

Service Processor 1.1
Installation and User's Guide

Note

Before using this information and the product it supports, be sure to read the general information under "Product Warranties and Notices" included with your server.

Third Edition (October 1997)

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Safety Information

DANGER

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

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

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

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

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

Handling the Service Processor (SP)

Attention: Standby power is always available to the SP, even when the server is powered off and plugged into an electrical outlet. The server must be unplugged from the electrical outlet any time you work on the SP or the serial ports.

Electrostatic Discharge Protection

Be sure you are familiar with all of these precautions. Static electricity can damage the SP or other components in your server.

Note: Do not open the static-protective bag containing the SP until instructed to do so. **Do not perform the following steps. They are for informational purposes only.**

To prevent electrostatic discharge:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the SP card carefully and by the edges.
- Do not touch any exposed printed circuitry.
- Prevent other people from touching the components or the card.
- When you are installing the card, touch the static-protective package containing the card to a metal expansion-slot screw or other unpainted metal surface on the server, for at least 2 seconds. (This drains static electricity from the package and from your body.)
- When possible, remove the SP card and install it directly into the server without setting it down. If this is not possible, place the card, component side up, on the static-protective bag on a flat surface until the card is installed.
- Do not place the card on the server cover or on a metal table.

About This Book

Use this book with your server documentation to install the Service Processor (SP) and its associated software.

There are instances in other documentation and related menus where the Service Processor is referred to as a **Support Processor**. Whenever you see a reference to Support Processor, it is actually referring to the SP.

ISO 9000

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

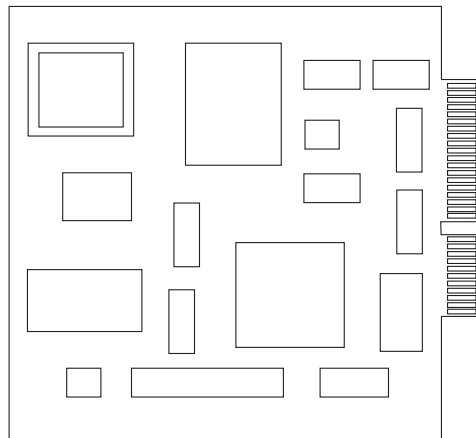
Related Publications

This book refers to the documentation that came with your server.

IMPORTANT

Be sure to retain your proof of purchase. It might be required to receive warranty service.

Chapter 1. Overview



Your server has several reliability, availability and serviceability features built in. With your new Service Processor (SP) installed, those features remain and are supplemented with new capabilities.

The SP shares serial ports 1 and 2 with the server. This sharing provides direct communications with the SP while the server power is off. When combined with an externally attached user supplied modem, it provides a path for the SP to report a fault condition to a remote location. Also, when serious problems with the server are detected, it enables several remote power control, reset and boot features, and it enables remote maintenance and diagnostic activities, including console mirroring. The SP participates in and supports the server password structure and language features.

The features of your SP are described in this book. They include the following:

- SP access via local or remote ASCII (TTY) terminals
- Console mirroring with quick disconnect capability
- Control menus, available locally or via call-in
- Call-out failure reporting ("call home")
- Remote power on via (1) ring detection or (2) direct SP command
- Unattended start after a power failure
- Remote power off/reboot in concert with the operating system
- Mutual surveillance with the system processor when supported by the operating system, including reporting and power-off as necessary.
- Remote SP reset
- Updateable Control Program
- Extended progress and error indicators

Device Drivers and Service Aids With Operating Systems Other Than AIX

Except in the case of mutual surveillance and its associated SP reporting, the SP does not depend on the operating system for its functions. If your operating system provides a device driver for SP, and it also supports mutual surveillance with SP, you can install the device driver from the operating system media using the procedures for that operating system. You can also run the SP Service Aids as a stand-alone function from the Diagnostics CD-ROM. Refer to your server's documentation for information on running stand-alone diagnostics.

If your operating system does not provide an SP device driver, you can still use all the features of SP except mutual surveillance. In this case, you would also run the SP Service Aids as a stand-alone function from the Diagnostics CD-ROM.

When run as a stand-alone function from the Diagnostics CD-ROM, the SP service aids expect to find the Sample Modem Configuration Files diskette inserted (as diagnostics supplemental media).

Chapter 2. Preparing for Installation

This section provides preparation information for installing the device driver and the Service Processor (SP).

The installation process consists of:

- Taking an inventory of all pieces necessary for installation
- Installing the SP software
- Updating the system firmware (if needed)
- Installing the SP
- Setting up the operational parameters
- Testing the setups.

