IBM

@server

pSeries 690

User's Guide

SA38-0588-02

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Third Edition (October 2002)

Before using this information and the product it supports, read the information in “Safety Notices” on page ix, Appendix A, “Environmental Notices” on page 155, and Appendix B, “Notices” on page 157.

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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:

- ix

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

- ix
- x

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

Electrical Safety

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

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.

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.
D06

CAUTION:
This product is equipped with a four-wire (three-phase and ground) power cable for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.
C27

DANGER

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

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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

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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.

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About This Book

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

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.

ISO 9000

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

Online Publications

IBM @server pSeries publications are available online. To access the online books, visit our IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base. Click **Hardware documentation**.

Related Publications

The following publications provide related information:

- The *System Unit Safety Information*, order number SA23-2652, contains translations of safety information used throughout this book.
- The *Site and Hardware Planning Information*, order number SA38-0508, contains information to help you plan your installation.
- The @server *pSeries 690 Service Guide*, SA38-0589, contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.
- The @server *pSeries 690 Installation Guide*, SA23-1285, contains information on how to set up and cable the server and verify server operation.

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- The *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590, provides information to system administrators on how to install and use a Hardware Management Console (HMC) to manage a system.
- The *IBM Hardware Management Console for pSeries Maintenance Guide*, SA38-0603, provides information on how to service a Hardware Management Console (HMC).
- The *RS/6000 and @server Diagnostic Information for Multiple Bus Systems*, SA38-0509, contains diagnostic information, service request numbers (SRNs), and failing function codes (FFCs).
- The *RS/6000 and @server Adapters, Devices and Cable Information for Multiple Bus Systems*, SA38-0516, contains information about adapters, devices, and cables for your server. This manual is intended to supplement the service information found in the Diagnostic Information for Multiple Bus Systems.
- The *PCI Adapter Placement Reference*, SA23-2504, contains information regarding slot restrictions for adapters that can be used in this system.

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- @server
- IBM
- pSeries

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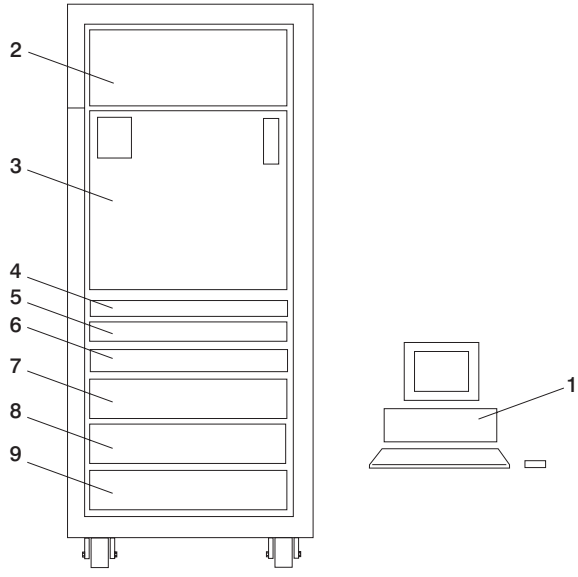
Chapter 1. Introducing the @server pSeries 690

The @server pSeries 690 system is a shared multiprocessor server.

The system can be configured (or partitioned) to be used as multiple separate systems. This configuration is known as a *logically partitioned system*.

The following illustration shows an @server pSeries 690 containing two Integrated Battery Feature drawers.



1	Hardware Management Console for pSeries	**7**	7040 Model 61D I/O Subsystem
2	7040 Model 61R Bulk Power Subsystem Redundant 7040 Model 61R Bulk Power Subsystem is placed in the rear.	**8**	7040 Model 61D I/O Subsystem (Optional)
3	7040 Model 681 Processor Subsystem	**9**	7040 Model 61D I/O Subsystem (Optional)
4	7040 Model 681 Media Drawer		
5*,6*	Primary 7040 Model 61R Integrated Battery Feature (IBF) (Optional) for the Primary Power Subsystem. Redundant 7040 Model 61R Integrated Battery Feature (IBF) (Optional) is placed in the rear.		

*****7040 Model 61D I/O Subsystem (Optional, if features 5 and 6 are not installed).

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A pSeries 690 system can have up to two racks, which support up to eight I/O drawer subsystems.

The Hardware Management Console for pSeries (HMC) is used to manage the resources in the system. The system can be configured as a full system partition, which means that all resources of the system are used as a single system.

The system can also be configured into multiple (or logical) partitioned systems. With a logically partitioned system, system resources can be divided into a number of systems each running in its own partition.

Numerous configurations of pSeries 690 systems can be managed from one Hardware Management Console. A second Hardware Management Console can be used for redundancy.

System Configurations

The system configuration may vary. Possible configurations include:

- Multiple pSeries 690s attached to one Hardware Management Console (HMC)
- Two HMCs attached to one pSeries 690
- Two HMCs jointly managing up to eight pSeries 690s

The following components make up the base configuration of the pSeries 690:

- **Rack and Bulk Power Subsystem** (BPA) The BPA is the main power control unit for the pSeries 690. This redundant bulk power assembly distributes power at 350 V to each drawer where conversion is made to the required chip level.
- **Processor Subsystem** The processor subsystem is a 17 EIA-unit-high drawer. The processor subsystem contains the backplane, up to four processor modules, up to 16 L3 cache modules, up to four I/O books, up to eight memory books, and cooling blowers. The processor subsystem drawer also contains the power subsystem components used in the conversion of 350 V bulk power to the supply voltages required by the various internal components.

  Several memory book sizes are available. The minimum memory requirement to operate this system is 8 GB, and the maximum amount of memory is 256 GB.
- **Media Drawer** The media drawer is a 1 EIA-unit high drawer containing an operator panel, 1.44 MB floppy diskette drive, one SCSI optical drive (either a CD-ROM or a DVD-RAM), signal cables, power cables, a 1 EIA-unit-high 24-inch rack-mountable sheet metal enclosure, and miscellaneous mechanical hardware. Three additional SCSI bays are available to add optional CD-ROMs, DVD-RAMs, or 4-mm tape drives:
  - Variable Speed SCSI-2 CD-ROM Drive
  - SCSI DVD-RAM Drive
  - 4-mm Internal Tape Drive
- **Integrated Battery Feature** (IBF) (optional) The IBF is a 2 EIA-unit-high drawer that can be added to your system. The IBF provides backup electric power in case of a power outage. You can install up to two IBFs in the base rack configuration. One additional IBF can be installed in an expansion rack.

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- **I/O Drawers** The I/O drawer is a 4 EIA-unit-high drawer containing up to two I/O boards, up to 16 disk drives, four DASD backplanes, a midplane card, four cooling fans and two power supplies (which are independent of the bulk power assembly). The base rack configuration can have up to four I/O drawers with each drawer having 20 PCI card slots, and more than 500 GB of storage. An expansion rack can be connected to the base system and contain additional I/O drawers and IBFs.

  Note: If your base rack configuration contains an IBF, the space in the rack for the fourth I/O drawer in that rack is not available.However, an expansion rack allows you to add additional I/O drawers and an additional IBF.
- **Hardware Management Console** (HMC) - The HMC consists of a display, independent processor, keyboard, and mouse. The HMC is mandatory for all systems. For more information on the use of logical partitioned systems, see the "Partitioned System Overview".

Partitioned System Overview

Partitioning enables users to configure a single computer into several independent systems. Each of these systems, called *logical partitions*, is capable of running applications in its own independent environment. This independent environment contains its own operating system, its own set of system processors, its own set of system memory, and its own I/O adapters.

An *affinity partition* is a special type of logical partition in which processors and system memory are allocated in a predefined way that may increase performance when running some types of applications (memory is assigned to a processor that is in close physical proximity to it).

The HMC allows you to perform many hardware management tasks for your managed system, including configuring logical partitions. You can choose to operate your managed system as a single server (called *full system partitions*), or you can choose to run multiple partitions.

Partition Profiles

A profile defines a configuration setup for a managed system or partition. The HMC allows you to create multiple profiles for each managed system or partition. You can then use the profiles you created to start a managed system or partition in a particular configuration.

A partition does not actually own any resources until it is activated; resource specifications are stored within partition profiles. The same partition can operate using different resources at different times, depending on the profile you activate.

When you activate a partition, you enable the system to create a partition using the set of resources in a profile created for that partition. For example, a logical partition profile might indicate to the managed system that its partition requires three processors, 2 gigabytes of memory, and I/O slots 6, 11, and 12 when activated.

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You can have more than one profile for a partition. However, you can only activate a partition with one profile at a time. Additionally, affinity partitions and logical partitions cannot be active at the same time.

When you create a partition profile, the HMC shows you all the resources available on your system. The HMC does not, however, verify if another partition profile is currently using a portion of these resources. For example, the HMC might show 16 processors on your system, but does not notify you that other partitions are using nine of them. You can create two partition profiles, each using a majority of system resources. If you attempt to activate both of these partitions at the same time, the second partition in the activation list fails.

System Profiles

Using the HMC, you can create and activate often-used collections of predefined partition profiles. A collection of predefined partition profiles is called a system profile. The system profile is an ordered list of partitions and the profile that is to be activated for each partition. The first profile in the list is activated first, followed by the second profile in the list, followed by the third, and so on.

The system profile helps you change the managed systems from one complete set of partitions configurations to another. For example, a company might want to switch from using 12 partitions to using only four, every day. To do this, the system administrator deactivates the 12 partitions and activates a different system profile, one specifying four partitions.

When you create a group of affinity partitions, the HMC automatically creates a system profile that includes all of the affinity partitions that you created.

Types of Partitions

The HMC allows you to use two types of partitions: logical partitions and the full system partition.

Logical Partitions

Logical partitions are user-defined system resource divisions. Users determine the number of processors, memory, and I/O that a logical partition can have when active.

Affinity Partitions: An affinity partition is a special type of logical partition in which processors and system memory are allocated in a predefined way that may increase performance when running some types of applications (memory is assigned to a processor that is in close physical proximity to it).

Affinity partitions can be created with either four or eight processors. The user determines the allocation of I/O resources in a server with affinity partitions; only the allocation of processors and memory is predefined.

