error. Run diagnostics on sysplanar0 in problem-determination mode to determine what repair action is needed.
- **Hardware Busy** - The system has repeatedly returned a busy indication, and a reading is not available. Try the service aid again. If the problem continues, run diagnostics on sysplanar0 in problem-determination mode to determine what repair action is needed.

This service aid can also be run as a command. You can use the command to list the sensors and their values in a text format, list the sensors and their values in numerical format, or a specific sensor can be queried to return either the sensor status or sensor value.

Run the command by entering one of the following: `/usr/lpp/diagnostics/bin/uesensor -l | -a`
`/usr/lpp/diagnostics/bin/uesensor -t` *token* `-i` *index* `[-v]`

Flag	Description
-l	List the sensors and their values in a text format.
-a	List the sensors and their values in a numerical format. For each sensor, the numerical values are displayed as: *token index status measured value location code*
-t *token*	Specifies the sensor token to query.
-i *index*	Specifies the sensor index to query.
-v	Indicates to return the sensor measured value. The sensor status is returned by default.

Examples

The following are examples from this command:

1. Display a list of the environmental sensors: `/usr/lpp/diagnostics/bin/uesensor -l`

   ```
   Sensor = Fan Speed
   Status = Normal
   Value = 2436 RPM
   Location Code = F1
   Sensor = Power Supply
   Status = Normal
   Value = Present and operational
   Location Code = V1
   Sensor = Power Supply
   ```

Status = Critical low
            Value = Present and not operational
            Location Code = V2

2. Display a list of the environmental sensors in a numerical list: `/usr/lpp/diagnostics/bin/uesensor -a`

    ```
    3 0 11 87 P1
    9001 0 11 2345 F1
    9004 0 11 2 V1
    9004 1 9 2 V2
    ```

3. Return the status of sensor 9004, index 1: `/usr/lpp/diagnostics/bin/uesensor -t 9004 -i 1`

    ```
    9
    ```

4. Return the value of sensor 9004, index 1: `/usr/lpp/diagnostics/bin/uesensor -t 9004 -i 1 -v`

    ```
    2
    ```

Display Test Patterns

This service aid provides a means of adjusting system display units by providing test patterns that can be displayed. The user works through a series of menus to select the display type and test pattern. After the selections are made, the test pattern displays.

Display USB Devices

The following are the main functions of this service aid:

- Display a list of USB controllers on an adapter.
- Display a list of USB devices that are connected to the selected controller.

To run the USB devices service aid, go to the diagnostics ″TASKS SELECTION″ menu, select ″*Display USB Devices*″. From the controller list that displayed on the screen, select one of the items that begins with ″OHCDX″, where ″X″ is a number. A list of devices attached to the controller displays.

Download Microcode

This service aid provides a way to copy microcode to an adapter or device. The service aid presents a list of adapters and devices that use microcode. After the adapter or device is selected, the service aid provides menus to guide you in checking the current level and downloading the needed microcode.

This task can be run directly from the AIX command line. See the following sections for instructions on downloading to a particular type adapter or device.

Download Microcode to PCI SCSI RAID Adapter

See the following command syntax for a PCI SCSI RAID Adapter:
`diag -c -d RAIDadapterName -T "download [-B] [-D] [-P]"`

Flag   Description
-B   Download boot block microcode (default to functional microcode)
-D   Microcode is on diskette (default to **/etc/microcode** directory)
-P   Download the previous level of microcode (default to latest level)

Download Microcode to a PCI-X Dual Channel Adapter

Microcode installation occurs while the adapter and attached drives are available for use. Before installation of the microcode, ensure that there is a current backup of the system available. It is recommended that the installation be scheduled during a non-peak production time period.

Notes:

1. If the source is **/etc/microcode**, the image must be stored in the **/etc/microcode** directory on the system. If the system is booted from a NIM server, the image must be stored in the **usr/lib/microcode** directory of the SPOT the client is booted from.

2. If the source is diskette, the diskette must be in a backup format and the image stored in the **/etc/microcode** directory.

See the following command syntax for a PCI-X Adapter:

```
diag -c -d device_name -T "download [-s {/etc/microcode|diskette}]
[-l {latest|previous}] [-f]"
```

Flag	Description
-c	No console mode. Run without user interaction.
-d	Device name is the name of the adapter.
-f	Force the installation even if the current level of microcode is not on the source.
-l	Level of microcode to install. The default is the latest.
-s	Source of the new microcode image. The default is **/etc/microcode**.
-T	Use the download option to download microcode.

Download Microcode to Disk Drive Attached to a PCI SCSI RAID Adapter

See the following command syntax for a disk drive attached to a PCI SCSI RAID Adapter:

```
diag -c -d RAIDadapterName -T "download {-l chID | -A} [-D] [-P]"
```

Flag	Description
-A	All disk drives
-D	Microcode is on diskette (default to **/etc/microcode** directory)
-l	RAID disk drive-physical disk channel/ID (for example, 27)
-P	Download the previous level of microcode (default to latest level)

Download Microcode to a Fiber Channel Adapter

Microcode installation occurs while the adapter and attached drives are available for use. Before installation of the microcode, ensure that a current backup of the system is available. It is recommended that the installation be scheduled during a non-peak production time period.

Notes:

1. If the source is **/etc/microcode**, the image must be stored in the **/etc/microcode** directory on the system. If the system is booted from a NIM server, the image must be stored in the **usr/lib/microcode** directory of the SPOT the client is booted from.

2. If the source is diskette, the diskette must be in backup format and the image stored in the **/etc/microcode** directory.

See the following command syntax for a Fiber Channel Adapter. `diag -c -d device_name -T "download [-s {/etc/microcode|diskette}] [-l {latest|previous}] [-f]"`

Flag	Description
-c	No console mode. Run without user interaction.
-d	Device name is the name of the adapter.
-T	Use the download option to download microcode.
-s	Source of the new microcode image. Default is **/etc/microcode**.
-l	Level of microcode to install. The default is the latest.
-f	Force the installation even if the current level of microcode is not on the source.

Download Microcode to DVD-RAM Attached to a PCI SCSI Adapter

See the following command syntax for a DVD-RAM attached to a PCI SCSI Adapter:

```
diag [-c] -d cdX -T "download [-s {/etc/microcode|diskette}]
[-l {latest|previous}] [-f]"
```

Flag	Description
-c	No console mode. Run without user interaction
cdX	Device selected, for example, cd0.
-s	Source of the new microcode. The default is **/etc/microcode**.
-l	Level of microcode image to be installed. Latest in default
-f	Install the microcode on the device even if the current level is unavailable on the source.

Download Microcode to Disk Attached to PCI SCSI Adapter

See following command syntax for a disk drive attached to a PCI SCSI adapter:

```
 diag [-c] -d hdiskX -T "download [-s {/etc/microcode|diskette}]
[-l {latest|previous}] [-f]"
```

Flag	Description
-c	No console mode. Run without user interaction
-d *hdiskX*	Selected device, for example, hdisk0.
-T *download*	Download microcode task.
-s	Source of the new microcode. The default is **/etc/microcode**.
-l	Level of microcode image to be installed. Latest in default
-f	Install the microcode on the device even if the current level is unavailable on the source.

Download Microcode to Other Devices

See the following command syntax: `diag -c -d device_name -T "download [-s diskette] [-l previous] [-F]"`

Flag	Description
-F	Force the download microcode even if the current level is unavailable on the source.
-l	Microcode level. Latest is default.
-s	Source of the new microcode. The default is **/etc/microcode**. Default source device is disk.

Fault Indicators

Note: Prior to Diagnostics version 5.1.0.35, this task was also known as the System Fault Indicator task.

This task is used to display or reset the Fault Indicators on the systems that support this function. This task may also be used to set the Fault Indicators for testing purposes, but the Indicators are not set back to normal when you exit this task.

The Fault Indicators are used to identify a fault with the system. These indicators may be set automatically by hardware, firmware, or diagnostics when a fault is detected in the system.

The Fault Indicators are turned off when a Log Repair Action is performed. After a serviceable event is complete, do a System Verification to verify the fix. Also do a Log Repair Action if the test on the resource was good, and that resource had an entry in the error log. If the serviceable event was not a result of an error log entry, use the Log Repair Action Task to turn off the system fault indicator.

For additional information concerning the use of these indicators, refer to the system guide.

Note: The AIX command does not allow you to set the fault indicators to the Fault state.

Use the following command syntax:

```
/usr/lpp/diagnostics/bin/usysfault [-s normal] [-l location code]
```

Flag	**Description**
-s *normal*	Sets the Fault Indicator to the normal state.
-l *location code*	Identifies the resource by physical location code.

When the command is used without the **-s** flag, the current state of the indicator is displayed as normal or attention.

When teh command is used without the **-l** flag, the Primary Enclosure resource is used.

Use the **-l** flag only in systems that have more than one fault indicator.

Note: See also the "Identify and System Attention Indicators" on page 125. Some systems that do not support Fault Indicators have a similar System Attention Indicator.

Fibre Channel RAID Service Aids

The Fibre Channel RAID service aids contain the following functions:

Certify LUN
> This selection reads and checks each block of data in the logical unit number (LUN). If excessive errors are encountered, the user is notified.
>
> You can run this task from the AIX command line. Use the following fast-path command:
>
> `diag -T "certify"`

Certify Spare Physical Disk
> This selection allows the user to certify (check integrity of the data) drives that are designated as spares.
>
> You can run this task from the AIX command line. Use the following fast-path command:
>
> `diag -T "certify"`

Format Physical Disk
> This selection is used to format a selected disk drive.
>
> You can run this task from the AIX command line. Use the following fast-path command:
>
> `diag -T "format"`

Array Controller Microcode Download
> This selection allows the microcode on the Fibre Channel RAID controller to be updated when required.
>
> You can run this task from the AIX command line. Use the following fast-path command:
>
> `diag -T "download"`

Physical Disk Microcode Download
> This selection is used to update the microcode on any of the disk drives in the array.
>
> You can run this task from the AIX command line. Use the following fast-path command:
>
> `diag -T "download"`

Update EEPROM
> This selection is used to update the contents of the electronically erasable programmable read-only memory (EEPROM) on a selected controller.

Replace Controller
> Use this selection when it is necessary to replace a controller in the array.

Flash SK-NET FDDI Firmware

This task allows the Flash firmware on the SysKonnect SK-NET FDDI adapter to be updated.

Format Media

This task allows the selection of diskettes, hardfiles, or optical media to be formatted. Each selection is described below.

Hardfile Attached to SCSI Adapter (non-RAID)

- Hardfile Format

  Writes all of the disk. The pattern written on the disk is device-dependent; for example some drives may write all 0s, while some may write the hexadecimal number 5F. No bad block reassignment occurs

- Hardfile Format and Certify

  Performs the same function as Hardfile Format. After the format is completed, Certify is run. Certify then reassigns all bad blocks encountered.

- Hardfile 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. The patterns are written serially; that is, the first pattern is written to all blocks. The next pattern is written to all blocks, overlaying the previous pattern. A random pattern is written by selecting the **Write Random Pattern?** option.

  Note: The Erase Disk service aid has not been certified as meeting the Department of Defense or any other organization's security guidelines.