Software Requirements

To fully utilize SP, you must have an operating system that includes an SP device driver such as AIX version 4.1.5. and system firmware dated 3/26/96 or later.

Installation Items

To install the SP you need:

- A flat-blade screwdriver.
- The SP
 - Note:** Some systems require a two-piece bracket (included) to secure the card.
- The documentation that came with the server.
- This documentation that came with the SP.
- Optional diskette "Sample Modem Configuration Files."
 - This diskette is not used with all levels of AIX. For details, go to Step 15 on page 3-3.
- Your operating system installation media, or your server's stand-alone diagnostics CD-ROM (version 4.1.5 or later).
- An ASCII terminal for SP set-up
- A modem for Call-in/Call-out feature

Refer to Appendix A, "SP Setup and Test" on page A-1 for an installation checklist.

Chapter 3. Installing the Software

Prior to installing the hardware, follow the procedure below to install and configure the device driver, the Service Processor (SP) service aids software, and update the firmware (if needed).

Note

If you installed the Service Processor (SP) card prior to installing the software, you must deactivate the operating system surveillance function using SP menus before continuing. After the software installation is completed, reactivate surveillance. For information on how to do this, refer to **Set Surveillance Parameters** on page 6-10.

Device Driver Installation on AIX Systems

1. Turn the server on.
2. Log in as **root**.
3. Insert the AIX installation CD-ROM (version 4.1.5 or later) into the CD-ROM drive.
4. Type:
`smit devinst`
and press Enter.
5. The **Install Additional Device Software** screen is displayed. The INPUT device/directory for software option is highlighted.
6. You can either:
 - Press F4 to display a list of input devices. Select the appropriate device and press Enter.
 - Enter the input device you are using in the entry field where the cursor is positioned.
7. The **Install Additional Device Software** screen is displayed. The device you selected is now displayed in the INPUT device/directory for software entry field. The "SOFTWARE to install" option is highlighted.

8. Press F4 to display a list of software you can install.

9. To install the SP software:

a. Type:

/

to display a Find dialog.

b. Type:

devices.isa_sio.IBM001F

c. Press Enter.

d. Press F7 to select the highlighted software.

e. Type:

/

to display a Find dialog.

f. Type:

devices.isa_sio.IBM001E

g. Press Enter.

h. Press F7 to select the highlighted software.

i. Press Enter.

The **Install Additional Device Software** screen is displayed with the required fields filled in.

10. Press Enter. ARE YOU SURE is displayed.

11. Press Enter.

12. The following occurs when the COMMAND STATUS screen is displayed:

- The term RUNNING is highlighted to indicate that the install and configure command is in progress.
- When RUNNING changes into OK, scroll down to the bottom of the page and locate the Installation Summary.
- At the bottom of the page, if the installation was successful, SUCCESS will appear in the Result column of this summary.

13. Remove the installation media from the drive.

14. Press F10 to exit SMIT.

15. Check your server subdirectory. If you find .cfg filetypes (like modem_f.cfg) in subdirectory /user/share/modems, skip this step. Your modem configuration files are already loaded. If you must install the sample modem configuration files:

a. With the Sample Modem Configuration Files diskette in your diskette drive, type:

```
cpio -idmv "/usr*" < /dev/rfd0
```

b. Press Enter.

c. When the command completes, remove the diskette.

Note: For additional information on modem configuration, refer to Appendix B, "Modem Configurations" on page B-1.

In the next steps you will be verifying the level of your system firmware. This will require you to power off the system and then power it back on.

16. Type:

```
shutdown -F
```

17. Press Enter.

18. Turn the server off after the Halt completed message is displayed.

19. Determine your System Firmware level. System Firmware includes a set of utilities called System Management Services (SMS). System Firmware must be at a level dated 3/26/96 (96086) or later. On some systems, the version is included in the text-mode SMS Main Menu heading. The SMS section of your server's User's Guide may provide more details.

If you must update your firmware, that can also be done from SMS.

You are ready to install the new hardware.

Chapter 4. Installing and Verifying the Service Processor

This section provides information for installing the Service Processor (SP) hardware. The device driver, SP service aid software, and system firmware should already be installed before proceeding.

Installing the SP

Refer to your server documentation for directions on shutting down the system, removing the covers, and installing the SP card.

Continue below when your SP hardware installation is complete.