Reassigning Partition Resources Dynamically: You can logically attach and detach a managed system's resources to and from a logical partition's operating system

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without rebooting. In addition, failing resources can be dynamically released from the owning partition, serviced and reattached, or replaced with an acceptable replacement without disturbing the partition's activities.

Full System Partition

A special partition called the full system partition assigns all of your managed system's resources to one large partition. The full system partition is similar to the traditional, non-partition method of operating a system. Because all resources are assigned to this partition, no other partitions can be started when the full system partition is running. Likewise, the full system partition cannot be started while other partitions are running.

The HMC allows you to easily switch from the full system partition to logical partitions. The actual setup of the operating system in a partition may require some careful planning to ensure that no conflicts exist between the two environments.

For more detail on partitions, see the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590.

Processor on Demand

The Processor On Demand (POD) feature of some IBM servers allows the server to be manufactured with extra processor capacity built in, ready to be activated when you need it. If your system is ordered with processor on demand features, you can activate the features and pay for the increased processing power as your needs grow.

The processor on demand feature enables you to start small, and then increase your processing capacity without disrupting any of your current operations.

For information about how to activate processor on demand features on your server, refer to "Activating Process for Processor on Demand" on page 8, or refer to the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590 that was delivered with your hardware management console.

The processor on demand feature offers the capability to non-disruptively activate two or more processors on a server that was ordered and installed with inactive processor on demand features. The processor on demand feature adds capacity in increments of two processors, up to the maximum number of standby processors. The processor on demand feature adds significant value if you want to upgrade without disruption, handle business peaks, or add new workloads. The processor on demand feature adds permanent capacity growth with no requirement to reboot the server.

Processor on Demand Features

If your system was ordered with processor on demand features, your managed system has a set of processors that are ″active″ and a set of standby processors that are ″not active.″ In the event that an active processor fails, the inactive processors are then available to be used by the system until the failing processor is replaced.

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Processor on Demand Activation Features

Standby processors (two or more) can be permanently activated by ordering a quantity of permanent processor on demand activation features. This order is filled when your service provider receives your request, generates an activation code, and delivers it to you. Activation codes can be delivered to you through postal mail and they are posted on the Web.

Capacity Planning

If you are doing capacity planning for models offering processor on demand, plan ahead for any potentially disruptive actions that might inhibit your using fully the capacity of the activated processors. Some actions you may want to take prior to activating any processor on demand features are as follows:

- Perform any I/O updates, such as adding adapters necessary to increase system capacity
- Perform memory upgrades
- Prepare LPAR partitions

By planning ahead, you can accommodate the growth of existing workloads, as well as handle new workloads without requiring a server outage. Other components of a server such as memory and I/O affect performance and overall throughput of workloads. By planning ahead and taking into account the complete server configuration, you can help ensure that you get the full benefit of processor on demand activations.

Note: If you have questions about capacity-planning topics not covered here, contact your sales representative for assistance.

Processor on Demand Ordering

Permanent processor-on-demand capacity can be activated in either of the following scenarios. The description of each of the following scenarios highlights if and when it is necessary to send vital product data (VPD) to IBM.

- **New system order (new footprint):** An order can contain a number of processor on demand activation features. The manufacturing facility fills orders directly at the plant of manufacture, before the server is delivered to the customer.
- **Ordering activation features for an installed server:** After you have determined that you want to permanently activate some or all of your standby processors, contact your business partner or sales representative to place an order.

  When the order record and the VPD are both available to the manufacturing facility, a processor on demand activation code unique to your server is generated. The activation code is mailed to you and posted at a public Web site for quick access:

  `http://www.ibm.com/servers/eserver/pseries/cuod/index.html`

  As part of the order process, VPD collected from the installed server is combined with information from the actual order records for processor on demand activation features. This combined information is used to generate a processor on demand activation code specifically for your server, enabling the activation of the desired number of standby processors. Allow some time for the order processing and posting

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of the processor on demand activation code to take place. Then use the code to activate the processor on demand features directly on your server.

Processor on demand activation features will not be fulfilled until you submit the VPD through the Electronic Service Agent or manually to the following Web site:

`http://www.ibm.com/servers/eserver/pseries/cuod/index.html`

When you enter a processor on demand activation code, standby processors will immediately become activated for use. After their status changes from Standby to Active, the processors can be dynamically moved to the partition where they are needed.

Electronic Service Agent and Processor on Demand

When Electronic Service Agent is used to electronically report VPD on a regular basis, you can eliminate potential delays in the order process for processor on demand activation features (no manual reporting of VPD is necessary prior to the fulfillment of a feature upgrade order). To best utilize Electronic Service Agent and to be prepared to activate processor on demand features conveniently, make sure that Electronic Service Agent and related communications requirements are up and running. If this is done before the processor on demand activation features are ordered, the VPD for the system will already be up to date, and the manual process of updating the VPD is not needed.

After Electronic Service Agent is installed, follow the procedures under “Activating Process for Processor on Demand” on page 8 to enable the system to collect and transfer the required VPD for processor on demand.

If a processor on demand activation feature is ordered and then canceled, an action by the service representative is required to cancel the order. After the activation code is posted on the Web or mailed, the order for processor on demand activation features is considered fulfilled, and the downstream billing process is started.

Dynamic Processor Sparing

In environments with CUoD, Dynamic Processor Sparing allows inactive processors to act as “dynamic spares”. An inactive processor is transparently activated if a failing processor reaches a predetermined error threshold, thus helping to maintain performance and improve system availability. Starting with AIX 5L V5.2, this capability is offered on pSeries servers with CUoD to help minimize the impact to server performance caused by a failed processor. This will happen dynamically and automatically when using DLPAR and the failing processor is detected prior to failure. If not detected prior to failure or not using DLPAR, a reboot of the system will bring onboard an alternate processor from the inactive spares. The user can then re-establish required performance levels without waiting for parts to arrive on-site. Dynamic Processor Sparing does not require the purchase of an Activation Code, it only requires the system have inactive CUoD processors available.

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Software Licenses and Processor on Demand

Activating a processor may change the terms and conditions for applications that you use on your server. Consult the application documentation to determine if the license terms and conditions requirements change based on hardware configuration.

Activating Process for Processor on Demand

The processor on demand process begins when you determine a potential need for more processing capability in the future and want to have the hardware installed on the server now. If processor on demand features are ordered for your server, they are included in the server when it is delivered. When additional processors become a necessity, use the following steps to activate them:

1. Determine the number of standby processors you want to activate.
2. Contact your sales representative or business partner to place an order for particular processor on demand activation features.
3. The sales representative places an order to the system coordinator or feature coordinator for the specific number of processor on demand activation features. The order specifies the number of additional processors you have requested to add.
4. To process the order, you must send the system Vital Product Data (VPD) to IBM in either of the following ways:
   - Electronic process (Electronic Service Agent)
   - Web-based VPD entry:

   For details on how to submit the VPD either through the Electronic Service Agent or using the Web system go to the following Web site and locate the document *Planning Guide for Capacity Upgrade on Demand*. The planning guide provides detailed procedures.

   `http://www.ibm.com/servers/eserver/pseries/cuod/index.html`
5. After the Activation Code is received (either from the Web or the mailed copy), enter the Activation Code using the HMC. Detailed procedures are available in the document *Planning Guide for Capacity Upgrade on Demand*.
6. Once you have finished the acivation process, you can assign the activated processors to a partition. If you are using dynamic partitioning (DLPAR), you need not reboot the system to use the processors. If you are not using DLPAR, you must reboot the managed system before the newly activated processors can be used.

   Before adding processors to a partition that is running Linux, you must stop Linux partitions and then restart them after you have assigned the processors.

Begin using the new processor capacity. If you encountered any problems using the preceding process, see the following Web site:

`http://www.ibm.com/servers/eserver/pseries/cuod/index.html`

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Chapter 2. Using the @server pSeries 690

This chapter discusses the Hardware Management Console for pSeries (HMC), system power control, and drives supported by the server.

Hardware Management Console (HMC) Overview and Setup

The Hardware Management Console (HMC) uses its connection to the processor subsystem to perform various functions. The main functions of the HMC include:

- Creating and maintaining a multiple partition environment
- Detecting, reporting, and storing changes in hardware conditions
- Acting as a service focal point for service representatives to determine an appropriate service strategy

Note: The HMC is shipped with the pSeries 690 and is the main interface for configuring and managing resources on this system through the HMC virtual terminal window. *Virtual terminal window* refers to the operating system session on a particular window. You can have up to 16 virtual terminal windows.

All the tasks you need to maintain the interface, the underlying operating system, and the HMC application code are available by using the HMC's management applications.

For more information on the HMC, refer to the *IBM Hardware Management Console for pSeries Installation and Operations Guide*.

System Power-on Methods

Using the HMC to power on the managed system is recommended. However, the white power button on the media subsystem operator panel can be used to power on the managed system. The managed system will reboot in the same mode in which it was previously booted. (If the managed system was previously booted in partitioned system mode, all partitions will automatically start and run.)

Powering the Server On and Off

This section provides procedures for powering the server on and off.

Progress indicators, also referred to as *checkpoints*, are visible on the media subsystem operator panel display. The power LED on the media subsystem stops blinking and stays on, indicating the system power is on.

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Powering On the Processor Subsystem using the HMC

To power on the processor subsystem using the HMC, do the following:

1. Log in to the HMC with your user ID and password. Refer to the *IBM Hardware Management Console for pSeries Installation and Operations Guide* for more information on HMC user IDs and passwords.
2. Click on the **Partition Management** icon under the HMC hostname to select your preferred partition environment. The Contents area now lists the processor subsystem as available as a managed system. If you have only one processor subsystem, the Contents area lists the processor subsystem as **System A**
3. Select the appropriate managed system.
4. To power on the managed system, select the desired system in the Contents area. Next, on the menu, choose **Selected**.
5. Select **Power On**.

Powering Off the Processor Subsystem Using the HMC

Attention: Shut down the partitions before powering off the processor subsystem.

To power off the processor subsystem using the HMC, do the following:

1. Click on the **Partition Management** icon under the HMC host name to select your preferred partition environment. The Contents area now lists the processor subsystem as available as a managed system. If you have only one processor subsystem, the Contents area lists the processor subsytem as **System A**.
2. Select the appropriate managed system.
3. To power off the managed system, select the desired system in the Contents area. Next, on the menu, choose **Selected**.
4. Select **Power Off**.
5. A screen displays to verify that you want to power off. Select **Yes**.