  To overwrite the data on the drive, use the following steps :
  1. Select **Erase Disk**.
  2. Do a format without certify.
  3. Select **Erase Disk** to run it a second time.

  For a newly installed drive, you can ensure that all blocks on the drive are overwritten with your pattern by using the following procedure:
  1. Format the drive.
  2. Check the defect MAP by running the **Erase Disk** option.

     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** option which was used in step 2.

     Note: Using the same version of the service aid is only critical if any bad blocks were found in step 3.
  6. Compare the bad blocks which were recorded for the drive in step 3 with those that now appear in the grown defect MAP.

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

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

This task can be run directly from the AIX command line. See the command syntax: `diag -c -d` *deviceName* `-T "format [-s* fmtcert | erase -a {read | write}] [-F]"`

Flag	Description
fmtcert	Formats and certifies the disk.
*	Available in no-console mode only.
-F	Force the disk erasure even if all blocks cannot be erased due to errors accessing grown defect map.

Note: The Erase Disk option in command line mode uses default values. To selectively read or write, use the **diag** command in console mode.

Hardfile Attached to PCI SCSI RAID Adapter

This function formats the physical disks attached to a PCI SCSI RAID adapter. This task can be run directly from the AIX command line. See the following command syntax: `diag -c -d` *RAIDadapterName* `-T "format {-l` *chId* `| -A }"`

Flag	Description
-l	Physical disk channel/ID (An example of a physical disk channel/ID is 27, where the channel is 2 and the ID is 7.)
-A	All disks

Optical Media

Use the following functions to check and verify optical media:

- Optical Media Initialize

  Formats the media without certifying. This function does not reassign the defective blocks or erase the data on the media. This option provides a quick way of formatting the media and cleaning the disk.

  Note: It takes approximately one minute to format the media.

- Optical Media Format and Certify

  Formats and certifies the media. This function reassigns the defective blocks and erases all data on the media.

This task can be run directly from the AIX command line. See the following command syntax: `diag -c -d` *deviceName* `-T "format [-s {initialize | fmtcert} ]"`

Option	Description
initialize	Formats media without certifying
fmtcert	Formats and certifies the media

Diskette Format

This selection formats a diskette by writing patterns to it.

Gather System Information

This service aid uses the AIX snap command to collect configuration information on networks, file systems, security, the kernel, the ODM, and other system components. You can also collect SSA adapter and disk drive configuration data, or AIX trace information for software debugging.

The output of the SNAP service aid can be used by field service personnel, or it can be put on removable media and transferred to remote locations for more extensive analysis.

To use the SNAP task, select **Gather System Information** from the task list. You can select which components you want to collect information for, and where to store the data (hard disk or removable media).

Generic Microcode Download

The Generic Microcode Download service aid provides a means of executing a genucode script from a diskette or tape. The purpose of this generic script is to load microcode to a supported resource.

The genucode program should be downloaded onto diskette or tape in **tar** format while the microcode image itself goes onto another one in **restore** format. Running the Generic Microcode Download task will search for the genucode script on diskette or tape and execute it. It will ask for a Genucode media to be inserted into the drive. The service aid moves the genucode script file to the **/tmp** directory and runs the program that downloads the microcode to the adapter or device.

This service aid is supported in both concurrent and standalone modes from disk, LAN, or loadable media.

Hot Plug Task

The Hot Plug Task provides software function for those devices that support hot-plug or hot-swap capability. This includes PCI adapters, SCSI devices, and some RAID devices. This task was previously known as ″SCSI Device Identification and Removal″ or ″Identify and Remove Resource.″

The Hot Plug Task has a restriction when running in Standalone or Online Service mode; new devices cannot be added to the system unless there is already a device with the same FRU part number installed in the system. This restriction is in place because the device software package for the new device cannot be installed in Standalone or Online Service mode.

Depending on the environment and the software packages installed, selecting this task displays the following subtasks:
- PCI Hot Plug Manager
- SCSI Hot Swap Manager
- RAID Hot Plug Devices

To run the Hot Plug Task directly from the command line, type the following: `diag -T"identifyRemove"`

If you are running the diagnostics in Online Concurrent mode, run the Missing Options Resolution Procedure immediately after removing any device.

If the Missing Options Resolution Procedure runs with no menus or prompts, device configuration is complete. Otherwise, work through the missing options menu to complete device configuration in diagnostics prior to version 5.2.0. In diagnostics version 5.2.0 and later, select the device that has an uppercase `M` in front of it in the resource list so that missing options processing can be done on that resource.

PCI Hot Plug Manager

The PCI Hot Plug Manager task is a SMIT menu that allows you to identify, add, remove, or replace PCI adapters that are hot-pluggable. The following functions are available under this task:
- List PCI Hot Plug Slots
- Add a PCI Hot Plug Adapter
- Replace/Remove a PCI Hot Plug Adapter
- Identify a PCI Hot Plug Slot

- Unconfigure Devices
- Configure Devices
- Install/Configure Devices Added After IPL

The **List PCI Hot Plug Slots** function lists all PCI hot-plug slots. Empty slots and populated slots are listed. Populated slot information includes the connected logical device. The slot name consists of the physical location code and the description of the physical characteristics for the slot.

The **Add a PCI Hot Plug Adapter** function is used to prepare a slot for the addition of a new adapter. The function lists all the empty slots that support hot plug. When a slot is selected, the visual indicator for the slot blinks at the Identify rate. After the slot location is confirmed, the visual indicator for the specified PCI slot is set to the Action state. This means the power for the PCI slot is off and the new adapter can be plugged in.

The **Replace/Remove a PCI Hot Plug Adapter** function is used to prepare a slot for adapter exchange. The function lists all the PCI slots that support hot plug and are occupied. The list includes the slot's physical location code and the device name of the resource installed in the slot. The adapter must be in the Defined state before it can be prepared for hot-plug removal. When a slot is selected, the visual indicator for the slot is set to the Identify state. After the slot location is confirmed, the visual indicator for the specified PCI slot is set to the Action state. This means the power for the PCI slot is off, and the adapter can be removed or replaced.

The **Identify a PCI Hot Plug Slot** function is used to help identify the location of a PCI hot-plug adapter. The function lists all the PCI slots that are occupied or empty and support hot plug. When a slot is selected for identification, the visual indicator for the slot is set to the Identify state.

The **Unconfigure Devices** function attempts to put the selected device, in the PCI hot-plug slot, into the Defined state. This action must be done before any attempted hot-plug function. If the unconfigure function fails, it is possible that the device is still in use by another application. In this case, the customer or system administrator must be notified to quiesce the device.

The **Configure Devices** function allows a newly added adapter to be configured into the system for use. This function should also be done when a new adapter is added to the system.

The **Install/Configure Devices Added After IPL** function attempts to install the necessary software packages for any newly added devices. The software installation media or packages are required for this function.

Standalone Diagnostics has restrictions on using the PCI Hot-Plug Manager. For example:
- Adapters that are replaced must be exactly the same FRU part number as the adapter being replaced.
- New adapters cannot be added unless a device of the same FRU part number already exists in the system, because the configuration information for the new adapter is not known after the Standalone Diagnostics are booted.
- The following functions are not available from the Standalone Diagnostics and will not display in the list:
  - Add a PCI Hot Plug Adapter
  - Configure Devices
  - Install/Configure Devices Added After IPL

You can run this task directly from the command line by typing the following command: `diag -d` *device* `-T"identifyRemove"`

However, note that some devices support both the PCI Hot-Plug task and the RAID Hot-Plug Devices task. If this is the case for the *device* specified, then the Hot Plug Task displays instead of the PCI Hot Plug Manager menu.

More detailed information concerning PCI Hot-Plug Manager can be found in the AIX Operating System, System Management Guide.

SCSI Hot Swap Manager

This task was known as ″SCSI Device Identification and Removal″ or ″Identify and Remove Resources″ in previous releases. This task allows the user to identify, add, remove, and replace a SCSI device in a system unit that uses a SCSI Enclosure Services (SES) device. The following functions are available:
* List the SES Devices
* Identify a Device Attached to an SES Device
* Attach a Device to an SES Device
* Replace/Remove a Device Attached to an SES Device
* Configure Added/Replaced Devices

The **List the SES Devices** function lists all the SCSI hot-swap slots and their contents. Status information about each slot is also available. The status information available includes the slot number, device name, whether the slot is populated and configured, and location.

The **Identify a Device Attached to an SES Device** function is used to help identify the location of a device attached to an SES device. This function lists all the slots that support hot swap that are occupied or empty. When a slot is selected for identification, the visual indicator for the slot is set to the Identify state.

The **Attach a Device to an SES Device** function lists all empty hot-swap slots that are available for the insertion of a new device. After a slot is selected, the power is removed. If available, the visual indicator for the selected slot is set to the Remove state. After the device is added, the visual indicator for the selected slot is set to the Normal state, and power is restored.

The **Replace/Remove a Device Attached to an SES Device** function lists all populated hot-swap slots that are available for removal or replacement of the devices. After a slot is selected, the device populating that slot is Unconfigured; then the power is removed from that slot. If the Unconfigure operation fails, it is possible that the device is in use by another application. In this case, the customer or system administrator must be notified to quiesce the device. If the Unconfigure operation is successful, the visual indicator for the selected slot is set to the Remove state. After the device is removed or replaced, the visual indicator, if available for the selected slot, is set to the Normal state, and power is restored.

Note: Before you remove the device, be sure that no other host is using it.

The **Configure Added/Replaced Devices** function runs the configuration manager on the parent adapters that had child devices added or removed. This function ensures that the devices in the configuration database are configured correctly.

Standalone Diagnostics has restrictions on using the SCSI Hot Plug Manager. For example:
* Devices being used as replacement devices must be exactly the same type of device as the device being replaced.
* New devices may not be added unless a device of the same FRU part number already exists in the system, because the configuration information for the new device is not known after the Standalone Diagnostics are booted.

You can run this task directly from the command line. See the following command syntax:

```
diag -d device-T"identifyRemove"
OR
diag [-c] -d device -T"identifyRemove -a [identify|remove]"
```

Flag   Description

-a   Specifies the option under the task.

-c   Run the task without displaying menus. Only command line prompts are used. This flag is only applicable when running an option such as identify or remove.

-d   Indicates the SCSI device.

-T   Specifies the task to run.

RAID Hot Plug Devices

This task allows the user to identify, or remove a RAID device in a system unit that uses a SCSI Enclosure Services (SES) device. The following subtasks are available:

*   **Normal**
*   **Identify**
*   **Remove**

The **Normal** subtask is used to return a RAID hot plug device to its normal state. This subtask is used after a device has been identified or replaced. This subtask lists all channel/IDs of the RAID and the status of the devices that are connected. A device in its normal state has power and the check light is off.

The **Identify** subtask is used to identify the physical location of a device or an empty position in the RAID enclosure. This subtask lists all channel/IDs of the RAID and the status of the devices that are connected to the RAID enclosure. If a device is attached to the selected channel/ID, the check light on the device will begin to flash. If the channel/ID does not have a device attached, the light associated with the empty position on the enclosure will begin to flash.