Verifying Device Driver Installation

To verify your SP installation using AIX¹, follow the steps below:

1. Turn the server on.
2. After the system boots, log in as **root**
3. At the prompt, type:

```
lsdev -Cs isa_sio
```
4. A list of ISA devices is displayed. Verify that the supp0 Support Processor is in an Available state.

You have successfully installed the new SP.

¹ Refer to your operating system's documentation for equivalent functions.

Chapter 5. Service Processor Service Aid

SP Service Processor Aid is invoked by the diagnostic controller program through a local ASCII or graphics terminal with the system power on.

This service aid consists of two tasks: Configure Ring Indicate Power-on and Configure Support Processor. These tasks are further explained in this chapter. Values shown in the menus are default values.

Starting the Diagnostic Controller Program

Note

To configure SP on an operating system other than AIX (or to configure when diagnostics are not loaded on your system), reboot using the Stand-alone diagnostics CD-ROM. To configure your modem at this time, you must tell the diagnostic controller that there is a supplemental diagnostics diskette.

The following four steps outline the program start-up procedures. The remainder of the chapter describes these selection tasks in detail.

1. Invoke the diagnostic controller. (On AIX systems, type `diag` at a system prompt and press Enter. If you are using stand-alone diagnostics, refer to your server's User's Guide for instructions to start the diagnostic controller.)
2. At the first screen, press Enter to continue to the FUNCTION SELECTION screen.
3. Select "Task Selection," and press Enter.
4. Cursor down the list of tasks and select one of the following:
 - a. "Configure Ring Indicate Power-On."
 - b. "Configure Support Processor."

Select the "Configure Ring Indicate Power-On" to enable or disable Ring Indicate Power-On.

Select the "Configure Support Processor" option to configure Surveillance Set-up, Modem Configuration, Call-In/Call-Out Set-up.

Configure Ring Indicate Power-On

Ring Indicate Power-On is an alternate method to dial-in without establishing an SP menu session. If the system is powered off, Ring Indicate Power-On is enabled and the server powers on at a predetermined number of rings. If the server is already on, no action is taken.

In either above case, the system powers on; but it cannot respond to the telephone caller directly.

Configure Ring Indicate Power-On Task Selection - Stand By

The following screen displays for a short time when you select "Configure Ring Indicator Power-On." The Ring Indicate Power-On menu follows.

Note: This selection is accessed directly from the AIX command line subdirectory /usr/lpp/diagnostics/bin by entering:

```
./usp -r
```

```
CONFIGURE RING INDICATE POWER-ON          802450

Please stand by.

F3=Cancel      F10=Exit
```

Configure Ring Indicate Power-on

```
CONFIGURE RING INDICATE POWER-ON          802451

The following information lists the current Ring Indicate
Power-on settings from NVRAM. Any data in brackets
[ ] may be changed or added at this time.
```

When finished, use 'Commit' to accept the data.

```
Ring Indicate Power-on          [off]
Number of Rings to Power-on     [ 6]
```

```
F1=Help    F3=Cancel    F4=List    F7=Commit    F10=Exit
```

- **Ring Indicate Power-on** is set to 'on' or 'off'
- **Number of Rings to Power-on** is set to any number, 1 to 255.

Configure Support Processor

Configure Support Processor - Stand By

The following screen displays for a short time when you select "Configure Support Processor." The Support Processor selection menu follows.

Note: This selection is accessed directly from the AIX command line subdirectory /usr/lpp/diagnostics/bin by entering:

```
./usp -s
```

```
CONFIGURE SUPPORT PROCESSOR          802450

Please stand by.
```

```
F3=Cancel    F10=Exit
```

Configure Support Processor - Selection

CONFIGURE SUPPORT PROCESSOR 802452

Move cursor to selection, then press Enter.

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

F3=Cancel F10=Exit Enter

Configure Support Processor - Surveillance Setup

CONFIGURE SUPPORT PROCESSOR 802453

Surveillance Setup

The following information lists the current Surveillance settings from NVRAM. Any data in brackets [] may be changed or added at this time.

When finished, use 'Commit' to accept the data.

Surveillance [off]
Surveillance time interval, in minutes []
Surveillance delay, in minutes []

F1=Help F3=Cancel F4=List F7=Commit F10=Exit

- **Surveillance** is set to 'on' or 'off'.
- **Surveillance time interval, in minutes** is set to any number, 2 to 255
- **Surveillance time delay, in minutes** is set to any number, 0 to 255

Note: When surveillance is configured or modified using this menu, the changes take place after the next system boot. For more information on Surveillance, see “Service Processor System Monitoring - Surveillance” on page 7-5.