Note: Only logical power will be removed; 350V dc power will still be present within the system.

Graphics Console Support

The pSeries 690 supports graphics consoles. Graphics console support requires the following adapters:

- Graphics adapter with a graphics display attached
- Universal Serial Bus (USB) adapter with a keyboard and mouse attached

Only one graphics console is supported per system partition. If the system is running partitions, up to eight partitions can have graphics consoles.

The graphics console is functional only when AIX is running. For any installation or service processor functions, you must use the HMC.

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Reading the Operator Panel Display

The operator panel display is located in the media drawer of the pSeries 690 and is used to:

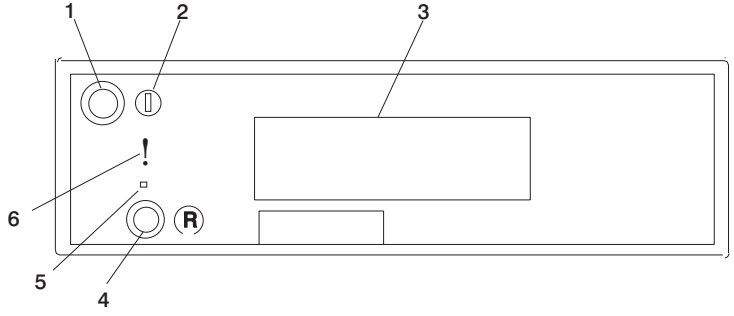
- Track the progress of the system unit self tests and configuration program
- Display codes when the operating system comes to an abnormal end
- Display system messages

Checkpoints

During power-on self-test (POST), four-digit checkpoints display, indicating the progress of the testing. If an error is detected that requires attention, the server halts with an eight-digit error code displayed in the upper row of the operator panel display, starting in the leftmost position. This eight-digit error code identifies the error. For a listing of the error codes, see the *@server pSeries 690 Service Guide*.

The four-digit checkpoints are in the form of `nnnn`, where `n` is an alphabetic or numeric character.

The following diagram shows the locations of the operator panel display and components of the operator panel.



1	Power on/off button	**4**	Reset button
2	Power on/off LED	**5**	Service processor reset button (Service use only)
3	Operator panel display	**6**	Disturbance or system attention LED

Disturbance or System Attention LED

The system attention LED on the operator panel is turned on when an entry is made in the service processor error log that gets transmitted to the system-level error logs (the AIX error log and the service action event log in service focal point). When the attention light comes on, examine these error logs to see if user intervention is required.

If a hardware problem is indicated, call service support. If no intervention is required, the system attention LED can be turned off by either of the following methods:

- On the HMC's graphical interface, as follows:
  1. Click on the **Service Applications** icon.

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

For more information about the operator panel as it relates to the HMC, see the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590.

- As a user with root authority, enter `diag` on an 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 and from the main menu do the following:
  1. Select **System Information Menu**.
  2. Select **LED Control Menu**.
  3. Select **Clear System Attention Indicator**. This will turn the LED off.

For more information regarding the LED, refer to Chapter 3, “Using the Service Processor” on page 15.

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Understanding the Power-On Self-Test (POST)

After power is turned on and before the operating system is loaded, the partition does a power-on self-test (POST). This test performs checks to ensure that the hardware is functioning correctly before the operating system is loaded. During the POST, a POST screen displays, and POST indicators appear on the virtual terminal window. The next section describes the POST indicators and functions that can be accessed during the POST.

POST Indicators

POST indicators indicate tests that are being performed as the partition is preparing to load the operating system. The POST indicators are words that display on the virtual terminal window. Each time that the firmware starts another different step in the POST, a POST indicator word appears on the console. Each word is an indicator of the tests that are being performed.

The POST screen displays the following words:

Memory
Memory test

Keyboard
Initialize the keyboard and mouse. The time period for pressing a key to access the System Management Services, or to initiate a service mode boot is now open. See “POST Keys” for more information.

Network
Self-test on network adapters

SCSI
Adapters are being initialized

Speaker
Sounds an audible tone at the end of POST

POST Keys

The POST keys, if pressed *after* the **keyboard** POST indicator displays and *before* the last (speaker) POST indicator displays, cause the system to start services or to initiate service mode boots used for configuring the system and diagnosing problems. The keys are described below:

Note: The program function keys (F1-F12) on a keyboard attached to the HMC or USB card are not used and will be ignored. After the **keyboard** POST indicator displays, you must use the numeric number keys to enter input.

1 Key

The numeric 1 key, when pressed during POST, starts the System Management Services (SMS) interface.

5 Key

The numeric 5 key, when pressed during POST, initiates a system boot in service mode using the default service mode boot list.

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6 Key

The numeric 6 key works like the numeric 5 key, except that the firmware uses the customized service mode bootlist.

8 Key

This option is used by service personnel. To enter the open firmware command line, press the numeric 8 key *after* the word **keyboard** displays and *before* the last word **speaker** displays during startup. After you press the 8 key, the remaining POST indicators display until initialization completes.

When initialization and POST are complete, the open firmware command line (an `0K` prompt) displays.

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

To exit from the open firmware command prompt, type `reset-all` or power off the system and reboot.

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Chapter 3. Using the Service Processor

Note: 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 primary I/O book (location U1.18-P1-H2). None of this information is applicable to the serial ports, or modems attached to those serial ports, on the Hardware Management Console for pSeries (HMC).

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

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 AIX 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 HMC virtual terminal window when 0K is displayed on the operator panel or when the service processor has detected a server 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 server is powered off, the service processor menus can be accessed locally or remotely on the following:

- Serial port 1 (S1)
- Serial port 2 (S2)
- The HMC

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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 `0K` displays in the operator panel, press any key on the keyboard to signal the service.

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 locks out access to the ASCII terminals and the other way around.

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 indicates `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 45), access the service processor menus 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 server. Refer to “Save or Restore Hardware Management Policies,” in “Introduction to Tasks and Service Aids” for information about this service aid.

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.

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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.

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- **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 61.
- **Read Service Processor Error Logs**

  Displays the service processor error logs. For an example, refer to “Service Processor Error Logs” on page 60.
- **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.

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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 server during setup

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

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

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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 21 for more information.
- **System Power Control Menu**
  See “System Power Control Menu” on page 27 for more information.
- **System Information Menu**
  See “System Information Menu” on page 32 for more information.
- **Language Selection Menu**
  See “Language Selection Menu” on page 42 for more information.
- **Call-In/Call-Out Setup Menu**
  See “Call-In/Call-Out Setup Menu” on page 44 for more information.
- **Set System Name**
  Allows setting of the system name.

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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 Policy:
 Currently Never

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.

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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 4, “Using System Management Services” on page 67). 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 server) or remotely (through a modem). The error threshold is three attempts.

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

If the error threshold is reached by someone entering passwords remotely, the service processor commands the server to power off to prevent potential security attacks on the server 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.

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- **Change Privileged-Access Password**

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

- **Change General-Access Password**

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

  Note: The general-access password can only be set or changed 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 59.

- **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.

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- **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 56 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 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

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- **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 AIX, 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 several 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:

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– 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 Policy Menu

   1. Scan Log Dump Policy:
        Currently Never

   2. Scan Log Dump Content:
       Not Applicable

  98. Return to Previous Menu

0>
```

Option 1 displays the following screen:

```
   Select from the following options:
(As needed=1, Never=2, Always=3, Immediate=4)

   Enter new option:

0>
```

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

1 = As needed
The processor run-time diagnostics record the dump data based on the error type. Selecting this option will set the scan log dump policy to ″Not Applicable″. This is the default value.

2 = Never
Selecting this option will set the scan log dump policy to ″Not Applicable″.

3 = Always
Selecting this option will set the scan log dump policy to ″Currently Checkstop Hardware Abbreviated″; this is the default. However, if the dump policy is set to always, the scan log dump content can be changed, by selecting option 2, to either ″abbreviated″ or ″complete″. Selecting ″complete″ will result in more data being stored in a larger scan dump, but the scan dump operation will take longer.

4 = Immediately
This option 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 policy can also be set from the Tasks menu in the AIX service aids.

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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 Enabled

  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 server 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 servers that require automatic power-on after a power failure. For more information, see “System Power-On Methods” on page 50.

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- **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 44 for information on configuring modems.

Option 2 is used to set the number of rings.

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

    On a partitioned system, this setting is ignored.

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- **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.

  If set to Yes on a partitioned system, the service processor restarts the system when the system loses control and it is detected by service processor surveillance.

- **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.

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- **Boot Mode Menu**

  Note: This option is disabled in partitioned systems.

  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.

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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

12. Performance Mode Setup 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 61.

- **Read Service Processor Error Logs**

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Displays error conditions detected by the service processor. Refer to “Service Processor Error Logs” on page 60 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 automatically deconfigures a CPU during a system boot if a processor has failed BIST POST, 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.

  Repeat gard is enabled by default.

  For more information, see “Configuring and Deconfiguring Processors or Memory” on page 55.

  Enable/Disable Dynamic Processor Sparing

  This option is part of the Capacity Upgrade on Demand (CUoD) function. Dynamic Processor Sparing is the capability of the system to deconfigure a failing (or potentially failing) processor and then configure a replacement processor from the unlicensed CUoD processor pool.

  If the system is running logical partitions, the hot sparing operation takes place while the system is running. If the system is booted in a full system partition, the system must be rebooted for the processor sparing operation to take place.

  Processor hot sparing is enabled by default.

  Note: The memory affinity of the failing processor is not taken into account when the replacement processor is assigned; the replacement processor is the next processor that is available.

  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 the processor, and then reconfigure the processor at a later time. An example of this menu follows:

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```
       PROCESSOR CONFIGURATION/DECONFIGURATION MENU

77. Enable/Disable CPU Repeat Gard: Currently Enabled

78. Enable/Disable Processor Hot Sparing (if available): Currently Enabled

 1.  0  3.0  (00)  Configured by system     2.  1  3.1  (00)  Deconfigured by system
 3.  2  3.2  (00)  Configured by system     4.  3  3.3  (00)  Configured by system
 5.  4  3.4  (00)  Configured by system     6.  5  3.5  (00)  Deconfigured by system
 7.  6  3.6  (00)  Configured by system     8.  7  3.7  (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 AIX.

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. 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. The default is enabled.

To enable or disable processor hot sparing, use option 78. The default is enabled.

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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.

Note: The processor numbering scheme used by the service processor is different from the numbering scheme used by AIX. To ensure that the correct processor is selected, consult the AIX documentation before configuring or deconfiguring a processor.

Note: To determine the number of processors available to AIX, run the following command on the AIX command line: `bindprocessor -q`

- **Memory Configuration/Deconfiguration Menu**

  Enable/Disable Memory Repeat Gard

  Memory repeat gard partially or fully deconfigures a memory book automatically during a system boot if a memory book has failed BIST POST, caused a machine check or checkstop, or has reached a threshold of recoverable errors. The memory will remain deconfigured until repeat gard is disabled or the memory book is replaced.

  Memory repeat gard is enabled by default.

  For more information, see “Configuring and Deconfiguring Processors or Memory” on page 55.

  Runtime Recoverable Error Repeat Gard

  Runtime recoverable error repeat gard 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 half-book or book in which the error occurred will be taken offline.

  Runtime Recoverabe Error Repeat Gard is disabled by default.

These menus allow the user to change the system memory configuration. If it is necessary to take one of the memory books partially or completely offline, this menu allows you to deconfigure a book, and then reconfigure the book at a later time. This menu also allows you to see if the repeat gard function has partially or completely deconfigured a memory book.

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

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```
       MEMORY CONFIGURATION/DECONFIGURATION MENU

77. Enable/Disable Memory Repeat Gard: Currently Enabled

78. Runtime Recoverable Error Repeat Gard: Currently Enabled

 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 book. The following is an example of this menu.