The **Remove** subtask is used to put the RAID hot plug device in a state where it can be removed or replaced. This subtask lists all channel/IDs of the RAID adapter that have devices that can be removed. Only devices with a status of `Failed`, `Spare`, `Warning`, or `Non Existent` can be removed. A device's status can be changed with the AIX **smitty pdam** command. After a device is selected for removal, the check light on the device will begin to flash, indicating that you may physically remove that device.

Standalone Diagnostics has restrictions on using the RAID Hot Plug Manager:

*   Devices being used as replacement devices must be exactly the same type of device as the device being replaced.
*   New devices may not be added unless a device of the same FRU part number already exists in the system because the configuration information for the new device is not known after the Standalone Diagnostics are booted.

You can run this task directly from the command line. See the following command syntax:

```
diag -c -d <device name> -T "identifyRemove -l <ChId> -s {identify|remove|normal}
```

Flags   **Description**

-c   Run the task without displaying menus. Only command line prompts are used.

-d   Raid adapter device name (for example, `scraid0`).

-s   Subtask to execute such as identify, remove, or normal.

-l   *CHId* is the channel number of the RAID adapter and SCSI ID number of the position in the enclosure concatenated together (for example, 27 for channel 2, device 7).

-T   Task to run.

Identify Indicators

See the "Identify and System Attention Indicators" on page 125 for a description of the Identify Indicators task.

Identify and System Attention Indicators

Note: Prior to Diagnostics version 5.1.0.35, this task may also have been known as the System Identify Indicator or Identify Indicators task.

This task is used to display or set the Identify Indicators and the single system attention indicator on the systems that support this function.

Some systems may support the Identify Indicators or the Attention Indicators. The Identify Indicator is used to help physically identify the system in a large equipment room. The Attention Indicator is used to help physically identify a system with a fault in a large equipment room.

When a fault has been detected on a system that supports the Attention Indicator, the Indicator is set to an Attention condition. After the failing system has been identified and the problem fixed, the Attention Indicator changes back to normal. This should be done by the Log Repair Action Task.

Note: It is important to run the Log Repair Action function. This action keeps the Fault Indicator from going back to the Fault state due to a previous error in the error log that has already been serviced.

For additional information concerning the use of this indicator, refer to the service guide.

This task can also be run directly from the command line by typing

`/usr/lpp/diagnostics/bin/usysident [-s {normal | identify}] [-l location code]`

Flag   **Description**
-s {normal | identify}
        Sets the state of the System Identify Indicator to either normal or identify.
-l *location code*
        Identifies the resource by physical location code.

When this command is used without the **-l** flag, the Primary Enclosure resource is used.

Use the **-l** flag only in systems that have more than one Identify and System attention indicator.

When this command is used without **-s** flag, the current state of the identify indicator is displayed.

For more information on the tasks, see Chapter 7, "Introducing Tasks and Service Aids", on page 99.

Local Area Network Analyzer

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

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

Log Repair Action

The Log Repair Action task logs a repair action in the AIX Error Log. A Repair Action log indicates that a FRU has been replaced, and error log analysis should not be done for any errors logged before the repair action. The Log Repair Action task lists all resources. Replaced resources can be selected from the list, and when **commit** (F7 key) is selected, a repair action is logged for each selected resource.

Periodic Diagnostics

This selection provides a tool for configuring periodic diagnostics and automatic error log analysis. You can select a hardware resource to be tested once a day, at a user-specified time.

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 either sent to the Service Focal Point when there is an attached HMC, or a mail message to the users belonging to the system group containing information about the failure, such as the 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 or enable automatic error log analysis

PCI RAID Physical Disk Identify

For a description of the PCI RAID Physical Disk Identify task, see "SCSI RAID Physical Disk Status and Vital Product Data" on page 130.

Process Supplemental Media

Process Supplemental Media contains all the necessary diagnostic programs and files required to test a particular resource. The supplemental media is normally released and shipped with the resource as indicated on the diskette label. Diagnostic Supplemental Media must be used when the device support has not been incorporated into the latest diagnostic CD-ROM.

This task processes the Diagnostic Supplemental Media. Insert the supplemental media when you are prompted; then press Enter. After processing has completed, go to the Resource Selection list to find the resource to test.

Notes:
1. This task is supported in Standalone Diagnostics only.
2. Process and test one resource at a time. Run diagnostics after each supplemental media is processed. (for example; If you need to process two supplemental media, run diagnostics twice, once after each supplement media is processed.)

Run Diagnostics

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 depend on the state of the diagnostics run-time options. See "Display or Change Diagnostic Run-Time Options" on page 112.

Run Error Log Analysis

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

Run Exercisers

The Run Exercisers task provides a tool to troubleshoot intermittent system problems, to test hardware, and to verify replacement parts. When AIX error logging is enabled, the Run Error Log Analysis task can be used to analyze errors after the exerciser completes. Hardware errors are logged in the AIX Error Log. Miscompares and recoverable errors are not reported. However, they may be logged in the AIX Error Log when logging thresholds are exceeded.

The diagnostic supervisor typically sets up temporary work files in the **/tmp** directory to log messages and device statistics. These files are deleted before an exerciser session begins. In addition to individual exerciser requirements, the following requirements pertain to all exercisers:
- Only supported in concurrent or service modes
- Not supported from standalone diagnostics
- System performance will be degraded while running the exerciser, so it is recommended that customer applications be shut down before it is run.
- At least 1 MB of free storage in the **/tmp** directory is available

From the TASK SELECTION LIST menu select **Run Exercisers**. The RESOURCES SELECTION LIST menu displays. From this menu, choose the resources you want to exercise, and then select **commit** to start the **Run Exerciser** task. An intermediate pop-up window might display, stating system performance will be degraded. (The pop-up window does not display if the task had previously been selected). Press Enter and the EXERCISER OPTIONS menu prompts for the type of test to run.

The EXERCISER OPTIONS menu displays the following options:
- **Option 1 - Short Exercise.** Exercises the resources within a relatively short time and exits.
- **Option 2 - Extended Exercise.** Allows greater flexibility and control over resources and test duration.

After choosing the **Short Exercise** option, additional menus, pop-up windows and prompts may display for each resource. Read any text and carefully complete any prompts before committing. The exercisers start, and the **Device Status Screen** displays. The exercisers runs 5 to 10 minutes depending on the number of processors, processor speed, memory size, and I/O configuration.

After choosing the **Extended Exercise** option, additional menus, pop-up windows and prompts may display for each resource. Read any text and carefully fill out any prompts before committing. The **System Exerciser Main Menu** displays. From this menu, the exercisers can be activated through:
- Option 1 - Short Exercise
- Option 2 - Extended Exercise
- Option x (where exercises are exited)

For information about using other available options, see the help text.

When the task completes, any errors that were encountered are displayed for review. Finally, an **Exerciser Complete** pop-up window displays.

To continue, press Enter. The TASK SELECTION LIST menu displays.

If miscompare errors were encountered, run diagnostics on the resource. If the problem is not reported, contact your service support structure. If any other error were encountered, select and run the Error Log Analysis task. If Error Log Analysis does not report a problem, contact your service support structure.

Exerciser Commands (CMD)

Use the following commands as needed in the exerciser menus and reports. Not all commands are available in each menu or report.

CMD   Description

a	Acknowledge an error
b	Back one page
c	Toggle between cycle count and last error
e	View the AIX error log
f	Page forward one page
q	Return to Main Menu
r	Refresh screen
s	Enable or disable beep on error
x	Exit system exerciser

Abbreviations

The following list describes abbreviations used in the exerciser reports.

Acronym	Description
COE	Continue on error (use number to select).
CP	Device has run the specified number of cycles and is not running.
DD	The exerciser has been terminated by a signal.
ER	Device has stopped with an error.
HG	The device is hung.
HOE	Halt on error (use number to select).
RN	Device is running.
ST	Device is stopped.

Memory Exerciser

The memory exerciser is labeled mem0. The exerciser requests as many memory buffers as possible from AIX. The exerciser fills these buffers with specified bit patterns and then compares them to the original bit patterns. If memory is removed as a result of processors being reconfigured dynamically, the exerciser terminates.

On systems with multiple processors, a process is started for each processor. The free memory space is split evenly between the available processors, thus reducing the time required to exercise all of the memory.

Running this service aid requires 128 KB of free space in **/etc/lpp/diagnostics/data**.

Tape Exerciser

The tape exerciser is labeled rmt$x$, where x is the number of a specific device. The exerciser performs read, write, and compare operations using known data patterns. A tape device and Test Diagnostic Cartridge are required to run this exerciser. The actual Test Diagnostics Cartridge depends upon the specific tape device being tested. The exerciser automatically rewinds the tape. Test Requirements are:
• Tape device
• Test Diagnostic Cartridge (the part number depends upon tape device)

Diskette Exerciser

The diskette exerciser is labeled fd$x$, where x is the number of a specific device. The exerciser performs read, write, and compare operations using known data patterns. A scratch diskette is required to run this exerciser, data on the scratch diskette is destroyed. Test requirements are:
• Diskette device
• Scratch diskette (data on diskette is destroyed)

CD-ROM Exerciser

The CD-ROM exerciser is labeled cd$x$, where x is the number of a specific device. The exerciser performs read and compare operations using known data patterns. A CD-ROM device and a Test Disc is required to run this exerciser. Test requirements are:

- CD-ROM device
- Test Disc P/N 81F8902

Floating Point Exerciser

The floating point exerciser is labeled `procx`, where x is the number of the processor containing the floating point unit. The exerciser performs load/store and arithmetic operations using floating point registers and instructions. The floating point instructions are executed using static values and the outcome of the operation is compared with the expected result. Any mismatch results in an error condition. If the processor is in use by the exerciser and is removed as a result of dynamic logical partitioning, the exerciser terminates.

Save or Restore Hardware Management Policies

Use this service aid to save or restore the settings from Ring Indicate Power-On Policy, Surveillance Policy, Remote Maintenance Policy and Reboot Policy. The following options are available:

- Save Hardware Management Policies

  This selection writes all of the settings for the hardware-management policies to the following file: **/etc/lpp/diagnostics/data/hmpolicies**

- Restore Hardware Management Policies

  This selection restores all of the settings for the hardware-management policies from the contents of the following file: **/etc/lpp/diagnostics/data/hmpolicies**

You can access this service aid directly from the AIX command line, by typing:
`/usr/lpp/diagnostics/bin/uspchrp -a`

SCSI Bus Analyzer

This service aid allows you to diagnose a SCSI bus problem in a freelance mode.

To use this service aid, the user should understand how a SCSI bus works. Use this service aid when the diagnostics cannot communicate with anything on the SCSI bus and cannot isolate the problem. Normally the procedure for finding a problem on the SCSI bus with this service aid is to start with a single device attached, ensure that it is working, then start adding additional devices and cables to the bus, ensuring that each one works. This service aid works with any valid SCSI bus configuration.