Configure Support Processor - Modem Configuration

```
CONFIGURE SUPPORT PROCESSOR                802454

Modem Configuration

A modem is configured by reading a specially formatted file and
loading the settings into NVRAM. If a file name is specified,
then a serial port must also be specified. Type the required
items in the brackets [ ].

Use 'Help' to see the names of sample files.

Use 'Commit' to begin loading the modem configuration.

Modem Configuration File Name              [ ]
Serial Port for Modem                      [ ]

F1=Help    F3=Cancel    F4=List    F7=Commit    F10=Exit
```

Modem Configuration File Name is the path and filename of a correctly formatted modem configuration file. Some example files are:

```
/usr/share/modems/modem_f0.cfg
/usr/share/modems/modem_z.cfg
```

Refer to Appendix B, “Modem Configurations” on page B-1 for more information.

Serial Port for Modem must be serial port 1 or 2 (if a modem is connected). Refer to “How to access SP menus remotely” on page 6-3 for more modem connect information.

Configure Support Processor - Modem Configuration Stand By

While the modem configuration file is read, converted, and loaded into non-volatile random access memory (NVRAM), the Configure Support Processor menu displays. If an error occurs, a pop-up error message allows you to try again from the modem configuration menu, cancel the setup selection menu, or exit. (A confirming pop-up message appears and instructs you to press Enter to continue to the setup selection menu.)

```
CONFIGURE SUPPORT PROCESSOR          802455

Loading modem configuration file in NVRAM.
Please stand by.
```

Configure Support Processor - Call-In/Call-Out Setup

```
CONFIGURE SUPPORT PROCESSOR          802456

Call-In/Call-Out Setup

The following information lists the current Call-In/Call-Out
settings from NVRAM. Any data in brackets [] may be
changed or added at this time.

When finished, use 'Commit' to accept the data.

Serial Port 1 Call-In                [off]
Serial Port 1 Call-Out                [off]
Serial Port 1 line speed              [9600]
Serial Port 2 Call-In                [off]
Serial Port 2 Call-Out                [off]
Serial Port 2 line speed              [9600]

F1=Help    F3=Cancel    F4=List    F7=Commit    F10=Exit
```

- **Serial Port 1 Call-In** may be set to 'On' or 'Off'. Call-In allows SP to receive a call from a remote terminal.

- **Serial Port 1 Call-Out** is set to 'On' or 'Off'. Call-Out allows SP to place calls for maintenance.
- **Serial Port 2 Call-In** is set to 'On' or 'Off'. Call-In allows SP to receive a call from a remote terminal.
- **Serial Port 2 Call-Out** is set to 'On' or 'Off'. Call-Out allows SP to place calls for maintenance.
- **Serial Port 1 Line Speed** and **Serial Port 2 Line Speed** is one of the following line speeds: 300, 600, 1200, 2000, 2400, 3600, 4800, 9600, 19200, 38400.

Configure Support Processor - Site Specific Setup

CONFIGURE SUPPORT PROCESSOR
802457

Site Specific Setup

The following information lists the current Site Specific Call-In/Call-Out settings from NVRAM. Any data in brackets [] may be changed or added at this time.

When finished, use 'Commit' to accept the data.

Service center phone number	[]
Customer Admin Center phone number	[]
Pager phone number	[]
Customer System phone number	[]
Customer voice phone number	[]
Customer Account number	[]
Call Out policy	[first]
Customer RETAIN login id	[]
Customer RETAIN login password	[]
Remote timeout, in seconds	[120]
Remote latency, in seconds	[2]
Number of retries	[2]
System name (System Administrator aid)	[]

F1=Help
F3=Cancel
F4=List
F7=Commit
F10=Exit

Service Center phone number is the number of the service center's system unit. The service center usually includes a system unit that takes calls from servers with call-out capability. This system unit is referred to as "the catcher." The catcher expects messages in a specific format and SP conforms to that format. For more information about the format and catcher system units, refer to the README file in the AIX /usr/samples/syscatch directory. Contact your service provider for the correct telephone number to enter here. Until you have that number, leave this field blank.

Customer Admin Center phone number is the number of the System Administration Center (catcher) system unit that receives problem calls from servers. Contact your system administrator for the correct telephone number to enter here. Until you have that number, leave this field blank.

Pager phone number is the number for a pager carried by someone who responds to problem calls from your server. Contact your administration center representative for the correct telephone number to enter here. For test purposes, enter your telephone number. You can change it later when testing is complete.