```
       MEMORY CONFIGURATION/DECONFIGURATION MENU


 1: 16.16(00, -)  Configured by system   2: 17.17(00, -) Configured by system
 3: 18.18(00, -)  Configured by system   4: 19.19(00, 1) Partially deconfigured 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 AIX.

The fields in the previous table represent the following:

Column 1
1. Menu selection index/book number

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

Column 3
(00, -) Error/deconfiguration status

The error status of the each memory book is indicated by (AB, -1) 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.

An error status of (00, -) (for example, `11.16(00, -)`) indicates that the memory book has not had any errors logged against it by the service processor, and it is fully configured.

The field after the error status will be a "-", "0", or "1". The dash indicates that the memory book is fully configured. A zero or a one indicates that memory repeat gard

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has deconfigured half of the memory book. If this occurs, the status of the book in the menu is shown as “Partially deconfigured by system.”

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

This menu only allows the deconfiguration of an entire book; it does not allow the manual deconfiguration of half a book. If half a book has been configured by the sytem (“Partially deconfigured”), it can be manually reconfigured using this menu.

In the previous example menu, each line shows two books and indicates whether they are configured, deconfigured, or partially deconfigured.

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

To enable or disable runtime recoverable error repeat gard, use option 78 of the Memory Configuration/Deconfiguration Menu. The default is enabled.

The failure history of each book is retained. If a book 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 book is taken offline again because of its history of failures.

The four inner memory books, if present, are listed first, followed by the four outer books, if present. The memory books are shown in the following order of physical location code:

1	U1.18-P1-M2	5	U1.18-P1-M4
2	U1.18-P1-M3	6	U1.18-P1-M8
3	U1.18-P1-M7	7	U1.18-P1-M5
4	U1.18-P1-M6	8	U1.18-P1-M1

- **Power Control Network Utilities Menu**

```
       POWER CONTROL NETWORK UTILITIES MENU

 1. Lamp Test for all Operator Panels

 2. Display I/O Type
  Not Supported
 3. Change I/O Type

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.

  – **Change I/O Type**

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Use this option to change the I/O type of the primary I/O book 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:

- For the I/O drawer address, type 1.
- For the I/O type, type 98.

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

- **LED Control Menu**

  This menu displays the state of the processor subsystem disturbance or 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 available only when the system is in the error state (the CEC is powered on and the service processor menus are available). Option 1 is not available when the system is in standby.

  An example of this menu follows:

```
        LED Control Menu


 1. Set/Reset Identify LED state

 2. Clear System Attention Indicator

98. Return to Previous Menu

   0 >
```

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

If option 1 is selected, a list of location codes of the I/O subsystems and the CEC drawer displays. The screen will be similar to the following:

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```
1.  U1.9-P1

2.  U1.9-P2

3.  U1.5-P1

4.  U1.5-P2

5.  U1.1-P1

6.  U1.1-P2

7.  U2.1-P1

8.  U2.1-P2

9.  U2.5-P1

10.  U2.5-P2

Enter number corresponding to the location code, or
press Return to continue, or 'x' to return to the menu.
0>4
```

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

```
U1.5-P2 is currently in the OFF state

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

U1.5-P2 is currently in the OFF state
        (Press Return to continue)
```

Option 2, Clear System Attention Indicator, will clear the attention indicator on the operator panel in the media drawer.

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

  Attention: Do not power on the system when in this menu. Fully eixt this menu before powering on the system.

  This menu tracks the number of times that the MCM(s) and L3 cache modules have been plugged into the system backplane.

  If an MCM or L3 cache module is replaced the plug count for tha module must be incremented by 1. If the plug count exceeds the limit of 10 (reaches 11 or greater), a 450x yyyy or 4B2x yyyy error with a detail value of CFF0 that calls out an MCM or L3 cache module will be posted in the service processor error log. The FRU should be replaced during a deferred service call.

  If an MCM or L3 cache module is replaced, or installed during an MES upgrade, the plug count must be set using the interposer plug count menu. If the plug count information is not inclueded with the new or replacement module, enter the default

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value of 7. If the plug count is not entered, a B1xx 4698 error code, with a detail value of E10B or E10C, will be posted in the service processor error log.

If the primary I/O book is replaced, the plug counts are retained. However the plug count menu must be accessed and option 50, ″Commit the values and write to the VPD,″ must be executed so that the plug counts are revalidated If the counts are not revalidated, a B1xx 4698 error code, with a detail value of E10B or E10C, will be posted in the service processor error log.

Notes:

1. The plug count will be zero for those positions in which L3 cache modules and MCMs have never been installed.
2. If MCM and L3 modules are removed from the system and not replaced, those plug counts are retained until they are manually changed.

A screen similar to the following will be displayed. In this example, all four MCMs and all 16 L3 modules are shown.

```
                    MCM/L3 Interposer Plug Count Menu

 1. L3_13:7   2. L3_0:7    3. MCM_0:7   4. L3_1:7   5. L3_4:7

 6. L3_14:7   7. L3_3:7                 8. L3_2:7   9. L3_7:7

                   10. MCM_3:1        11. MCM_2:1

12. L3_15:7  13. L3_10:7  14. MCM_1:7   15. L3_11:7  16. L3_6:7

17. L3_12:7   18. L3_9:7                19. L3_8:7   20. L3_5:7

50. Commit the values and write to the VPD

98. Return to Previous Menu
```

The format of the preceding menu entries is the menu index number, followed by L3_xx, followed by the plug count after the colon. The following table correlates the preceding information with the physical location codes.

Menu Index Number	Physical Location Code
1. L3_13	U1.18-P1-C5
2. L3_0	U1.18-P1-C6
3. MCM_0	U1.18-P1-C1
4. L3_1	U1.18-P1-C7
5. L3_4	U1.18-P1-C8
6. L3_14	U1.18-P1-C9
7. L3_3	U1.18-P1-C10
8. L3_2	U1.18-P1-C11
9. L3_7	U1.18-P1-C12

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10. MCM_3	U1.18-P1-C2
11. MCM_2	U1.18-P1-C3
12. L3_15	U1.18-P1-C13
13. L3_10	U1.18-P1-C14
14. MCM_1	U1.18-P1-C4
15. L3_11	U1.18-P1-C15
16. L3_6	U1.18-P1-C16
17. L3_12	U1.18-P1-C17
18. L3_9	U1.18-P1-C18
19. L3_8	U1.18-P1-C19
20. L3_5	U1.18-P1-C20

To change the plug count for a particular module, enter a menu index number. For example, to change the plug count of the L3 module that is physically in the upper-right corner (U1.18-P1-C8), type 5, then enter the new plug count.

When all of the new plug counts have been entered, select 50, **Commit the values and write to the VPD**. This action stores the new values in NVRAM.

- **Performance Mode Setup Menu**

  If certain types of processor cards are installed in the system, this menu is ″not applicable.″ For other types of processor cards, this menu will be active after the first boot as noted below.

  Note: The first time the system is booted after NVRAM is cleared, ″Not Applicable″ will display under ″Performance Mode Setup Menu″ on the screen. This may also happen if the service processor is replaced, or the processor MCMs are upgraded.

  If option 12 is selected when ″Not Applicable″ is on the screen, the system will respond with ″Not Applicable″ and redisplay the system information menu. The setup menu can be displayed after the performance mode is set, which happens the first time the system is booted.

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 performance mode setup menu. The performance mode setup menu will be similar to the following:

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```
                    Default Performance Mode:  Large Commercial System optimization

 1. Current Performance Mode:
 Large Commercial System optimization


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 MCM configuration changes, such as going from an 8-way to a 24-way system, will cause the default performance mode to change. This new setting will not be 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`.

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 best 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.

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.

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```
      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.

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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 primary I/O book (location U1.18-P1-H2). 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 hardware management console (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 45.
- **Serial Port Selection Menu**, see “Serial Port Selection Menu” on page 46.
- **Serial Port Speed Setup Menu**, see “Serial Port Speed Setup Menu” on page 47.
- **Telephone Number Setup Menu**, see “Telephone Number Setup Menu” on page 47.
- **Call-Out Policy Setup Menu**, see “Call-Out Policy Setup Menu” on page 49.
- **Customer Account Setup Menu**, see “Customer Account Setup Menu” on page 50.
- **Call-Out Test** tests the configuration after the modem is installed and configured correctly.

  Note: If the system is running in partition mode, the call-out option is disabled.

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Modem Configuration Menu

Note: This option applies only to a modem attached to serial port 1 (S1) or serial port 2 (S2) on the primary I/O book.