The SCSI Bus Service Aid transmits a SCSI Inquiry command to a selectable SCSI Address. The service aid then waits for a response. If no response is received within a defined amount of time, the service aid displays a timeout message. If an error occurs or a response is received, the service aid then displays one of the following messages:

- `The service aid transmitted a SCSI Inquiry Command and received a valid response back without any errors being detected.`
- `The service aid transmitted a SCSI Inquiry Command and did not receive any response or error status back.`
- `The service aid transmitted a SCSI Inquiry Command and the adapter indicated a SCSI bus error.`
- `The service aid transmitted a SCSI Inquiry Command and an adapter error occurred.`
- `The service aid transmitted a SCSI Inquiry Command and a check condition occur.`

When the SCSI Bus Service Aid is started a description of the service aid displays.

Pressing the Enter key displays the Adapter Selection menu. Use this menu to enter the address to transmit the SCSI Inquiry Command.

When the adapter is selected, the SCSI Bus Address Selection menu displays. Use this menu to enter the address to transmit the SCSI Inquiry Command.

After the address is selected, the SCSI Bus Test Run menu displays. Use this menu to transmit the SCSI Inquiry Command by pressing Enter. The service aid then indicates the status of the transmission. When the transmission is completed, the results of the transmission displays.

Notes:
1. A Check Condition can be returned when the bus or device is working correctly.
2. If the device is in use by another process, AIX does not send the command.

SCSI RAID Physical Disk Status and Vital Product Data

Note: This task was previously known as the PCI RAID Physical Disk Identify task.

Use this service aid when you want to look at the vital product data for a specific disk attached to a RAID adapter.This service aid displays all disks that are recognized by the PCI RAID adapter, along with their status, physical location, microde level, and other vital product data. The physical location of a disk consists of the channel number of the RAID adapter and the SCSI ID number of the position in the enclosure. The microde level is listed next to the physical location of the disk.

You can run this task directly from the command line with the following command syntax:

```
diag -c -d < device name > -T "identify"
```

Flags Description

-c   Run the task without displaying menus. Only command line prompts are used.

-d   RAID adapter device name (for example, `scraid0`).

-T   Task to run.

SCSD Tape Drive Service Aid

This service aid allows you to obtain the status or maintenance information from a SCSD tape drive. Not all models of SCSD 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 displays on the screen, as well as a message regarding whether the drive is recommended to be cleaned.
- Copy a tape drive's trace table. The trace table of the tape drive is written to diskettes or a file. The diskettes must be formatted for DOS. Writing the trace table may require several diskettes. The actual number of diskettes is determined by the size of the trace table. Label the diskettes as follows:

  TRACE*x*.DAT (where *x* is a sequential diskette number). The complete trace table consists of the sequential concatenation of all the diskette data files.

  When the trace table is written to a disk file, the service aid prompts for a file name. The default name is: **/tmp/TRACE.***x*, where *x* is the AIX name of the SCSD tape drive being tested.
- Display or copy a tape drive's log sense information. The service aid provides options to display the log sense information to the 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 to the diskette. The service aid prompts for a file name when you have selected that the log sense data is to be copied to a file.

This service aid can be run directly from the AIX command line. See the following command syntax (path is **/usr/lpp/diagnostics/bin/utape**):

```
utape [-h | -?] [-d device] [-n | -l | -t]
OR
utape -c -d device [-v] {-n | {-l | -t} { -D | -f [ filename]}}
```

Flag   Description

-c   Run the service aid without displaying menus. The return code indicates success or failure. The
         output is suppressed except for the usage statement and the numeric value for hours since
         cleaning (if **-n** and **-D** flags are used).

-D   Copy data to diskette.

-f   Copy data to the file name given after this flag or to a default file name if no name is specified.

-h, -? Display a usage statement and/or return code. If the **-c** flag is present, only the return code
         displays to indicate the service aid did not run. If the **-c** is not used, a usage statement displays
         and the service aid exits.

-l   Display or copy log sense information.

-n   Display time since drive was last cleaned.

-t   Copy trace table.

-v   Verbose mode. If the **-c** flag is present, the information displays on the screen. If the **-n** flag is
         present, the information about tape-head cleaning is printed.

Spare Sector Availability

This selection 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 must be backed up and replaced.
Formatting the disk does not improve the availability of spare sectors.

You can run this task directly from the AIX command line. See the following command syntax: `diag -c -d`
deviceName `-T chkspares`

SSA Service Aid

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

System Fault Indicator

For a description of the System Fault Indicator task, see "Fault Indicators" on page 117.

System Identify Indicator

For a description of the System Fault Indicator task, see "Identify and System Attention Indicators" on
page 125.

Update Disk-Based Diagnostics

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

This task invokes the SMIT Update Software by Fix (APAR) task. The task allows the input device and APARs to be selected. You can install any APAR using this task.

Update System or Service Processor Flash

Attention: If the system is running on a logically partitioned system, ask the customer or system administrator if a service partition has been designated.

- If a service partition has been designated, ask the customer or system administrator to shut down all of the partitions except the one with service authority. The firmware update can then be done using the service aid or the AIX command line in that partition.
- If a service partition has not been designated, the system must be shut down. If the firmware update image is available on backup diskettes, the firmware update can then be done from the service processor menus as a privileged user. If the firmware update image is in a file on the system, reboot the system in a full system partition and use the following normal firmware update procedures.

If the system is already in a full system partition, use the following normal firmware update procedures.

This selection updates the system or service processor flash.

Look for additional update and recovery instructions with the update kit. You need to know the fully qualified path and file name of the flash update image file provided in the kit. If the update image file is on a diskette, the service aid can list the files on the diskette for selection. The diskette must be a valid backup format diskette.

Refer to the update instructions with the kit, or the service guide for the system unit to determine the current level of the system unit or service processor flash memory.

When this service aid is run from online diagnostics, the flash update image file is copied to the **/var** file system. It is recommended that the source of the microcode that you want to download be put into the **/etc/microcode** directory on the system. If there is not enough space in the **/var** file system for the new flash update image file, an error is reported. If this error occurs, exit the service aid, increase the size of the **/var** file system, and retry the service aid. After the file is copied, a screen requests confirmation before continuing with the flash update. When you continue the update flash, the system reboots using the **shutdown -u** command. The system does not return to the diagnostics, and the current flash image is not saved. After the reboot, you can remove the **/var/update_flash_image** file.

When this service aid is run from standalone diagnostics, the flash update image file is copied to the file system from diskette or from the NIM server. Using a diskette, the user must provide the image on backup format diskette because the user does not have access to remote file systems or any other files that are on the system. If using the NIM server, the microcode image must first be copied onto the NIM server in the **/usr/lib/microcode** directory pointed to the NIM SPOT (from which you plan to have the NIM client boot standalone diagnostics) prior to performing the NIM boot of diagnostics. Next, a NIM check operation must be run on the SPOT containing the microcode image on the NIM server. After performing the NIM boot of diagnostics one can use this service aid to update the microcode from the NIM server by choosing the **/usr/lib/microcode** directory when prompted for the source of the microcode that you want to update. If not enough space is available, an error is reported, stating additional system memory is needed. After the file is copied, a screen requests confirmation before continuing with the flash update. When you continue with the update, the system reboots using the **reboot -u** command. You may receive a `Caution: some process(es) wouldn't die` message during the reboot process, you can ignore this message. The current flash image is not saved.

You can use the **update_flash** command in place of this service aid. The command is located in the **/usr/lpp/diagnostics/bin** directory. The command syntax is as follows:

```
update_flash [-q] -f file_name
update_flash [-q] -D device_name -f file_name
update_flash [-q] -D update_flash [-q] -D device_name -l
```

Attention: The **update_flash** command reboots the entire system. Do not use this command if more than one user is logged in to the system.

Flag   **Description**

-D   Specifies that the flash update image file is on diskette. The *device_name* variable specifies the diskette drive. The default *device_name* is /dev/fd0.

-f   Flash update image file source. The *file_name* variable specifies the fully qualified path of the flash update image file.

-l   Lists the files on a diskette, from which the user can choose a flash update image file.

-q   Forces the **update_flash** command to update the flash EPROM and reboot the system without asking for confirmation.

7135 RAIDiant Array Service Aid

The 7135 RAIDiant Array service aids contain the following functions:

*   Certify LUN

    Reads and checks each block of data in the logical unit number (LUN). If excessive errors are encountered, the user is notified.
*   Certify Spare Physical Disk

    Allows the user to certify (check the integrity of the data) on drives designated as spares.
*   Format Physical Disk

    Formats a selected disk drive.
*   Array Controller Microcode Download

    Allows the microcode on the 7135 controller to be updated when required.
*   Physical Disk Microcode Download

    Updates the microcode on any of the disk drives in the array.
*   Update EEPROM

    Updates the contents of the EEPROM on a selected controller.
*   Replace Controller

    Replaces a controller in the array.

Command Examples

To download the adapter microcode, use this command syntax: `diag -c -d` *deviceName* `-T "download [-B][-D][-P]"`

Flag   **Description**
-B   Download boot block microcode (default to functional microcode)
-D   Microcode is on diskette (default to **/etc/microcode** directory)
-P   Download the previous level of microcode (default to latest level)

To download physical disk microcode, use this command syntax : `diag -c -d` *deviceName* `-T "download -l` *ChId* `[-D][-P]"`

Flag   **Description**
-D   Microcode is on diskette (default to /etc/microcode directory)
-l   Physical disk channel/ID (for example, 27)
-P   Download the previous level of microcode (default to latest level)

To format a physical disk, use this command syntax: `diag -c -d` *deviceName* `-T "format -l` *ChId*"

Flag   **Description**
-l   Physical disk channel/ID (for example, 27)

To certify a physical disk, use this command syntax: `diag -c -d` *deviceName* `-T "certify -l` *ChId*"

Flag   **Description**
-l   Physical disk channel/ID (for example, 23)

To identify a physical disk, use this command syntax: `diag -c -d` *deviceName* `-T "identify"`

7318 Serial Communications Network Server Service Aid

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

Chapter 8. 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.

Running System Verification When Not Connected to a Hardware Management Console (HMC)

If you are not connected to an HMC, perform the following procedure. If you are connected to an HMC, go to "Running System Verification When Connected to an HMC" on page 138.

Step 1. Considerations Before Running This Procedure

Read the following before using this procedure:

- An operating system must be installed on your system before this procedure is performed.
- If this system unit is directly attached to another system unit or attached to a network, be sure communication with the other systems is 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, an ASCII terminal attached to the S1 port, or an HMC connected to an HMC port on the system.
- 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 sequences you need in order to respond to the diagnostics.
- 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.
- If your system is connected to an HMC, refer to "Step 1. Run Online Diagnostics in Service Mode" on page 138.

Step 2. Load the Diagnostics

Note: If the system is in standby mode (Power-On LED on the operator panel is slowly blinking and the operator panel displays `OK`), or if your system is not running and is not connected to an HMC, go to step 4. If you are connected to an HMC, go to "Step 1. Run Online Diagnostics in Service Mode" on page 138.

To load the diagnostics on a system that is not connected to an HMC, do the following:

1. Stop all application programs running on the operating system.
2. If AIX is the operating system, stop the operating system by logging in as root and typing `shutdown`.
3. Wait for the system to go into standby mode.
   - The operator panel LED starts to blink at a slow rate.
   - The `OK` message displays in the operator panel.