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

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

Customer Account Number is assigned by your service provider for record keeping and billing. If you have an account number, enter it here. Otherwise, leave this field blank.

Call Out policy is set to 'first' or 'all'. If call out policy is set to 'first', SP stops at the **first successful** call out to one of the following numbers in the order listed:

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

If call out policy is set to 'all', SP attempts to call out to **all** the following numbers in the order listed:

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

Customer RETAIN login id and **Customer RETAIN login password** applies to a service function your service provider may not have access. Leave these fields blank if you do not use RETAIN.

Remote timeout and **Remote latency** are functions of your service provider's catcher service unit. Contact your service provider for recommended settings.

Number of retries is the number of times the server retries unsuccessful calls.

The ***System name*** is the name your server reports in problem messages. This name helps your support team to identify the location, configuration, and history of your server. Contact your system administrator or service provider for this name or leave this field blank.

Chapter 6. Service Processor Menus

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

During the first power up (i.e. power cord is plugged into the outlet), SP menus are not available for 45 seconds while SP is running self-tests and initializing the server. If the server powers down, SP menus become available after a maximum 15 seconds. (This time varies depending on whether the modem is configured.)

Note: There may be instances in other documentation and menus where the Service Processor is referred to as a Support Processor. Whenever you see a reference to Support Processor, it is actually referring to the Service Processor (SP).

For a summary of the Service Processor functions and the methods used to invoke them, see the table on page 6-2 summarizes the various SP functions and from which facilities they may be called.

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

¹ Operating system root password

² Privileged access password

³ General access (power-on) password

SP Menus

The Service Processor (SP) menus are divided into two groups:

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

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

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

Menu Inactivity

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

How to access SP menus locally

SP menus may be accessed locally by connecting an ASCII terminal to either serial port 1 or 2. Since the presence of the ASCII terminal cannot be confirmed by the SP, you must press a key on the ASCII terminal to confirm its presence. Next the SP prompts you for a password (if set), and when verified, displays the SP menus.

How to access SP menus remotely

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

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

Note: If your modem has not been configured, go to “CALL-IN/CALL-OUT SETUP MENU” on page 6-16.

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

General User Menus

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 (also known as Power-On Password) in order to access these menus.

GENERAL USER MENU

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

- **Power-On System**

Allows the user to power-on the system.

- **Read VPD**

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

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

Displays the boot progress indicators (check points), up to a maximum of 80, from the last system boot. This historical information may be useful to help diagnose system faults.

- **Read Service Processor Error Logs**

Displays the SP error logs.

- **Read NVRAM**

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

- **View System Environmental Conditions**

On selection of this menu, the SP reads all environmental sensors and reports the results to the user. This option maybe useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

Privileged User Menus

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

MAIN MENU

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

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

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

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

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

```
Service Processor Firmware
EPROM: 963551107
FLASH: 963551108
Copyright 1997, IBM Corporation
SYSTEM NAME
```

MAIN MENU

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

SERVICE PROCESSOR SETUP MENU

SERVICE PROCESSOR SETUP MENU

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

Note

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

Passwords

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

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

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

- **Change Privileged Access Password**

Set or change the Privileged Access Password. It provides the user with the capability to access all SP 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 SP menus, and is usually available to all users who are allowed to power-on the server.

- **Enable/Disable Console Mirroring**

When Console Mirroring is enabled, the SP sends information to both serial ports. This capability may be enabled by local or remote users. This provides local users the capability to monitor remote sessions. Console mirroring may be enabled for the current session only. For more information, see "Console Mirroring" on page 7-8.

- **Start Talk Mode**

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

- **Surveillance Setup Menu**

This option may be used to setup operating system surveillance.

Surveillance Setup Menu

1. Surveillance:
Currently Disabled
2. Surveillance Time Interval:
Not Applicable
3. Surveillance Delay:
Not Applicable

98. Return to Previous Menu

- **Surveillance**

May be set to Enabled or Disabled.

- **Surveillance Time Interval:**

May be set to any number from 2 through 255.

- **Surveillance Delay:**

May be set to any number from 0 through 255.

Refer to “Service Processor System Monitoring - Surveillance” on page 7-5 for more information about surveillance.

- **Reset Service Processor** - Allows the user to reinitialize the SP. (This option is mainly used to enable all changes or to enable changes to the Ring Indicator.)
- **Reprogram Service Processor Flash EPROM** - This is an automatic process.