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 169.

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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: If the system is running in partition mode, call-out is disabled.

```
       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.

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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.

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```
       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 server. 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 58).

  Note: If the system is running in partition 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.

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- **Customer Voice Telephone Number** is the telephone number of a phone near the server or answered by someone responsible for the server. This is the telephone number left on the pager for callback. For test purposes, use a test number, which you can change later.
- **Customer System Telephone Number** is the telephone number to which your server's modem is connected. The service or administrative center representatives need this number to make direct contact with your server for problem investigation. This is also referred to as the *call-in* phone number.

Call-Out Policy Setup Menu

Note: Call-out is disabled in 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 server to retry calls that failed to complete.

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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. Leave these fields unassigned if your service provider does not use RETAIN.

Call-out Test

Call-out test is disabled in partitioned systems.

Service Processor Parameters in Service Mode (Full System Partition)

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

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

When service mode is exited, the service processor functions are re-activated.

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

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The server 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 server 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 27.

  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 server can operate a timer, much like the wake-up timer on your clock radio. You can set the timer so that your server powers on at a certain time after shutting down. The timer is battery-operated, so power interruptions that occur while the server 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 (exceeding the hold-up time of any optional IBFs) is in progress when the timed power-on attempt occurs, the server 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.

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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 server 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 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. If set to yes on 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).

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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.

This setting is ignored on a partitioned system.

Enable supplemental restart policy - The default setting is yes. When set to yes on 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 partitioned system, 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 52.

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

In a partitioned system, the service processor’s supplemental restart policy is the only setting that is used, as shown in the following table:

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Service Processor enable supplemental restart policy	System Response
No	
Yes (default)	Restarts

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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 books with a failure history are marked ″bad″ to prevent their being configured on subsequent boots.

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

- A processor or memory book 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 book causes a machine check or check stop during runtime, and the failure can be isolated specifically to that processor or memory book (as determined by the processor runtime diagnostics in the service processor).
- A processor or memory book 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 books that are marked “bad.”

If a processor or memory book is deconfigured, the processor or memory book remains offline for subsequent reboots until it is replaced or repeat gard is disabled. The repeat gard function also provides the user with the option of manually deconfiguring a processor or memory book, or re-enabling a previously deconfigured processor or memory book. For information on configuring or deconfiguring a processor, see the Processor Configuration/Deconfiguration Menu on page 33.

For information on configuring or deconfiguring a memory book, see the Memory Configuration/Deconfiguration Menu on page 35. 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 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.

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Service Processor System Monitoring - Surveillance

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

Surveillance is available during two phases:

- System firmware bringup (automatic)
- Operating system runtime (optional)

Note: Operating system surveillance is disabled on 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.

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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.

You can also use service processor menus and AIX service aids to enable or disable operating system surveillance.

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 three options above, a fourth 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 52.

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

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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.

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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 a 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 server 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.

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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). AIX 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 screen is shown below.

```
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.

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LCD Progress Indicator Log

The following is an example of the LCD progress indicator log. It shows the types of entries that may 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..U1.5-P1-I14/E1
          0539..
          0742..U1.5-P1-I12/E1
          0539..
          0776..U1.5-P1-I10/T1
          E139
          E1FB
          E139
          E183
Press Return to continue, or 'x' to return to menu. >
          EAA1..U1.9-P1-I14
          E172..U1.9-P1
          E172..U1.9-P1-I14
          E172..U1.9-P1
          94BB
          9109
          9380
          9108
          9107
          9106
          9105
          9118
          9104
          9103
          9102
          90FD
```

Resetting the Service Processor

Some error conditions might cause the service processor to hang. The service processor must be reset to recover from a hung condition. If the system is powered on, resetting the service processor will cause the system to shut down. When the service processor is reset, it carries out its power-on sequence, including self-tests. Successful completion of the reset sequence is indicated by `0K` in the operator panel in the media drawer.

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Before resetting the service processor, if the managed system is powered on and running AIX, shut down all partitions, or the full system partition. This action causes the system to shut down and the system power is turned off.

To reset the service processor when the managed system is powered off, perform either of the following:

- If the service processor is responding to input from the HMC (or ASCII terminal), select **Service Processor Setup Menu** from the main menu, then select **Reset Service Processor**. This can only be done by a privileged user.
- Put the UEPO switch in the off position, then back to the on position.

Note: Do *not* use the pinhole reset switch to reset the service processor.

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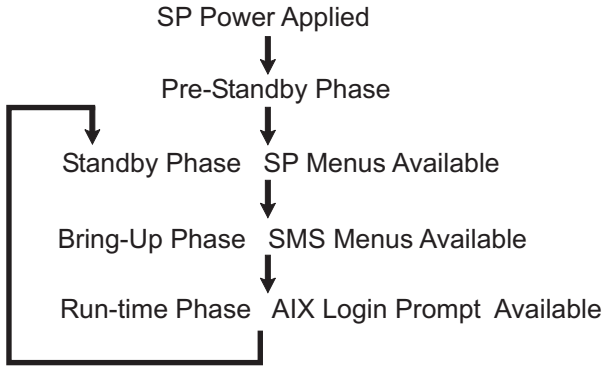
Service Processor Operational Phases

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



Pre-Standby Phase

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

The pre-standby phase components are:

- 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 server. 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.

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Standby Phase

The standby phase can be reached in either of two ways:

- With the server off and power connected (the normal path), recognized by `0K` in the LCD display.

  OR

- With the server 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 server 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 primary I/O book, and on terminal emulators. On HMC-managed systems, service processor menus are also available on the HMC graphical user 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 when `LPAR` displays on the operator panel. At this point, the server can start multiple logical partitions which would be activated through the HMC graphical user 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

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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.

Run-Time 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.

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Chapter 4. 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.

To start the text-based System Management Services, press the number **1** key on the terminal or in the virtual terminal window on the HMC after the word **keyboard** appears and before the word **speaker** appears. After the text-based 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 menus can also be started using the Service Processor Boot Mode Menu. See page 31.

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.

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

N Display the next page of the list.

P Display the next 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, either *m* or *M* takes you back to the main menu.

On each menu screen, you can choose either a menu item and press Enter (if applicable), or select 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: _
```


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Password Utilities

Note: This option is disabled in partitioned systems.

The Password Utilities menu enables you to select from password utilities.

```
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: _
```

Set Privileged-Access Password

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: _
```


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

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Setup Remote IPL (Initial Program Load)

This option allows you to enable and set up the remote startup capability of your system unit. You must first specify the network parameters.

```
Network Parameters

 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 Parameters option displays the following menu.

```
IP Parameters

 1. Client IP Address    [000.000.000.000]
 2. Server IP Address    [000.000.000.000]
 3. Gateway IP Address   [000.000.000.000]
 4. Subnet Mask          [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 (Internet Protocol) parameters, type the number of the parameters for which you want to change the value.

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

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Selecting the **Adapter Parameters** option allows you to view an adapter's hardware address, as well as configure network adapters that require setup. A menu similar to the following displays.

```
 Device                                Slot             Hardware Address

 1. 10/100 Ethernet Adapter         U1.9-P1-I4/E1          000629aca72d
 2. 10/100 Ethernet Adapter         U1.5-P2-I3/E1          0020357A0530
 3. High Speed Token-Ring Adapter   U1.5-P1-I3/T1          000629be04e1
 4. Gigabit Ethernet PCI Adapter    U1.1-P2-I3/T1          0004ac7c9ec7




-------------------------------------------------------------------------------------------------
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: _
```

Entering adapter parameters on these screens will automatically update the parameters on the ping test screen.

Selecting an adapter on this menu displays configuration menus for that adapter:

```
10/100 Ethernet TP PCI Adapter


1. Data Rate           [Auto]
2. Full Duplex         [Yes]







-------------------------------------------------------------------------------------------------
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: _
```


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Selecting the **Data Rate** option allows you the change the media usedd by the Ethernet adapter:

```
Data Rate

  1. 10 Mbps
  2. 100 Mbps
  3. Auto




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

```
Full Duplex

  1. Yes
  2. No
  3. Auto




-------------------------------------------------------------------------------------------------
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: _
```

From the Network Parameters Menu, select **Ping** to test a connection to a remote system unit. After selecting the **Ping** option, you must choose which adapter communicates with the remote system.

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```
Adapter Parameters

Device                                Slot             Hardware Address

1. 10/100 Ethernet Adapter         U1.9-P1-I4/E1          000629aca72d
2. 10/100 Ethernet Adapter         U1.5-P2-I3/E1          0020357A0530
3. High Speed Token-Ring Adapter   U1.5-P1-I3/T1          000629be04e1
4. Gigabit Ethernet PCI Adapter    U1.1-P2-I3/T1          0004ac7c9ec7




-------------------------------------------------------------------------------
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: _
```

After selecting an adapter, you will be asked to set the parameters for the adapter; a menu similar to the following displays:

```
Adapter Parameters
10/100 Ethernet Adapter
  1. Data Rate     [Auto]
  2. Full Duplex    [Auto]
  3. Continue with Ping




-------------------------------------------------------------------------------
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: _
```


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

```
Ping Test

 1. Client IP Address    [129.132.4.20]
 2. Server IP Address    [129.132.4.10]
 3. Gateway IP Address   [129.132.4.30]
 4. Subnet Mask          [255.255.255.0]
 5. Execute 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: _
```

If changes to the adapter parameters must be made in this screen, entering those changes will not automatically update the Adapter Parameters screen. Go back to the adapter parameters menu to make any changes.

Notes:

1. After the ping test is initiated, it might take up to 60 seconds to return a result.
2. When the ping test completes, the firmware stops and waits for a key to be pressed before continuing.

Change SCSI Settings

This option allow 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: _
```


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Select Console

Note: This option is disabled in partitioned systems.