   The following figure shows the operator panel and the locations of operator panel components that are referred to in this procedure.
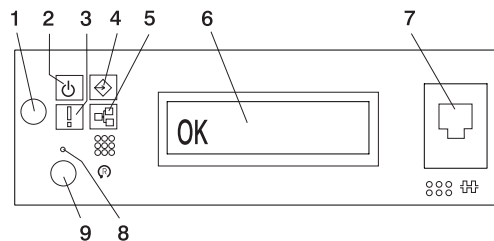
1 Power-On Button		**6** Operator Panel Display	
2 Power-On LED		**7** (FS1) Front Serial Connector (RJ-48 Connector)	
3 Attention LED		**8** Service Processor Reset Switch (Pinhole)	
4 SCSI Port Activity		**9** System Reset Button	
5 Ethernet Port Activity			

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. Run the Verification Procedure

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

1. Press Enter.
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, with minimal 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; the diagnostics may instruct you to install wrap plugs to better isolate a problem.
4. Select the **System Verification** option on the Diagnostic Mode Selection menu.
5. If you want to run a general checkout of all installed resources, select the **All Resource** option on the Diagnostic Selection menu.

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

The checkout programs end with either of the following results:

- The Testing Complete menu displays with 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.

Step 4. Perform 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. Stop the Diagnostics".

Step 5. Stop 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 system passed all the diagnostic tests, the verification process is complete and your system is ready to use.

Running System Verification When Connected to an HMC

Run the following procedure only if you are connected to an HMC.

Step 1. Run Online Diagnostics in Service Mode

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

1. From the HMC, select the **Partition Manager**.
2. Right-click on the mouse and select **Open Terminal Window**.
3. From the Service Processor Menu on the VTERM, select Option 2 **System Power Control**.
4. Select option 6. Verify that the state changes to `currently disabled`. Disabling fast system boot automatically enables slow boot.
5. Select Option 98 to exit the system power control menu.
6. Power on the managed system in a full system partition by selecting the managed system in the Contents area.
7. Right-click or select the desired system in the Contents area. Next, on the menu, choose **Selected**.
8. Select **Power On**.
9. Select the **Power on Diagnostic Stored Boot list** option. For more information about full system partitions, see "Full System Management Tasks" in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590.
10. Make sure that there is no media in the devices in the media subsystem.
11. Enter any passwords, if requested.

> **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 2. Run the Verification Procedure

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

1. Press Enter.
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, with minimal 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; the diagnostics may instruct you to install wrap plugs to better isolate a problem.
4. Select the **System Verification** option on the Diagnostic Mode Selection menu.
5. If you want to run a general checkout of all installed resources, select the **All Resource** option on the Diagnostic Selection menu.

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

The checkout programs end with either of the following results:

- The Testing Complete menu displays with 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.

Step 3. Perform 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 4. Stop the Diagnostics".

Step 4. Stop 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 system passed all the diagnostic tests, the verification process is complete and your system is ready to use.

Standalone Diagnostics Operations

Refer to ″Standalone Diagnostics Operations″ in Chapter 6, "Using the Online and Standalone Diagnostics", on page 91 to test the system when the online diagnostics are not installed and as a method of testing the disk drives that cannot be tested by the online diagnostics.

Note: No error log analysis is done by the standalone diagnostics. The CD-ROM drive and the controller that controls it cannot be tested by the standalone diagnostics. Standalone diagnostics:

- Are resident on CD-ROM or a Network Installation Management (NIM) server
- Provide a method to test the system when the online diagnostics are not installed or cannot be loaded from the disk drive
- Allow testing of the disk drives and other resources that cannot be tested by the online diagnostics
- Do not have access to the AIX configuration data
- Do not have access to the AIX error log
- Do not allow for running of error log analysis

Performing Slow Boot

To fully analyze all of the available information, perform the following steps before doing a hardware repair or replacement:

1. Record the 8-character error code (and location code if present) in the operator panel or that was reported by the customer.

2. Do a slow-mode boot in service mode. This boot can be specified using the System Power Control Menu on the service processor main menu. (A fast-mode boot skips much of the built-in diagnostic testing.) A slow-mode boot may yield a new 8-character error code on the operator panel and new errors in the service processor error log. If a new error code is reported, use this code to continue problem analysis.

Considerations for Running Standalone Diagnostics on a Partitioned Systems

To run standalone diagnostics on a full system partition, you must reboot the entire system. However, for a partition in a partitioned system, you can boot standalone diagnostics either in a given partition or on the

entire system (which is the same procedure as a full system partition). When running in a multiple partitioned system, the device from which you are booting standalone diagnostics must be made available to the partition dedicated to running standalone diagnostics. This might require moving the device from the partition that currently contains the boot device (for example, the CD-ROM or network adapter connected to the NIM server that has a standalone diagnostic image) to the partition used to run standalone diagnostics. Reboot both partitions if you move a device. Devices on a partitioned system are moved on an I/O-slot basis.

The CD-ROM is attached to an integrated adapter in the base system. All integrated devices must be moved together from partition to partition.

Running Standalone Diagnostics from a Network Installation Management (NIM) Server with an HMC Attached to the System

A client system connected to a network with a Network Installation Management (NIM) server can boot standalone diagnostics from the NIM server if the client-specific settings on both the NIM server and client are correct.

Notes:

1. All operations to configure the NIM server require root user authority.
2. If you replace the network adapter in the client, the network-adapter hardware-address settings for the client must be updated on the NIM server.
3. The **Cstate** for each standalone diagnostics client on the NIM server should be kept in the *diagnostic boot has been enabled* state.
4. On the client system, the NIM server network adapter should be put in the bootlist after the boot disk drive. This allows the system to boot in standalone diagnostics from the NIM server if there is a problem booting from the disk drive. For information about setting the bootlist, see the **Multiboot** section under "SMS" in the client system's service guide.

NIM Server Configuration

Refer to the "Advanced NIM Configuration Tasks" chapter of the *AIX Installation Guide and Reference*, order number SC23-4389, for information on doing the following:

- Registering a client on the NIM server
- Enabling a client to run diagnostics from the NIM server

Documentation for the AIX operating system is available from the IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base. Select **AIX documentation**. The *AIX Documentation* CD contains the base set of publications for the operating system, including system-management and end-user documentation.

To verify that the client system is registered on the NIM server and the diagnostic boot is enabled, run the **lsnim -a Cstate -Z *ClientName*** command from the command line on the NIM server. Refer to the following table for system responses.

Note: The *ClientName* is the name of the system on which you want to run standalone diagnostics.

System Response	Client Status

`#name:Cstate:`
`ClientName:diagnostic boot has been`
`enabled:`
	The client system is registered on the NIM server and enabled to run diagnostics from the NIM server.

`#name:Cstate:`
`ClientName:ready for a NIM operation:`
 	
or
 	
`#name:Cstate:`
`ClientName:BOS installation has been`
`enabled:`
	The client is registered on the NIM server but not enabled to run diagnostics from the NIM server.
	Note: If the client system is registered on the NIM server but Cstate has not been set, no data will be returned.

`0042-053 lsnim: there is no NIM object` `named "ClientName"`	The client is not registered on the NIM server.

Client Configuration and Booting Standalone Diagnostics from the NIM Server

To run standalone diagnostics on a client from the NIM server, do the following:

1. Remove any removable media (tape or CD-ROM disc).
2. Stop all programs including the operating system (get help if needed).
3. If you are running standalone diagnostics in a full system partition, verify with the system administrator and system users that the system unit can shut down. Stop all programs, including the operating system. Refer to the operating system documentation for **shutdown** command information.

   In a partitioned system, make the CD-ROM drive available to the partition used to run standalone diagnostics (refer to the *IBM Hardware Management Console for pSeries Maintenance Guide* for more information). Verify with the system administrator and system users using that partition that all applications on that partition must be stopped, and that the partition will be rebooted. Stop all programs on that partition, including the operating system.
4. If you are in a full system partition, power on the system unit to run standalone diagnostics. In a partitioned system, reboot the partition to run standalone diagnostics.
5. When the keyboard indicator is displayed (the word **keyboard**), press the number 1 key on the keyboard to display the SMS menu.
6. Enter any requested passwords.
7. Select **Setup Remote IPL (Initial Program Load)**.
8. Enter the client address, server address, gateway address (if applicable), and subnet mask. Exit to the Network Parameters screen.
9. If the NIM server is set up to allow pinging from the client system, use the **ping** utility in the RIPL utility to verify that the client system can ping the NIM server. Under the **ping** utility, choose the network adapter that provides the attachment to the NIM server to do the ping operation. If the ping returns with an `OK` prompt, the client is prepared to boot from the NIM server. If ping returns with a `FAILED` prompt, the client cannot proceed with the NIM boot.

   Note: If the ping fails, contact your service representative.

To do a one-time boot of the network adapter attached to the NIM server network, do the following:

1. Exit to the SMS Main screen.
2. Select **Select Boot Options**.
3. Select **Install or Boot a Device**.
4. On the Select Device Type screen, select **Network**.
5. Set the network parameters for the adapter from which you want to boot.
6. Exit completely from SMS. The system starts loading packets while doing a **bootp** from the network.

Follow the instructions on the screen to select the system console.

- If `Diagnostics Operating Instructions Version x.x.x` displays, standalone diagnostics have loaded successfully.
- If the operating system login prompt displays, standalone diagnostics did not load. Check the following items:
  - The network parameters on the client may be incorrect.
  - Cstate on the NIM server may be incorrect.
  - Network problems might be preventing you from connecting to the NIM server.

Verify the settings and the status of the network. If you continue to have problems, contact your service representative.

Verify Partition Standby and Full System Partition Power Options

If an HMC is attached, perform these procedures to verify that the system can be booted to partition-standby and full-system partition modes.

1. At the HMC, in the Navigation area, click the **Partition Management** icon.
2. In the Contents area, select the managed system.
3. In the menu, click **Selected**.
4. Select **Power On**.

   You are asked to select a power-on mode from the following:

   - Partition Standby
   - Full System Partition
   - System Profile

5. In the Power On Options menu, select Partition Standby and click **OK**.
6. If the boot to Partition Standby is successful, LPAR will appear in the operator panel.
7. Reboot the system to Full System Partition.
8. If the boot to Partition Standby and Full System Partition is not successful, contact your service representative to correct the problem.

Chapter 9. Hardware Problem Determination

This chapter provides information about using standalone or online diagnostics to help you solve hardware problems.

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 148. 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 an 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 Online and Standalone Diagnostics", on page 91.
- Go to "Step 2".

Step 2
Is the Attention LED on?

NO   Go to "Step 3".

YES   Go to "Component LEDs" on page 20 for more information about your system LEDs.

Step 3
Are the online diagnostics installed on this system?

NO   Go to "Step 16" on page 147.

YES   Go to "Step 4".

Step 4
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.

                 Verify with the system administrator and users that the system can be turned off. If so, turn off the system unit and go to "Step 7" on page 144.

YES   Go to "Step 5" on page 144.

Step 5

Diagnostic tests can be run on many resources while the operating system is running. However, you can obtain more extensive problem isolation by running online diagnostics in service mode.