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

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

The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort. When this process is selected, you are prompted to place the diskette into the drive and to indicate to the system that the diskette is available and the automatic process starts. If the system has other needs, you are prompted. See “SP Flash EPROM Updates” on page 7-9 for additional information and update methods.

SYSTEM POWER CONTROL MENU

SYSTEM POWER CONTROL MENU

1. Enable/Disable Unattended Start Mode
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
98. Return to Previous Menu
99. Exit from Menus

- **Enable/Disable Unattended Start Mode**

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

For more details, see “System Power-On Methods” on page 7-3.

- **Ring Indicator Power-On Menu**

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

Ring Indicator Power-On Menu

- 1. Ring Indicator Power-On :
 Currently Disabled
- 2. Number of Rings :
 Currently 6

- 98. Return to Previous Menu

- Ring Indicate Power-On may be set to 'Enabled' or 'Disabled'.
- Number of Rings may be set to any number from 1 through 255.

- **Reboot/Restart Policy Setup Menu**, see “Reboot/Restart Policy Setup Menu” on page 6-22.

- **Power-on System**

Allows you to power-on the system immediately. For other power-on methods see “System Power-On Methods” on page 7-3.

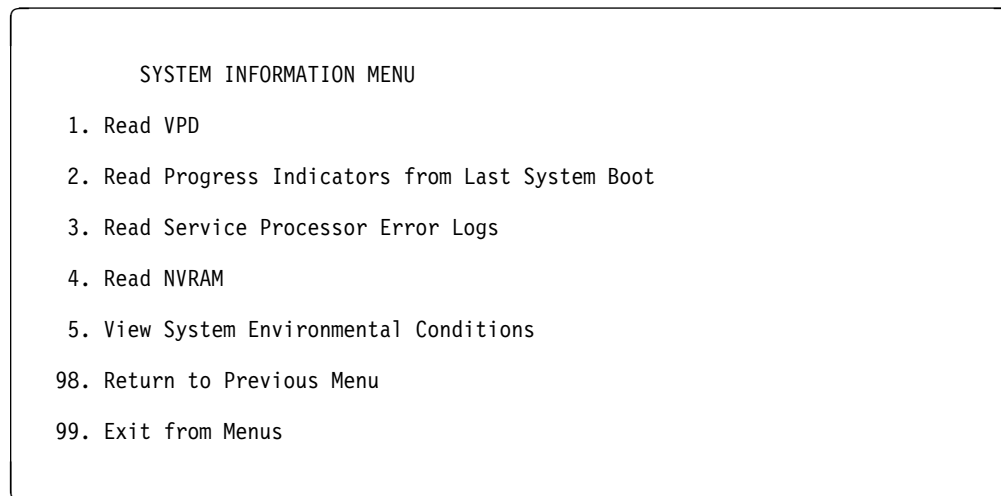
- **Power-off System**

Allows the user to power-off the server following a surveillance failure.

- **Enable/Disable Fast System Boot**

When this option is enabled, the system performs a quick memory test instead of the standard, more thorough memory test.

SYSTEM INFORMATION MENU



- **Read VPD**

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

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

Displays the boot progress indicators (check points), up to a maximum of 80, from the last system boot. This historical information may be useful to help diagnose system faults.

- **Read Service Processor Error Logs**

Displays error conditions detected by the SP.

- **Read NVRAM**

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

- **View System Environmental Conditions**

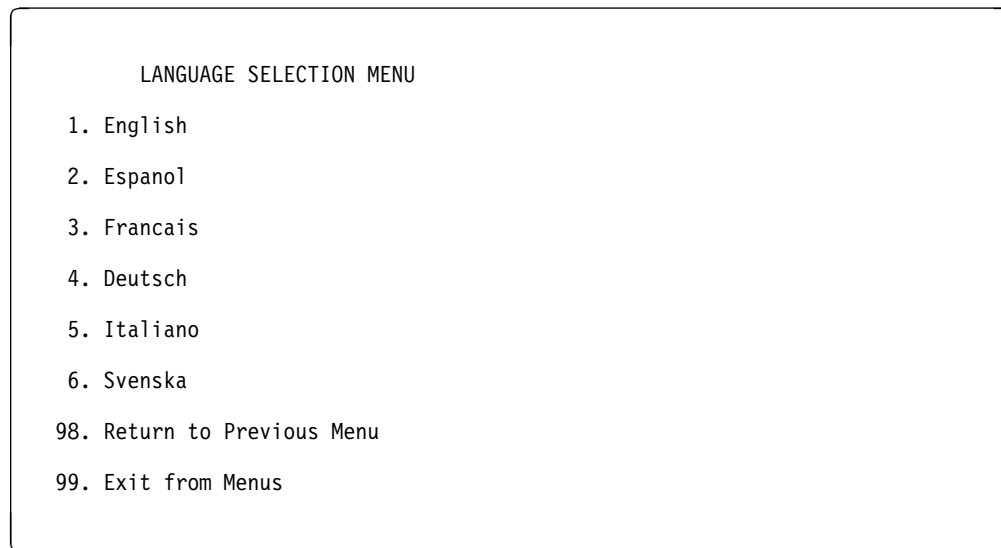
SP reads all environmental sensors and reports the results to the user. This option is most useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