The Select Console option allows the user to select the console to use to display the SMS menus. This selection is valid only for the SMS menus and does not affect the display used by the AIX 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: _
```

The following options are explained as follows:

1. **Select Install or Boot a Device** allows you to select a device to boot from or to install the operating system from. This selection is for the current boot only.
2. Select Boot Devices allows you to set the boot list.
3. **Multiboot Startup** toggles the multiboot startup flag, which controls whether the multiboot menu is invoked automatically on startup.

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If **Diskette** is selected, the following menu is displayed:

```
  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 does not reside 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: _
```


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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=U1.9-P2/Z1-A8,0)
 2.        -      SCSI 18200 MB Harddisk (loc=U1.9-P2/Z1-A9,0)
 3.        -      SCSI 18200 MB Harddisk (loc=U1.9-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=U1.9-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 requests confirmation. 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.

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Select Boot Devices

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 Boot Device options are selected, the Select Device Type screen displays, which will be 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: _
```


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When a device type is selected, Select Task menu displays, similar to the following:

```
 Select Task

SCSI 18200 MB Harddisk (loc=U1.9-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 (U1.9-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.

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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=U1.9-P2/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:

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




-------------------------------------------------------------------------------------------------
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: _
```


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Multiboot Startup

The Multiboot Startup option 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) at the Utilities menu to boot your system or partition. On all other screens, typing **x** returns you to the previous screen.

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Chapter 5. Using the Online and Standalone Diagnostics

The diagnostics consist of online diagnostics and standalone diagnostics.

Attention: The AIX operating system must be installed in a partition in order to run online diagnostics 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.

Online and Standalone Diagnostics Operating Considerations

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 only available 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 partitioned system, the device from which you are booting standalone diagnostics must be made available to the partition dedicated to running standalone diagnostics. This may 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. If you move devices, reboot both partitions. For more information, see “Standalone Diagnostic Operation” on page 88.
- 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.

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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.

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. Bypass these difficulties by pressing 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 panel displays, and you are required to go through the DEFINE TERMINAL process again.

Running Online Diagnostics

Consider the following when you run the online diagnostics from a server or a disk:

- The diagnostics cannot be loaded and run from a disk until the AIX operating system has been installed and configured.
- 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 full system partitions, 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.

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Online Diagnostics Modes of Operation

Note: When running online diagnostics on a partition in a partitioned system, diagnostics can be run only on resources that are allocated to that partition.

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 system on a full system partition. All partition or system on a full system partition resources, except the SCSI adapter and the disk drives used for paging, can be tested. However, note that the memory and processor are only tested during POST, and the results of the POST tests are reported by diagnostics.

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

Running 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. 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 see the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590, for more information about full system partitions).
10. Make sure that there are no media in the devices in the media subsystem.
11. Enter any passwords, if requested.

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Note: If you are unable to load the diagnostics to the point when the DIAGNOSTIC OPERATING INSTRUCTIONS display, go to “Step 2.5 Loading the Standalone Diagnostics from CD-ROM” on page 142.

Concurrent Mode

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 the Problem Determination option 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.

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4. When testing is complete, use 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 the **Problem Determination** option 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, use 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.

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Standalone Diagnostic Operation

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 SCSI 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.

Partitioned System Considerations for Standalone Diagnostics

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). For a partitioned system, before running standalone diagnostics on a given partition, the user must move the device from the existing location where standalone diagnostics is booted (the CD-ROM drive or the network adapter connected to the NIM server, in the case of NIM boot of standalone diagnostics), to the partition that will run standalone diagnostics. Devices on a partitioned system are moved on an I/O-slot basis.

If the CD-ROM drive is moved from one partition to another, all SCSI devices on the same SCSI adapter card to which the CD-ROM drive is attached must be moved to the same partition. It is recommended that you attach few SCSI devices to the same SCSI controller card to prevent moving them, along with the CD-ROM drive, between

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partitions. A reboot is required on the partition containing this device and on the moved device, but the system itself is *not* powered off in order to boot standalone diagnostics in a logically partitioned system..

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

Loading the Standalone Diagnostics from CD-ROM

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

1. Stop all programs including the AIX operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROMs.
3. Power off the pSeries 690 (see the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, order number SA38-0590, for more information about full system partitions).
4. Right-click the mouse and select **Open Terminal Window**.
5. From the service processor menu on the VTERM, 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**.
9. Insert the CD-ROM into the CD-ROM drive in the media subsystem in the pSeries 690 (*not* into the HMC's CD-ROM drive).

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.

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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. Refer to the **Multiboot** section under “SMS” in the client system’s service guide for information on setting the bootlist.

NIM Server Configuration

See 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

To verify that the client system is registered on the NIM server and the diagnostic boot is enabled, run the command **lsnim -a Cstate -Z *ClientName*** 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.

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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. Stop all programs including the AIX operating system (get help if needed).
2. 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 AIX operating system. Refer to the AIX operating system documentation for **shutdown** command information.

   Verify with the system administrator and system users who are 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.
3. 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.
4. When the keyboard indicator is displayed (the word **keyboard** on an HMC virtual terminal window), press the number 1 key on the keyboard to display the SMS menu.
5. Enter any requested passwords.
6. Select **Setup Remote IPL (Initial Program Load)**.
7. Enter the client address, server address, gateway address (if applicable), and subnet mask. Exit to the Network Parameters screen.
8. 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, refer to the *Boot Problems* section of the @server *pSeries 670 Service Guide* and follow the steps for network boot problems.

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 AIX login prompt displays, standalone diagnostics did not load. Check the following items:

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– 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, refer to the *Boot Problems* section of the *@server pSeries 670 Service Guide* and follow the steps for network boot problems.

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Chapter 6. Introduction to 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. This chapter describes the Tasks available in AIX Diagnostics Version 4.2 and later.

Note: 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. Still other programs might only be supported on a particular system architecture, such as CHRP (Common Hardware Reference Platform) or RSPC (PowerPC Reference Platform).

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

- Configure Reboot Policy
- Configure Remote Maintenance Policy
- Configure Ring Indicate Power-On Policy
- Update System or Service Processor Flash
- 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.

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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 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
- 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
- SCSI Bus Analyzer

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- 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:

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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.

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Certify Media

This task allows the selection of diskette, DVD-RAM media or hard files to be certified. Normally, this is done for the following two 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, one would run certify if after running diagnostics on a drive and its media, no problem is found, but one still suspects that a problem still does exist.

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 may 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, then the hard file needs to be formatted and certified. If the

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unrecovered data errors, recovered data errors, recovered and unrecovered equipment errors exceed the threshold values, the disk needs to be replaced.

It also makes 2000 random seeks after the read certify of the surface completes. If a disk timeouts 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 backup 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 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.

  Use the following steps to overwrite the data on the drive:

  1. Use the Erase Disk selection to overwrite the data on the drive.

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2. Do a format without certify.
3. Run a second pass of the Erase Disk selection.

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.

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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 (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 it 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.

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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

Note: This service aid runs on CHRP system units only.

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, is used to describe 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.

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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

Note: This service aid runs on CHRP system units only.

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.

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- 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.

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- 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

Note: This service aid runs on CHRP system units only.

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:

Note: 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`

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Configure Scan Dump Policy

Note: This function works only on CHRP systems and only under diagnostics 5.1.0.35 or later.

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)

and

- Scan Dump Size (size and content of the dump)

The Scan Dump Control (SDC) settings are:

- 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 Requested - Dump content is determined by the platform firmware.
- Minimum - Dump content collected provides the minimum debug information. The intent is to allow 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 task directly from the AIX command line by typing:

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


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Configure Surveillance Policy

Note: This service aid runs on CHRP system units only. This service aid is only supported 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).

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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 V4.3 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.

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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

Note: This service aid runs on CHRP system units only.

This task displays the firmware device node information that appears on CHRP platforms. 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.

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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 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.

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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).

- Include Error Log Analysis

  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 are in a popup box at the bottom of the screen which indicate that the test 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]
```


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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 **diaggetrto** and **diagsetrto** 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 option.

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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. If more information is available than can be displayed on one screen, use the Page Down and Page Up keys to scroll through the information.

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.

Use the arrow keys to scroll through the information in the file.

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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

Note: This service aid runs on CHRP system units only.

This service aid displays the environmental sensors implemented on a CHRP 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.

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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 following 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
   ```


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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 and 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.

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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 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 (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. It is recommended that a current backup be available and the installation be scheduled during a non-peak production time period.

Note: If the source is diskette, the diskette must be in a backup format and the image stored in the **/etc/microcode** directory.

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.

Note: If the source is diskette, the diskette must be in backup format and the image stored in the **/etc/microcode** directory.

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See the following command syntax for a PCI FC-ALFiber 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 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.

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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.

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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 126. 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 fastpath 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 fastpath 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 fastpath 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 fastpath 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 fastpath 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.

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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. Then the next pattern is written to all blocks, overlaying the previous pattern. A random pattern is written by selecting the **Write Random Pattern?** option.

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

  Use the following steps to overwrite the data on the drive:
  1. Use the **Erase Disk** selection to overwrite the data on the drive.
  2. Do a format without certify.
  3. Run a second pass of the **Erase Disk** selection.

  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 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** 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.

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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.
*****	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

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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, filesystems, security, the kernel, the ODM, and other system components. You can also choose to 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 may not be added to the system unless there is already a device

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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 three 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, then device configuration is complete. Otherwise, work through the missing options menu to complete device configuration (in diagnostics prior to version 5.2.0) or (in diagnostics version 5.2.0 and later) select the device that has an uppercase `M` shown in front of it in the resource list for missing options processing to 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

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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.

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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 a 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: Be sure that no other host is using the device before you remove it.

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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 selection starts the PCI SCSI-2 F/W RAID Adapter Service Aid.

Identify Indicators

See the “Identify and System Attention Indicators” 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.

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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 system 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 6, “Introduction to Tasks and Service Aids” on page 93.

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.

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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

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

You can run this task directly from the AIX command line. See the following command syntax: `diag -c -d` *pci RAID adapter* `-T identify`

Process Supplemental Media

Diagnostic 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 you need to run diagnostic twice. Once after each supplement media is processed.)

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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 depends on the state of the diagnostics run-time options. See “Display or Change Diagnostic Run-Time Options” on page 110.

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 in AIX 4.3.2 or later, 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 **/tmp** 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 on CHRP platforms
- 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 **/tmp** is available

From the TASK SELECTION LIST menu select **Run Exercisers** then 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 popup may appear stating system performance will be degraded. (The popup does not appear 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 two options (1) **Short Exercise** and (2) **Extended Exercise**. The **Short Exercise** option exercises the resources within a relatively short time and exits. The **Extended Exercise** option allows greater flexibility and control over resources and test duration.