Do you want to run the online diagnostics in service mode?

NO   Go to "Step 6".

YES   Do the following to shut down your system:

1. At the system prompt, stop the operating system using the appropriate command for your operating system.
2. After the operating system is stopped, turn off the system unit.
3. Go to "Step 7".

Step 6

This step invokes the online diagnostics in concurrent mode.

1. Log in as root user.
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 appropriate command for your operating system.
2. After the operating system is stopped, turn off the system unit.
3. Go to "Step 7".

YES   Go to "Step 10" on page 145.

Step 7

This step loads online diagnostics in service mode. If you are unable to load the diagnostics, go to "Step 8" on page 145.

1. Turn on the power.
2. When the **keyboard** indicator appears, press 6 on the directly attached keyboard, or 6 on the ASCII terminal keyboard, to indicate that diagnostics should 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 8" on page 145.

YES   Go to "Step 10" on page 145.

Step 8

Starting at the top of the following table, find your symptom and follow the instructions given in the Action column.

Symptom	Action
Display problem	Go to "Step 9".
All other symptoms	Go to "Problem Determination When Unable to Load Diagnostics" on page 148

Step 9

Find your type of console display in the following table. Follow the instructions given in the Action column.

Console Display	Action
Display Device	Go to the problem determination documentation for this display.
ASCII terminal	Go to the problem-determination documentation for this type of terminal.

Step 10

The diagnostics loaded correctly.

Press Enter.

Is the Function Selection menu displayed?

NO   Go to "Step 11".

YES   Go to "Step 12" on page 146.

Step 11

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table. 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 problem-determination documentation for this type of terminal.

Step 12

1. If the terminal type has not been defined, 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 from selecting the console display.
2. Select **Diagnostics**.
3. Press Enter.
4. In the following table, find the menu or system response you received when you selected **Diagnostics**. Follow the instructions given in the Action column.

System Response	Action
The Diagnostic Mode Selection menu is displayed.	Select Problem Determination and go to "Step 13".
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 13". If you get an SRN, record it, and go to "Step 15" on page 147.
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 13". If you get an SRN, record it, and go to "Step 15" on page 147. If you do not get an SRN, go to "Step 18" on page 148.
The system does not respond to selecting **Diagnostics**.	Go to "Step 11" on page 145.

Step 13

Did the Diagnostic Selection Menu display?

NO   If **Problem Determination** was selected from the Diagnostic Mode Selection menu, and if a recent error has been logged in the error log, the diagnostics automatically begin testing the resource. Follow the displayed instructions.

- If the **No Trouble Found** screen is displayed, press Enter.
- If another resource is tested, repeat this step.
- If the **Diagnostic Selection** menu is displayed, go to "Step 14" on page 147.
- If an SRN is displayed, record it, and go to "Step 15" on page 147.

YES   Go to "Step 14" on page 147.

Step 14

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

Select and run the diagnostic tests on the resources you are having problems with or select the **All Resources** option to check all of the configured resources. Find the response in the following table, and follow the instructions given in the Action column.

Diagnostic Response	Action
An SRN is displayed.	Go to "Step 15".
The system hangs.	Report SRN 109-200.
The Testing Complete menu and the `No trouble was found` message displays and you have not tested all of the resources.	Press Enter and continue with the testing.
The Testing Complete menu and the `No trouble was found` message displays and you have tested all of the resources.	Go to "Step 18" on page 148.

Step 15

The diagnostics produced an SRN for this problem. Do the following:

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 16

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 17" on page 148.

YES   Go to Chapter 6, "Using the Online and Standalone Diagnostics", on page 91 and be sure your terminal attributes are set to work with the diagnostic programs.

Return to "Step 17" on page 148 when you finish checking the attributes. Record any settings that are changed.

Step 17

This step loads the standalone diagnostics. If you are unable to load the diagnostics, go to "Step 8" on page 145.

1. Turn on the power.
2. Insert the diagnostic CD-ROM into the CD-ROM drive.
3. When the **keyboard** indicator displays, press 5 on the directly 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 8" on page 145.

YES   Go to "Step 10" on page 145.

Step 18

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. Service personnel use 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 an 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" on page 149.

YES   Go to "Step 3".

Step 3

This step attempts to load online diagnostics in service mode.

1. Turn off the power.
2. Turn on the power.
3. If the **keyboard** indicator displays, press 6 on the directly attached or 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" on page 149.

YES   Go to "Step 6" on page 151.

Step 4

This step loads the standalone diagnostics.

1. Turn off the power.
2. Turn on the power.
3. Insert the diagnostic CD-ROM into the CD-ROM drive.
4. If the **keyboard** indicator displays, press 5 on the directly attached or 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" on page 151.

Step 5

Starting at the top of the following table, find your symptom and follow the instructions given in the Action column.

Symptom	Action
The power LED does not come on, or comes on and does not stay on.	Check the power cable to the outlet. Check the circuit breakers and check for power at the outlet. Ensure that the room temperature is within 60 - 90°F. If you do not find a problem, record error code M0PS0000 and report the problem to the service organization.
The system appears to be stopped and *no* beep was heard from the system unit.	Processor POST failure. Report error code M0CPU000.
The system appears to be stopped and *no* beep was heard from the system unit. E122, E123, or E124 is displayed on the operator panel display.	No good memory could be found. Report error code M0MEM000.
The system appears to be stopped. A beep was heard from the system unit.	No good memory could be found. Report error code M0MEM001.
The diagnostics are loaded and there was *no* beep heard from the system unit during the IPL sequence.	Record error code M0SPK001.
The system stops with the Diagnostic Operating Instructions displayed.	Go to "Step 6" on page 151.
The diskette LED is blinking rapidly, or E1EA or E1EB is displayed on the operator panel.	The flash EPROM data is corrupted. Run the recovery procedure for the flash EPROM.
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.

Symptom	Action
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 that you pressed the correct key in a timely manner, go to "Step 7" on page 151.
The system does not respond when the password is entered.	Go to "Step 7" on page 151.
The system stopped and an indicator is displayed on the system console and an eight-digit error code is not displayed.	If the indicator (text or icon) represents: • A keyboard, record error code M0KBD000 and report the problem to the service organization. • Memory, record error code M0MEM002 and report the problem to the service organization. • SCSI, record error code M0CON000 and report the problem to the service organization. • Network, record error code M0NET000 and report the problem to the service organization. • Speaker/Audio, record error code M0BT0000 and report the problem to the service organization.
The System Management Services menu is displayed.	The device or media that you are attempting to boot from might be faulty. 1. Check the SMS error log for any errors. To check the error log: • View **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 representative. • 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 the problem 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 with the message `STARTING SOFTWARE PLEASE WAIT` displayed.	Report error code M0BT0000.
The message `The system will 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 143.

Step 7

There is a problem with the keyboard.

In the following table, find the type of keyboard you are using. 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 problem-determination documentation for this type of terminal.

Appendix A. Environmental Notices

Product Recycling and Disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets and connectors which may contain lead and copper/beryllium alloys 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. IBM offers product-return programs in several countries. For country specific instructions refer to the following web site: http://www.ibm.com/ibm/environment/products/prp.phtml

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries, contact your local waste disposal facility.

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and other battery packs from IBM Equipment. For information on proper disposal of these batteries, please contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

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 1 ozone-depleting chemicals in the manufacturing process and reductions in manufacturing wastes. For more information, contact an IBM account representative.

Acoustical Noise Emissions

The equivalent continuous A-weighted sound pressure level at workstations (emission sound pressure level at the 1-meter bystander positions) does not exceed 70 dB(A).

Declared Acoustical Noise Emissions

Product Configuration	Declared A-Weighted Sound Power Level, $LWAd$ (B)		Declared A-Weighted Sound Pressure Level, <LpAm>(dB) at 1 meter Bystander Position	
	Operating	Idling	Operating	Idling
6E4 (Deskside)	6.0	5.9	42	41
6C4 (Rack Drawer)	6.1	6.0	44	43

Notes:

1. ^{LWAd} is the declared (upper limit) sound power level for a random sample of machines. (1B = 10dB)

2. ^{LpAm} is the mean value of the A-weighted sound pressure level at the 1-meter bystander positions for a random sample of machines.

3. 7028 Model 6E4 levels apply to the following system configurations: 2 way 1 gigahertz processor, 2 disk drives, 2048 GB of RAM, non-redundant power supply (One power supply, 1 processor fan).

4. 7028 Model 6C4 levels apply to the following hardware configurations: 2 way 1 gigahertz processor, 2 disk drives, 2048 GB of RAM, redundant power supply (Two 645 watt power supplies, 2 processor fans).

5. All measurements made in conformance with ISO 7779 and declared in conformance with ISO 9296.

Appendix B. 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.

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

Additional Communication Attributes

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

Communication Setup Attributes	3151/11 /31/41) Settings	3151 /51/61, Settings	3161 /3164 Settings	Description
Operating mode	Echo	Echo	Echo	Data entered from the keyboard on the terminal is sent to the system unit for translation and then sent back to the display screen. Sometimes called *conversational mode.*
Line speed	9600 bps	9600 bps	9600 bps	Uses the 9600 bps (bits per second) line speed to communicate with the system unit.
Word length (bits)	8	8	8	Selects eight bits as a data word length (byte).
Parity	No	No	No	Does not add a parity bit and is used together with the word length attribute to form the 8-bit data word (byte).
Stop bit	1	1	1	Places a bit after a data word (byte).
Turnaround character	CR	CR	CR	Selects the carriage return (CR) character as the line turnaround character.
Interface	EIA-232	EIA-232	EIA-232	Uses the EIA-232 interface protocol.
Line control	IPRTS	IPRTS	IPRTS	Uses the 'permanent request to send' (IPRTS) signal to communicate with system unit.
Break signal (ms)	500	500	500	The terminal sends a break signal to the system unit within 500 ms after the Break key is pressed.
Send null suppress	On	On		Trailing null characters are not sent to the system unit.
Send null			On	Trailing null characters are sent to the system unit.
Response delay (ms)	100	100	100	The terminal waits for 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.

Keyboard Setup Attributes	3151/11 /31/41 Settings	3151 /51/61 Settings	3161 /3164 Settings	Description
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	

Appendix D. Service Processor Setup and Test

This appendix includes an example of a basic service processor setup checklist. Your setup may include more or fewer of the available features, so you can adjust this checklist for your own application so that it is helpful to you.

Service Processor Setup Checklist

1. Unplug the power cord from the server.
2. Attach a local terminal for this setup procedure.
3. Plug in the system and power on the local terminal.

   Attention: Make sure that system power remains off.
4. Start the service processor menus. See Chapter 4, "Using the Service Processor", on page 35.
5. Set the system name. See "Privileged User Menus" on page 37.
6. Enable surveillance. See 40.
7. Configure Call-In/Call-Out. See "Call-In/Call-Out Setup Menu" on page 57.
8. Exit the service processor menus.
9. Unplug the power cord from the system.
10. Attach modems (if needed). See "Accessing the Service Processor Menus Remotely" on page 36.
11. Plug in the system.