The following is an example of system environment conditions:

```
System Environmental Conditions
(System Power is currently off.)

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

LANGUAGE SELECTION MENU



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

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

CALL-IN/CALL-OUT SETUP MENU

CALL-IN/CALL-OUT SETUP MENU

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

- **Modem Configuration Menu**, see “Modem Configuration Menu.”
- **Serial Port Selection Menu**, see “Serial Port Selection Menu” on page 6-17.
- **Telephone Number Setup Menu**, see “Telephone Number Setup Menu” on page 6-18.
- **Call-Out Policy Setup Menu**, see “Call-Out Policy Setup Menu” on page 6-20.
- **Customer Account Setup Menu**, see “Customer Account Setup Menu” on page 6-21.
- **Ring Indicate Power-On Menu**, see on page 6-12.

Modem Configuration Menu

The first two lines of the Modem Configuration Menu are status lines showing the current selections. Selections are made in the two 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 that port. If you wish to set up both serial ports with modems, make your selections one port at a time.

Note: Must select 9 to save your choices.

For information on choosing a modem configuration file, see “Sample Modem Configuration Files” on page B-1 and “Seamless Transfer of a Modem Session” on page B-5.

Modem Configuration Menu

Port 1 Modem Configuration File Name:

Port 2 Modem Configuration File Name:

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

Modem Ports:

1. Serial port 1
2. Serial port 2

Modem Configuration File Name:

3. modem_f_sp
4. modem_f0_sp
5. modem_f1_sp
6. modem_z_sp
7. modem_z0_sp
8. none
9. Save configuration to NVRAM and Configure modem
98. Return to Previous Menu

Serial Port Selection Menu

Serial Port Selection Menu

1. Serial Port 1 Call-Out:
Currently Disabled
2. Serial Port 2 Call-Out:
Currently Disabled
3. Serial Port 1 Call-In:
Currently Disabled
4. Serial Port 2 Call-In:
Currently Disabled
98. Return to Previous Menu

You may enable and/or disable the call-in and call-out functions of serial port 1 or 2 in any combination.

The assumption is that Service Processor users wish to also communicate with the SMS utilities. Therefore, the modem speed is automatically set to 9600 baud from these menus.

Telephone Number Setup Menu

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

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

Note: This number must be present if the pager option is used.

Telephone Number Setup Menu

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

- **Service Center Telephone Number** is the number of the service center computer. The service center usually includes a computer that takes calls from servers with call-out capability. This computer is referred to as "the catcher." The catcher expects messages in a specific format to which SP conforms. For more information about the format and catcher computers, refer to the README file in the AIX `/usr/samples/syscatch` directory. Contact your service provider for the correct telephone number to enter here. Until you have that number, leave this field blank.
- **Customer Administration Center Telephone Number** is the number of the System Administration Center computer (catcher) that receives problem calls from servers. Contact your system administrator for the correct telephone number to enter here. Until you have that number, leave this field blank.
- **Digital Pager Telephone Number** is the number for a digital pager carried by someone who will respond to problem calls from your server. Contact your administration center representative for the correct telephone number to enter here. For test purposes, enter your telephone number here. You can change it later when testing is complete.
- **Customer Voice Telephone Number** is the telephone number of a phone near the server or answered by someone responsible for the server. This is the telephone number left on the pager for callback. For test purposes, enter your telephone number here. You can change it after testing is completed.

Note: For the SP to successfully call the pager, this field should not be left blank.

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

Call-Out Policy Setup Menu

CALL-OUT POLICY SETUP MENU

1. Call-Out policy (First/All):
Currently First
2. Remote timeout, (in seconds):
Currently 120
3. Remote latency, (in seconds):
Currently 2
4. Number of retries:
Currently 2
98. Return to Previous Menu

- **Call Out policy** may be set to 'first' or 'all'. If call out policy is set to 'first', the SP will stop at the **first successful** call out to one of the following numbers in the order listed:

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

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

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

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

Number of retries is the number of times you want the server to retry calls that were unsuccessful.

Customer Account Setup Menu

Customer Account Setup Menu

1. Customer Account Number:
Currently Unassigned