After choosing the **Short Exercise** option, additional menus, pop-ups and prompts may appear for each resource. Please read any text and carefully fill out any prompts before committing. Next, the exercisers start, and the **Device Status Screen** displays. The exercisers runs 5 to 10 minutes depending on the number of processors, processor

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speed, memory size, and I/O configuration. After choosing the **Extended Exercise** option, additional menus, pop-ups and prompts may appear for each resource. Please read any text and carefully fill out any prompts before committing. Following, the **System Exerciser Main Menu** displays. From this menu the exercisers can be activated through option 1 where they will continuously run until halted (option 2) or exited (option x). See also the help text for information on how to use other available options.

When the task completes any errors that were encountered are displayed for review. Finally, an **Exerciser Complete** popup displays. To continue, press the **Enter** key. Following, you will be taken back to the TASK SELECTION LIST menu. If miscompare errors were encountered, run diagnostics on the resource. If the problem is not reported then contact your service support structure. If any other errors were encountered, select and run the Error Log Analysis task. If Error Log Analysis does not report a problem then 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.

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Memory Exerciser

The memory exercisers are labeled `mem`*x*, where *x* is a number for the exerciser. Multiple exercisers can be active.

The memory exerciser requests as many memory buffers as possible from AIX. The exerciser then fills the memory buffers with specified bit patterns, then reads and compares the memory buffers to the specified bit patterns.

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 Dynamic Reconfiguration, 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; (P/N 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

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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.

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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. AIX does not allow the command to be sent if the device is in use by another process.

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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.

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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 needs to 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 118.

System Identify Indicator

For a description of the System Fault Indicator task, see “Identify and System Attention Indicators” on page 126.

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.

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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 it has, 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 machine partition and use the following normal firmware update procedures.

If the system is already in a full machine partition, use the following normal firmware update procedures:

Note: This service aid runs on CHRP system units only.

This selection updates the system or service processor flash for CHRP system units. Some systems may have separate images for system and service processor firmware; newer systems have a combined image that contains both in one image.