    Attention: Make sure that the system power remains off.
12. Test both of the following:
    - Call-In, see "Testing Call-In"
    - Call-Out, see "Testing Call-Out" on page 162

Your service processor is now ready for use.

Testing the Setup

This section contains sample testing procedures to help ensure that your setup is working.

These tests include communicating with the server operating system. Before you start, ensure that the necessary serial port(s) is configured. If you need assistance, refer to "Serial Port Configuration" on page 162.

The server should be powered off as a result of the "Service Processor Setup Checklist".

Testing Call-In

1. At your remote terminal, call in to your server. Your server answers and offers you the Service Processor Main Menu after requesting your privileged access password.
2. Select **System Power Control**.
3. Select **Power-On System**.

   When you are asked if you wish to continue powering on the system, type **Y**.
4. After the system firmware and operating system have initialized the server, the login prompt displays at your remote terminal if you set up Seamless Modem Transfer (refer to "Transfer of a Modem Session" on page 167 for more information). This may take several minutes. When the login prompt displays, you have successfully called the service processor.
5. Type `logout` to disconnect from the operating system. The message `No Carrier` displays on your remote terminal.

6. Call your server again. The operating system answers and offers you the login prompt. If these tests are successful, call-in is working.

7. Log in and type `shutdown` to shut down your server.

8. The message `No Carrier` displays on your remote terminal.

Testing Call-Out

During the setup, you entered your phone numbers for the pager (on page 60) and customer voice (on page 60). These numbers are used for this test.

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

2. Call your server again.

3. At the service processor main menu, select **Call-In/Call-Out Setup** menu, then select **Call-Out** test. This action causes a simulated error condition for the purposes of this test.

4. After a few moments, a message displays, regarding an illegal entry. Press Enter to clear the message and return to the main menu.

5. When your telephone rings, answer the call. You should hear the sound of a telephone being dialed. Your computer is trying to page you.

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

Return to the "Telephone Number Setup Menu" on page 59 to enter the actual telephone numbers your server will use for reporting problems.

Serial Port Configuration

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

1. Log in as `root` user.

2. To determine if you have any serial ports already configured, type:

   `lsdev -Cc tty`

   If no serial ports are configured, none are listed. If you want to configure serial ports that are not listed, continue with the remaining steps.

3. Identify the serial port(s) with the modem(s).

4. Type `smit tty`

5. Select **add tty**

6. Select **RS232**

7. Select **Baud rate 9600** or higher.

8. Select **login enable** and set the flow control to RTS.

9. Commit the selections and set up any other needed serial ports.

10. Exit SMIT.

Appendix E. Modem Configurations

Attention: This appendix applies only to modems attached to serial ports S1 and S2 located on the CEC backplane (location U0.1-P1).

The service processor is designed to place little demand on an attached modem, thereby increasing the setup and connection success rates.

Sample Modem Configuration Files

This appendix contains information about several sample modem configuration files that either work directly with your modem or provide a good starting point for a custom setup.

The sample modem configuration files are located in your service processor firmware in the **/usr/share/modems** subdirectory (if your system / server is running AIX) with the following names. A listing of each specific file is included in this appendix.

Generic Modem Configuration Files

AIX File Name	Service Processor Firmware File Name
modem_z.cfg	modem_z_sp
modem_z0.cfg	modem_z0_sp
modem_f.cfg	modem_f_sp
modem_f0.cfg	modem_f0_sp
modem_f1.cfg	modem_f1_sp

Specific Modem Configuration Files

AIX File Name	Service Processor Firmware File Name
modem_m0.cfg	modem_m0_sp
modem_m1.cfg	modem_m1_sp

Use the following selection procedures and your modem manual to determine which of the configuration files is suitable for your use.

Configuration File Selection

Use the following steps to select a configuration file:

1. Is your modem an IBM 7852-400?

    If Yes, use modem configuration file **modem_m0.cfg** and go to step 7 on page 164.

    Note: The IBM 7852-400 modem has DIP switches on the right side of the unit. See "IBM 7852-400 DIP Switch Settings" on page 166 for the correct switch settings.

    If No, continue with step 2 on page 164.

2. Is your modem an IBM 7857-017?

   If Yes, use modem configuration file **modem_m1.cfg** and go to step 7.

   Note: The IBM 7857-017 modem has two telephone line connections on the back of the unit. One is marked **LL** (for Leased Line), and the other is marked **PTSN** (for Public Telephone Switched Network). The service processor expects to use the modem on the public network, so the telephone line should attach to the PTSN connector.

   If No, continue with step 3.
3. Does your modem respond to the extended command set (prefixed with &)?

   If Yes, go to step 5.
   If No, continue with step 4.
4. Does your modem respond to:
   - ATZ reset command

     or

   - ATZ*n* reset commands, where *n* can be 0, 1, and so on?

     If ATZ, configuration file **modem_z.cfg** is recommended.
     If ATZ*n*, configuration file **modem_z0.cfg** is recommended.

   Go to step 7.
5. Does your modem command set include a test for V.42 error correction at the remote modem (often called "Auto-Reliable Mode")?

   If Yes, disable this test. You can use sample configuration files **/usr/share/modem_m0.cfg** or **/usr/share/modem_m1.cfg** as models to help you create a file for your particular modem. See "Customizing the Modem Configuration Files" on page 165 for more information. Go to step 7.

   If No, go to step 6.
6. Does your modem respond to:
   - AT&F reset command

     or

   - AT&F*n* reset commands, where *n* can be 0, 1, and so on?

   If AT&F, configuration file **modem_f.cfg** is recommended.
   If AT&F*n*, configuration file **modem_f0.cfg** or **modem_f1.cfg** is recommended, depending on which provides the hardware flow control profile.
7. You have completed selection of the configuration file.

   If your modem configuration selection is not available in the Service Processor Modem Configuration Menu, you must access it through the Configure Remote Maintenance Policy Service Aid.

   If you find it necessary to adjust any of these configuration files, use the manual provided with your modem to accomplish that task. It is recommended you select settings that enable hardware flow control and respond to DTR.

   Note: Some older modems do not respond to the **X0** or **&R1** commands. Edit out these commands from the modem configuration file if yours is such a modem. See your modem manual for more information.

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

Examples for Using the Generic Sample Modem Configuration Files

The following table contains information to help you determine which modem configuration file to use with various modems.

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 (Ring interrupt only on first ring)				X	
Bocamodem 1440E			X		
Hayes Smart Modem 300	X				
IBM 5841	X				
IBM 5843	X				
IBM 7851				X	
IBM 7852-10				X	
IBM 7855					X
USRobotics 36.6K Sportster					X
Zoom V.32			X		

Customizing the Modem Configuration Files

You can create your own modem configuration files or modify the samples provided. After you customize your modem configuration files, you *must* access them through the Configure Remote Maintenance Policy Service Aid rather than from the service processor menus.

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

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

To disable Auto-Reliable Mode testing of the remote modem, use the sample modem configuration file **/usr/share/modems/modem_f.cfg** as a model that you can modify, as follows:
1. Find the necessary command in your modem manual.
2. Copy the **/usr/share/modems/modem_f.cfg** file to a new file with a different name (for example, **modem_fx.cfg**).
3. In the new file (**modem_fx.cfg**), change the line `Send "ATE0T\r"` to `Send "ATcccE0T\r"` where ccc is the added command as specified in your modem manual, as follows:

   Change the third line of each of the following stanzas:
   * `condout`
   * `condin`
   * `ripo`
4. Save the changes.

IBM 7852-400 DIP Switch Settings

If you are using a 7852-400 modem to enable service processor communications, for proper operation, the dual inline package (DIP) switches must be set according to the following table:

Switch	Position	Function
1	Up	Force DTR
2	Up	Flow Control &E4
3	Down	Result Codes Enabled
4	Down	Modem Emulation Disabled
5	Up	Auto Answer Enabled
6	Up	Maximum Throughput Enabled
7	Up	RTS Normal Functions
8	Down	Enable Command Mode
9	Down	Remote Digital Loopback Test Enabled
10	Up	Dial-Up Line Enabled
11	*Up	AT Responses Enabled (Extended Responses Disabled)
12	*Down	Asynchronous Operation
13	Up	28.8KB Line Speed
14	Up	
15	Up	CD and DSR Normal Functions
16	Up	2-Wire Leased Line Enabled

* Only switches 11 and 12 are changed from the factory default settings.

Xon/Xoff Modems

Some early modems assume software flow control (Xon/Xoff) between the computer and the modem. Modems with this design send extra characters during and after the transmitted data. The service processor cannot accept these extra characters. If your configuration includes such a modem, your functional results may be unpredictable.

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

If you experience unexplainable performance problems that may be due to Xon/Xoff characters, it is recommended that you upgrade your modem.

Ring Detection

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

The service processor uses the ring interrupt request to count the number of rings when Ring Indicate Power-On (RIPO) is enabled. If your modem produces an interrupt on only the first ring, set Ring Indicate Power-On to start on the first ring. Otherwise, you can choose to start Ring Indicate Power-On on any ring count.

Terminal Emulators

The service processor is compatible with simple ASCII terminals, and therefore compatible with most emulators. When a remote session is handed off from the service processor to the operating system, agreement between terminal emulators becomes important.

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

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

Recovery Procedures

Situations such as line noises and power surges can sometimes cause your modem to enter an undefined state. When it is being used for dial-in, dial-out or ring indicate power-on, your modem is initialized each time one of these actions is expected. If one of these environmental conditions occur after your modem has been initialized, it might be necessary to recover your modem to a known state.

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

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

In case recovery becomes necessary, shut down your system using established procedures. Disconnect the power cable and press the power button to drain capacitance while power is disconnected. Disconnect and reconnect modem power, and then reconnect system power to completely reinitialize your system.

Transfer of a Modem Session

Because many modem command variations exist, the sample modem configuration files located at the end of this appendix have been written to capture the largest number of workable modem settings.

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

Consult your modem manual for its specific response scheme for the **&Dn** command.

Two strategies are available for dealing with the modem's response to DTR:
- Recovery
- Prevention

Before you use one of these strategies, determine if your server's modem is set up correctly to respond to DTR.

With the remote terminal connected to serial port 1 and defined as the Primary Console Device, there are two tests you can perform:
1. Will the modem drop the connection after the `System initialization complete` message displays at the remote terminal?

   If Yes, the modem is set up correctly.

If No, try another **&Dn** setting for your server's modem. See your modem manual for this information. The **&Dn** command appears in three places each in three of the sample modem configuration files, as follows:

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

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

   If No, try another **&Dn** setting for your server's modem. See your model manual for this information. The **&Dn** command appears in three places each in three of the sample modem configuration files. Only the following sample modem configuration files contain the **&Dn** command (in three places each):
   - modem_f.cfg
   - modem_f0.cfg
   - modem_f1.cfg

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

Recovery Strategy

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

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

Prevention Strategy

The disconnect is caused by the operating system when it initializes the Primary Console. The tests listed in "Transfer of a Modem Session" on page 167 are conducted with the remote terminal selected as the primary console to manifest the modem's response to DTR transitions.

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

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

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

Modem Configuration Sample Files

Sample File modem_m0.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP: modem_m0
#
# FUNCTIONS: Modem configuration file specifically for IBM 7852-400
#  modem with Auto-Reliable feature.  This feature must be turned off
#  for Catcher calls.  This example uses the AT&F reset command to
#  choose the factory defaults.
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#
#
# The modem has configuration switches.  They should be set to the
# factory default settings, except switches 11 and 12.  These must be
# to UP ("AT" responses) and DOWN (Asynchronous operation), respectively.

ICDelay 1
DefaultTO 10
CallDelay 120
#
#  %N  Call-Out phone number     %R    Return phone number
#
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

condout:    send "AT&F&E2E0T\r"                    # Reset to factory defaults
                                                   # Reliable mode
                                                   # Echo off
            ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
            send "AT&E12&E14\r"                    # Disable pacing
                                                   # Disable data compression
            expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful.
            send "AT&SF1&S0S9=1\r"                 # DSR independent of CD
                                                   # Force DSR on.
                                                   # CD respond time=100ms
            expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful.
            send "ATV0S0=0\r"                      # Numeric response code
                                                   # Auto-Answer off
            expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful.
            done

 connect:   send "ATDT%N\r"                        # Tone dialing command.
                                                   # %N from Call Home setup.
                                                   # Expect a connection response.
            expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
            timeout 60
            done

 retry:     send "A/"                              # Repeat the previous command.
                                                   # Expect a connection response.
            expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
```

```
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
           timeout 60
           done

 disconnect:
           delay 2                              # Separate from previous data.
           send "+++"                           # Assure command mode.
           delay 2                              # Allow mode switching delay.
           send "ATH0T\r"                       # Set modem switch-hook down
                                                #  (i.e., hang up).
           ignore "0\r" or "OK\r" timeout 2     # Ignore modem response.
           send "ATE0Q1\r"                      # Initialize modem: Echo OFF,
                                                #  Disable responses.
           ignore "0\r" timeout 1
           done

 condin:   send "AT&F&E2E0T\r"                  # Reset to factory defaults.
                                                # Reliable mode
                                                # Echo off
           ignore "0\r" or "OK\r\n" timeout 2   # Ignore modem response.
           send "AT&E12&E14\r"                  # Disable pacing
                                                # Disable data compression
           expect "0\r" or "OK\r\n" timeout 2   # Confirm commands successful
           send "AT&SF1&S0S9=1\r"               # DSR independent of CD.
                                                # Force DSR on.
                                                # CD respond time=100ms
           expect "0\r" or "OK\r\n" timeout 2   # Confirm commands successful.
           send "ATV0S0=2\r"                    # Numberic response code
                                                # Answer on 2nd ring
           expect "0\r" timeout 2               # Confirm commands successful.
           done

 waitcall: ignore "2\r" timeout 1               # Ignore first ring.
           expect "2\r" timeout 10              # Pickup 2nd ring or timeout
                                                # Expect a connection response.
           expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
           timeout 60
           done

 page:     send "ATDT%N,,,,%R;\r"               # %N = pager call center number
                                                # Add enough commas to wait for
                                                #  time to enter paging number.
                                                # %R = paging number
           expect "0\r" timeout 60              # Confirm successful command.
           delay 2                              # Wait before hanging up.
           send "ATH0\r"                        # Hang up.
           expect "0\r" timeout 2               # Confirm successful command.
           done

 ripo:     send "AT&F&E2E0T\r"                  # Reset to factory defaults.
                                                # Reliable mode
                                                # Echo off
           ignore "0\r" or "OK\r\n" timeout 2   # Ignore modem response.
           send "AT&E12&E14\r"                  # Disable pacing
                                                # Disable data compression
           expect "0\r" or "OK\r\n" timeout 2   # Confirm successful command.
           send "AT&SF1&S0S9=1\r"               # DSR independent of CD.
                                                # Force DSR on.
                                                # CD respond time=100ms
```

```
                     expect "0\r" or "OK\r\n" timeout 2   # Confirm commands successful.
                     send "ATV0S0=0\r"                     # Numeric response code
                                                           # Auto Answer OFF
                     expect "0\r" timeout 2                # Confirm commands successful.
                     done                                  #

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

Sample File modem_m1.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP modem_m1
#
# FUNCTIONS: Modem configuration file specifically for IBM 7857-017 modem with
#  Auto-Reliable feature.  This feature must be turned off for Catcher calls.
#  This example uses the AT&F reset command to choose the factory defaults.
#
#  To allow dial commands for digital pagers, it is necessary to reduce
#  the number of characters in the dial command.  Each comma (delay) has
#  been set to 6 seconds (S8=6) for that reason.
#
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#

ICDelay 1
DefaultTO 10
CallDelay 120
#
#  %N  Call-Out phone number     %R   Return phone number
#
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

condout:    send "AT&F*E0E0\r"                     # Reset to factory defaults.
                                                   # *E0=data compression disabled
                                                   # E0=echo disabled
            ignore "0\r" or "OK\r\n" timeout 2     # Ignore modem response.
            send "AT#F0*Q2S8=6\r"                  # Trellis modulation disabled
                                                   # Retrain with adaptive rate
                                                   # Set ,=6second
            expect "0\r" or "OK\r\n" timeout 2     # Confirm commands successful
            send "ATV0X0S0=0\r"                    # Numeric response code
                                                   # AT compatible messages
                                                   # Auto-Answer disabled
            expect "0\r" or "OK\r\n" timeout 2     # Confirm commands successful.
            done

connect:    send "ATDT%N\r"                        # Tone dialing command.
                                                   # %N from Call Home setup.
            expect "1\r" busy "7\r" timeout 60     # Expect a connection response.
            done
```

```
retry:     send "A/"                           # Repeat the previous command.
           expect "1\r" busy "7\r" timeout 60  # Expect a connection response.
           done

disconnect:
           delay 2                             # Separate from previous data.
           send "+++"                          # Assure command mode.
           delay 2                             # Allow mode switching delay.
           send "ATH0\r"                       # Set modem switch-hook down
                                               #  (i.e., hang up).
           ignore "0\r" or "OK\r" timeout 2    # Ignore modem response.
           send "ATE0Q1\r"                     # Initialize modem: Echo OFF,
                                               #  Disable responses.
           ignore "0\r" timeout 1
           done

condin:    send "AT&F*E0E0\r"                  # Reset to factory defaults.
                                               # *E0=data compression disabled
                                               # E0=echo disabled
           ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
           send "AT#F0*Q2\r"                   # Trellis modulation disabled
                                               # Retrain with adaptive rate
           expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful
           send "ATV0X0S0=2\r"                 # Numeric response code
                                               # AT compatible messages
                                               # Answer on 2nd ring
           expect "0\r" timeout 2              # Confirm commands successful.
           done

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

page:      send "ATD%N,%R\r"                   # %N = pager call center number
                                               # commas=6sec wait time to
                                               #   enter paging number.
                                               # %R = return number
           expect "0\r" or "3\r" timeout 30    # Confirm successful command.
           delay 2                             # Wait before hanging up.
           send "+++"                          # Assure command mode.
           delay 2                             # Allow mode switching delay.
           send "ATH0\r"                       # Hang up.
           expect "0\r" timeout 2              # Confirm successful command.
           done

ripo:      send "AT&F*E0E0\r"                  # Reset to factory defaults.
                                               # *E0=data compression disabled
                                               # E0=echo disabled
           ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
           send "AT#F0*Q2\r"                   # Trellis modulation disabled
                                               # Retrain with adaptive rate
           expect "0\r" or "OK\r\n" timeout 2  # Confirm successful command.
           send "ATV0X0S0=0\r"                 # Numeric response code
                                               # AT compatible messages
                                               # Auto-Answer disabled
           expect "0\r" timeout 2              # Confirm commands successful.
```

```
            done                                         #

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

Sample File modem_z.cfg

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

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

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

```
          done

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

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

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

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

disconnect:
          delay 2                                    # Separate from previous data.
          send "+++"                                 # Assure command mode.
          delay 2                                    # Allow mode switching delay.
          send "ATH0T\r"                             # Set modem switch-hook down
                                                     #  (i.e., hang up).
          ignore "0\r" or "OK\r" timeout 2           # Ignore modem response.
          send "ATE0Q1\r"                            # Initialize modem: Echo OFF,
                                                     #  Disable responses.
          ignore "0\r" timeout 1
          done

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

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

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

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

ripo:       send "ATZQ0T\r"                          # Reset to factory defaults.
```

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

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

Sample File modem_z0.cfg

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

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

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

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

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

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

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

disconnect:
            delay 2                                 # Separate from previous data.
            send "+++"                              # Assure command mode.
            delay 2                                 # Allow mode switching delay.
            send "ATH0T\r"                          # Set modem switch-hook down
                                                    #  (i.e., hang up).
            ignore "0\r" or "OK\r" timeout 2        # Ignore modem response.
            send "ATE0Q1\r"                         # Initialize modem: Echo OFF,
                                                    #  Disable responses.
            ignore "0\r" timeout 1
            done

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

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

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

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

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

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

Sample File modem_f.cfg

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

ICDelay 1
DefaultTO 10
CallDelay 120
#  AT  Attention Code          ,    Inserts delay in dialing commands
#  &F  Reset to default profile Q0   Turn on responses
#  E0  Turn echo off           Q1   Turn off responses
#  V0  Use numeric responses    S0=0 Automatic answer inhibit
#  +++ Escape to command mode   S0=2 Answer on second ring
#  H0  Hang-up                  X0=0 Limit modem response codes
#                               T =  Tone mode.  When used as T\r, it is a
#                                    no op to maintain program synchronization
#                                    when modem may/will echo the commands.
#
```

```
# &C1  Detect CD                    &D2  Respond to DTR (often the default)
#
#  %N  Call-Out phone number     %P    Paging phone number
#  %S  Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses.  Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

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

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


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

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

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

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

            ignore "0\r" timeout 1
            done

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

```
            done

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

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

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

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

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

Sample File modem_f0.cfg

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

```
#
# If the modem has configuration switches, they should be set to the
# factory default settings.

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

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

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

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

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

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

disconnect:
            delay 2                              # Separate from previous data.
            send "+++"                           # Assure command mode.
```

```
          delay 2                              # Allow mode switching delay.
          send "ATH0T\r"                       # Set modem switch-hook down
                                               #  (i.e., hang up).
          ignore "0\r" or "OK\r" timeout 2     # Ignore modem response.
          send "ATE0Q1\r"                      # Initialize modem: Echo OFF,
                                               #  Disable responses.
          ignore "0\r" timeout 1
          done

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

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

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

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

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

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

Sample File modem_f1.cfg

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

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

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

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

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

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

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

disconnect:
            delay 2                                  # Separate from previous data.
            send "+++"                               # Assure command mode.
            delay 2                                  # Allow mode switching delay.
            send "ATH0T\r"                           # Set modem switch-hook down
                                                     #  (i.e., hang up).
            ignore "0\r" or "OK\r" timeout 2         # Ignore modem response.
            send "ATE0Q1\r"                          # Initialize modem: Echo OFF,
                                                     #  Disable responses.
            ignore "0\r" timeout 1
            done

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

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

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

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

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

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

Index

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User's Guide

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