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

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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
```

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.

Attention: The **update_flash** command reboots the entire system. Do not use this command if more than one user is logged on to the system.

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.

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- Update EEPROM
  Updates the contents of the EEPROM on a selected controller.
- Replace Controller
  Replaces a controller in the array.

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Command Examples

Use this command syntax to download the adapter microcode:
`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)

Use this command syntax to download physical disk microcode:
`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)

Use this command syntax to format a physical disk:
`diag -c -d deviceName -T "format -l ChId"`

Flag	Description
-l	Physical disk channel/ID (for example, 27)

Use this command syntax to certify a physical disk:
`diag -c -d deviceName -T "certify -l ChId"`

Flag	Description
-l	Physical disk channel/ID (for example, 23)

Use this command syntax to identify a physical disk:
`diag -c -d deviceName -T "identify"`

7318 Serial Communications Network Server Service Aid

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

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Chapter 7. Verifying the Hardware Operation

The system verification procedure checks the system for correct hardware operation. Run the system verification procedure as described in the following steps.

If you are analyzing a hardware problem, see Chapter 8, “Hardware Problem Determination” on page 145.

Step 1. Considerations Before Running This Procedure

Read the following before using this procedure:

- The AIX operating system must be installed on your system before you attempt to perform this procedure.
- If this system unit is directly attached to another system unit or attached to a network, be sure communications with the other systems are stopped.
- This procedure requires use of all of the system resources. No other activity can be running on the system while you are performing this procedure.
- This procedure requires an Hardware Management Console for pSeries (HMC) attached to the HMC port on the pSeries 690.
- This procedure runs the AIX online diagnostics in service mode on a full system partition.

Does the system have AIX diagnostics preinstalled?

YES Go to “Step 2. Loading the Online Diagnostics in Service Mode”.

NO Go to “Step 2.5 Loading the Standalone Diagnostics from CD-ROM” on page 142.

Step 2. Loading the Online Diagnostics in Service Mode

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

1. Stop all programs including the AIX operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROM discs.
3. Power off the managed system (refer to Full System Management Tasks in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*).
4. Use the HMC to power on the managed system in full system partition mode. Select the **Power on Diagnostic Stored Boot List** option (see the *IBM Hardware Management Console for pSeries Installation and Operations Guide* for more information about full system partitions).
5. 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.

Go to step “Step 3. Running System Verification” on page 142.

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Step 2.5 Loading the Standalone Diagnostics from CD-ROM

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

1. Stop all programs including the AIX operating system (get help if needed).
2. Remove all tapes, diskettes, and CD-ROMs.
3. Power off the managed system (see the *IBM Hardware Management Console for pSeries Installation and Operations Guide* for more information about full system partitions).
4. Use the HMC to power on the managed system in full system partition mode. Select the **Power on Diagnostic Stored Boot List** option (refer to Full System Management Tasks in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*).
5. Insert the diagnostic media into the CD-ROM drive of the pSeries 690 (*not* into the HMC CD-ROM drive).
6. Enter any requested passwords.

Go to “Step 3. Running System Verification”.

Step 3. Running System Verification

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

1. Press Enter.
2. If the terminal type is requested, you must use the **Initialize Terminal** option on the Function Selection menu to initialize the operating system before you can continue with the diagnostics. Select **VT100 terminal emulation**.
3. Select the **System Verification** option on the Diagnostic Mode Selection menu.
4. To run a general checkout of all installed resources, select the **All Resource** option on the Diagnostic Selection menu. Follow the instructions on the screen to complete the checkout procedure.

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

The checkout program ends with either of the following results:

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

To perform additional system verification, go to “Step 4. Performing Additional System Verification” on page 143. To exit diagnostics, go to “Step 5. Stopping the Diagnostics” on page 143.

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Step 4. Performing Additional System Verification

To perform additional system verification, do the following:

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

Step 5. Stopping the Diagnostics

To stop the diagnostics, do the following:

1. To exit the diagnostics, press the F3 key (from a defined terminal) or press 99 (from an undefined terminal).
2. If you changed any attributes on your ASCII terminal to run the diagnostics, change the settings back to normal.
3. This completes the system verification. If you received an error code, record the code and report it to the service organization.

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

If you received an error code, record the code and go to the @server *pSeries 690 Service Guide*.

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Chapter 8. Hardware Problem Determination

This chapter provides information on using standalone or online diagnostics to help you solve hardware problems.

You may obtain more extensive problem isolation by running online diagnostics in service mode. This requires that the partition be rebooted (in a logical partitioned system) with no other users on that partition or that the system be rebooted (in a full system partition) with no other users on the system. Alternatively, if AIX online diagnostics are installed on the partition or system, you can run online diagnostics in concurrent mode. If the system or partition does not have AIX diagnostics installed, or if you cannot boot AIX or online diagnostics in service mode, run standalone diagnostics instead.

Problem Determination Using the Standalone or Online Diagnostics

Use this procedure to obtain a service request number (SRN) when you 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 151. 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 *IBM Hardware Management Console for pSeries Installation and Operations Guide* to find the key sequences you need for your Hardware Management Console for pSeries (HMC) virtual terminal window to respond to the diagnostic programs.

- The diagnostics may be run within a virtual terminal window on the HMC connected to the system.
- This procedure requires that you select the type of diagnostics you want to run.
- Go to “Step 2”.

Step 2

Are the online diagnostics installed on this system?

NO	Go to “Step 6” on page 147.
YES	Go to “Step 3” on page 146.

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Step 3

Determine if the partition is accepting commands.

Is the operating system accepting commands?

NO If a partition is not accepting commands (or if the partition has an operating system other than AIX installed), run standalone diagnostics.

YES Go to “Step 4”.

Step 4

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 5”.

YES Go to “Step 6” on page 147.

Step 5

This step starts the online diagnostics in concurrent mode.

Note: The AIX operating system must be installed on the partition on which you want to run online diagnostics.

1. Log in as root user or use CE Login.
2. Enter the `diag` command.
3. Wait until the diagnostic operating instructions display, or wait for three minutes.

Are the diagnostic operating instructions displayed without any obvious console display problems?

NO If the diagnostics operating instructions are not displayed on the partition, reboot that partition.

Note: Do not turn off the system unit if the system is running one or more logical partitions.

Go to “Step 6” on page 147.

YES Go to “Step 9” on page 147.

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Step 6

This step loads online diagnostics in service mode.

1. Reboot the system.
2. At the SMS menu, press the numeric 6 key on the keyboard to indicate that diagnostics are to be loaded.
3. Type the requested passwords.
4. Follow instructions to select a console.

Did the diagnostics operating instructions display without any obvious display problem?

NO Go to “Step 7”.

YES Go to “Step 9”.

Step 7

Locate your symptom in the following table, and perform the action listed in the Action column.

Symptom	Action
Display problem	Go to “Step 8”
All other symptoms	Go to “Problem Determination When Unable to Load Diagnostics” on page 151.

Step 8

This step analyzes a console display problem.

Go to the problem-determination documentation for this type of terminal. For more information, refer to the *Hardware Management Console for pSeries Maintenance Guide*.

Step 9

The diagnostics loaded correctly.

Press Enter.

Is the Function Selection menu displayed?

NO Go to “Step 10” on page 148.

YES Go to “Step 11” on page 148.

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Step 10

There is a problem with the keyboard.

Go to the problem-determination documentation for this type of terminal. For more information, refer to the *Hardware Management Console for pSeries Maintenance Guide*.

Step 11

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 **Diagnostic Routines**.
3. Press Enter.
4. In the following table, find the menu or system response you received when you selected **Diagnostics**. Perform the action listed in the Action column.

System Response	Action
The Diagnostic Mode Selection menu is displayed.	Select **Problem Determination** and go to "Step 12" on page 149.
The Missing Resource menu is displayed.	Follow the displayed instructions until either the Diagnostic Mode Selection menu or an SRN is displayed. If the Diagnostic Mode Selection menu is displayed, select **Problem Determination** and go to "Step 12" on page 149. If you get an SRN, record it, and go to "Step 14" on page 149.
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. If the Diagnostic Mode Selection menu is displayed, select Problem Determination and go to "Step 12" on page 149. If you get an SRN, record it, and go to "Step 14" on page 149. If you do not get an SRN, go to "Step 16" on page 150.
The system does not respond to selecting **diagnostics**.	Go to "Step 10".

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Step 12

Did the Diagnostic Selection Menu display?

NO If **Problem Determination** was selected from the Diagnostic Mode Selection menu, and if a recent error has been logged in the error log, the diagnostics automatically begin testing the resource.

Follow the displayed instructions.

- If the No Trouble Found screen is displayed, press Enter.
- If another resource is tested, repeat this step.
- If the Diagnostic Selection menu is displayed, go to “Step 13”.

If an SRN is displayed, record it, and go to “Step 14”.

YES Go to “Step 13”.

Step 13

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

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 perform the action listed in the Action column.

Diagnostic Response	Action
An SRN is displayed.	Go to “Step 14”.
The system hangs.	Report SRN 109-200.
The Testing Complete menu and the `No trouble was found` message is displayed, and you have not tested all of the resources.	Press Enter and continue with the testing.
The Testing Complete menu and the `No trouble` was found message displayed and you have tested all of the resources.	Go to “Step 16” on page 150.

Step 14

The diagnostics produced an SRN for this problem. Do the following:

1. Record the SRN.
2. Report the SRN to the service organization.
3. **STOP.** You have completed these procedures.

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Step 15

This step loads the standalone diagnostics.

1. If you are running one or more logical partitions, reboot the partition.

   Note: Standalone diagnostics may be run with a CD-ROM or from a NIM server. If run from CD-ROM, the CD-ROM drive must be made available to the partition upon which you want to run standalone diagnostics. After this is done, go to step 2. If running from NIM, the NIM server must be set up to allow a diagnostic boot from that partition (both NIM server and client partition must have network adapters). For more information, see Chapter 5, "Using the Online and Standalone Diagnostics" on page 83.

2. Insert the diagnostic CD into the CD-ROM drive.
3. When the **keyboard** POST indicator displays, press the numeric 5 key on the keyboard to indicate that diagnostics are to be loaded.
4. Type the requested passwords.
5. Follow the instructions to select a console.

Did the Diagnostics Operating Instructions display without any obvious display problem?

NO Go to "Step 7" on page 147.

YES Go to "Step 9" on page 147.

Step 16

The diagnostics did not detect a hardware problem. If you still have a problem, contact your service organization.

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Problem Determination When Unable to Load Diagnostics

Use the following procedure to obtain an error code. The service organization uses the error code to determine which field replaceable units (FRUs) are needed to restore the system to correct operation.

Step 1. Considerations before Running This Procedure

Go to “Step 2”.

Step 2

Are the online diagnostics installed on this system?

NO Go to “Step 15” on page 150.

YES Go to “Step 3”.

Step 3

This step attempts to load online diagnostics in service mode.

1. Reboot the partition.
2. If the **keyboard** POST indicator displays, press the numeric 6 key on the keyboard to indicate that diagnostics are to be loaded from the hard disk.
3. Type the requested passwords.
4. Follow the instructions to select a console.
5. Wait until the diagnostics load or the system appears to stop.

Did the diagnostics load?

NO Go to “Step 5” on page 152.

YES Go to “Step 6” on page 154.

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Step 4

This step attempts to load the standalone diagnostics.

1. Reboot the partition.

   Note: Standalone diagnostics may be run with a CD-ROM or from a NIM server. If run from CD-ROM, the CD-ROM drive must be made available to the partition upon which you want to run standalone diagnostics. After this is done, go to step 2 on page 150. If running from NIM, the NIM server must be set up to allow a diagnostic boot from that partition (both NIM server and client partition must have network adapters). For more information, see Chapter 5, "Using the Online and Standalone Diagnostics" on page 83.

2. Insert the diagnostic CD into the CD-ROM drive.
3. If the **keyboard** POST indicator displays, press the numeric 5 key on the keyboard to indicate that diagnostics are to be loaded from CD-ROM.
4. Type the requested passwords.
5. Follow the instructions to select a console.
6. Wait until the diagnostics load or the system appears to stop.

Did the diagnostics load?

NO Go to "Step 5".

YES Go to "Step 6" on page 154.

Step 5

Starting at the top of the following table, locate your symptom and perform the action listed 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 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 154.
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 a three-, four- or eight-digit error code(s) displayed on the console.	Record the error code(s) and report the problem to the service organization.

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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 154.
The system does not respond when the password is entered.	Go to “Step 7” on page 154.
The system stopped and an indicator is displayed on the system console and an eight-digit error code is not displayed.	If the indicator 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:
	  • Select **tools**.
	  • Select **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.
	2. If you are attempting to load the online diagnostics, try loading the standalone diagnostics. Otherwise, record error code M0SCSI01 and report to the service organization.

The system appears to be stopped, the disk activity light is on continuously, and a beep was heard from the system unit.	Record error code M0MEM001 and report the problem to the service organization.
The system stops and the message `STARTING SOFTWARE PLEASE WAIT ...` is displayed.	Report error code M0BT0000.
The message `The system will now continue the boot process` is displayed continuously on the system unit’s console.	Report error code M0SCSI01.

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Step 6

The diagnostics loaded correctly.

Go to “Problem Determination Using the Standalone or Online Diagnostics” on page 145.

Step 7

There is a problem with the keyboard.

Go to the problem-determination documentation for this type of terminal. For more information, refer to the *Hardware Management Console for pSeries Maintenance Guide*.

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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 please refer to the following web site:
http://www.ibm.com/ibm/environment/products/prp.phtml

This product may contain a sealed lead acid battery(s) or nickel-cadmium battery(s). The battery(s) must be recycled or disposed of properly. Recycling facilities may not be available in your area. In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used sealed lead acid, nickel cadmium and nickel metal hydride batteries and battery packs from IBM equipment. For information on proper disposal of the batteries in this product, please contact IBM at 1-800-426-4333. For information on disposal of sealed lead acid or nickel cadmium batteries outside the United States, contact your local waste disposal or recycling facility.

Environmental Design

The environmental efforts that have gone into the design of this system signify IBM's commitment to improve the quality of its products and processes. Some of these accomplishments include the elimination of the use of Class 1 ozone-depleting chemicals in the manufacturing process and reductions in manufacturing wastes. For more information, contact an IBM account representative.

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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).

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

Declared Acoustical Noise Emissions

Product Configuration	Acoustical Characteristic			
	Declared A-Weighted Sound Power Level, L_{WAd} (B)		Declared A-Weighted Sound Pressure Level, LpAm (dB)	
	Operating	Idle	Operating	Idle
7040 Acoustical Doors	7.5	7.5	57	57
7040 Slimline Doors	7.9	7.9	62	62

Notes:

1. Noise levels cited are for the typical configuration (A-Frame: Bulk Power, CEC cage, battery option, media drawer, and two I/O drawers).
2. The 0.6-B (6-dB) reduction in noise emission levels with the acoustical rear door corresponds to a factor of 4 reduction. That is, the noise level of a single A-Frame with thin covers is about the same as the noise level of four A-Frames with acoustical covers.
3. L_{WAd} is the upper-limit A-weighted sound power level; LpAm is the mean A-weighted sound pressure level at the 1-meter bystander positions; 1 B = 10 dB.
4. All measurements made in conformance with ISO 7779 and declared in conformance with ISO 9296.

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Appendix B. Notices

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Appendix C. Service Processor Setup and Test

Attention: This procedure applies to modems attached to the serial ports (S1 and S2) on the primary I/O book (location U1.18-P1-H2). It does not affect the operation of the modem attached to the Hardware Management Console for pSeries (HMC).

The call-out function is normally handled by the Service Focal Point running on the HMC.

For your convenience, an example of a basic service processor setup checklist is included here. Your setup may include more or fewer of the available features, so you can adjust this checklist for your own application.

Note: The call-out and surveillance options are disabled in partitioned systems.

Service Processor Setup Checklist

1. Shut down the managed system, and wait for the `OK` in the physical operator panel.
2. Open a virtual terminal window on the HMC.
3. Start the service processor menus.
4. Set the system name.
5. Enable Surveillance.
6. Configure call-in/call-out.
7. Attach modems if necessary. If modem attachment is not necessary, proceed to step 8. To attach a modem, do the following:
   a. Exit the service processor menus.
   b. Disable the 350 V dc outputs from the BPA by placing the UEPO switch in the *off* position.

      Attention: With the UEPO *off*, power is still present within the BPA .
   c. Place the UEPO switch in the *on* position.
   d. Proceed to step 8.
8. Test both of the following:
   - Call-In, page “Testing Call-In” on page 160
   - Call-Out, page “Testing Call-Out” on page 161
9. Use the “Save or Restore Hardware Management Policies,” in the “Introduction to Tasks and Service Aids” section of the *RS/6000 and @server Diagnostic Information for Multiple Bus Systems* to back up the service processor settings.

   Note: This action is strongly recommended to protect the usefulness of the service processor and the availability of the server.

Your service processor is now ready for use.

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Testing the Setup

This section contains sample testing procedures to help ensure 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 161.

The server should be powered off as a result of the “Service Processor Setup Checklist” on page 159.

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. 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 -F** to shut down your server.
8. The message `No Carrier` displays on your remote terminal.

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Testing Call-Out

During the setup, you entered your phone numbers for the pager and customer voice. 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. This is your computer trying to page you.

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

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.

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Appendix D. Modem Configurations

Note: This appendix applies only to modems attached to the serial ports (S1 and S2) on the primary I/O book (location U1.18-P1-H2).

These configuration files do not apply to the modem attached to the Hardware Management Console for pSeries (HMC).

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 the firmware in **/usr/share/modems** subdirectory (if your server is using 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.

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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 165.

   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.

2. Is your modem an IBM 7857-017?

   If Yes, use modem configuration file **modem_m1.cfg** and go to step 7 on page 165.

   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 on page 165.

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 166 for more information. Go to step 7 on page 165.

   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.

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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		

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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.

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

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Switch	Position	Function
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.

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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.

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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.

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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 169 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.

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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.
```


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```
            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
```


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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.
```


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```
                                        # *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
```


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Sample File modem_z.cfg

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

ICDelay 1
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"
```


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```
 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
```


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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.
```


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```
 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
```


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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
```


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```
            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
```


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


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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.
```


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```
 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.
```


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```
            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
```


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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"
```


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```
 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.
```


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


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