2. Customer RETAIN Login UserID:
Currently Unassigned
3. Customer RETAIN Login Password:
Currently Unassigned

98. Return to Previous Menu

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

Reboot/Restart Policy Setup Menu

Reboot/Restart Policy Setup Menu

1. Number of reboot attempts:
Currently 3
2. Enable restart:
Currently No
3. Call-Out before restart:
Currently Disabled

98. Return to Previous Menu

- **Number of reboot attempts** If the server fails to successfully complete the boot process, it attempts to reboot the number of times specified. Entry values equal to or greater than 0 are valid. Only successive failed reboot attempts count, not reboots that occur after a restart attempt. At restart, the counter is set to 0.
- **Enable restart** The default setting is NO. If set to YES, SP restarts the server when the operating system loses control as detected by OS surveillance.
- **Call-Out before restart (Enabled/Disabled)** If a restart is necessary due to a system fault, you can enable the SP to call out and report the event. This item is valuable if the number of these events becomes excessive, signalling a bigger problem.

Chapter 7. Service Processor Features and Functions

The following section discusses some of the Service Processor (SP) features more fully.

Built-in Functions	Initialization and Test	SP Basic Instructions Test (BIST)
		JTAG System Chip Initialization
	Error Data Collection	BIST/POST errors and status
		Checkstop FIR data logout
		Machine check logout
	Configuration	CPU Complex validation
		VPD Collection
	System Management	Reset and Reboot on System Firmware Surveillance fail
		Reboot on system failure
Local User Function	User Interface	Local async console
		Text based menus with NLS
		Operator Panel messages
	Power and Miscellaneous	Power On/Off
		Configurable Reboot Policy
	Status and Data Access	VPD
		Error data (SP)
		Error data (system)
		Environmental data
	SP Setup Utilities	Passwords
		Phone numbers
		Language (NLS) selection
		Call In/Call Out enable/disable
		Flash (Gold/Recovery block) Update
		Flash (Composite block) Update
		System Name
		Modem Configuration

Remote User Functions	Call Out (Call Home) Reporting	Boot failure
		Surveillance failure
		Critical EPOW reporting
		Checkstop
		Machine check
		Identify system by name
	Call In	Power-on via ring-indicate
		Password/security check
		Console mirroring/Quick disconnect
Application Interface Functions	Monitor/Sense	Thermal/Voltage/fan speed
		SP Flash Update(Recovery and Composite)

System Power-On Methods

- Power-on Switch
- SP Menu power-on request

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

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

Refer to “Seamless Transfer of a Modem Session” on page B-5 for information on transferring modem sessions from SP to the operating system.

- Unattended start mode - refer to *Enable/Disable Unattended Start Mode* on page 6-11.

The SP can be enabled to recover from the loss of AC power. When AC power is restored, the system powers-on. For example, if the system was powered-on when AC loss occurred, it reboots/restarts when power is restored. Be aware that if the system was powered-off when AC loss occurred, it also powers-on.

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

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

- Ring Indicate Power-On

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

- Follow-up to a Failed Boot Attempt

The SP will initiate a power-on sequence upon detection of a failed boot attempt. If the re-boot policy is configured to do so, refer to “Service Processor Reboot/Restart Recovery” on page 7-4.

Service Processor Reboot/Restart Recovery

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

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

Failure During Boot Process

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

Failure During Normal System Operation

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

Service Processor System Monitoring - Surveillance

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

Surveillance is available during two phases:

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

System Firmware Surveillance

Provides the SP with a means to detect boot failures while the system firmware is running.

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

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

Operating System Surveillance

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

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

Operating system surveillance can be enabled and disabled in AIX via:

- SP Menus
- SP Service Aids

Three parameters must be set for operating system surveillance:

1. Surveillance enable/disable
2. Surveillance interval

This is the maximum time SP should wait for a heartbeat from the operating system before timeout.

3. Surveillance delay

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

Surveillance will not take effect until the next time the operating system is started after setting the parameters unless you use the Service Aid option. The latter starts surveillance immediately.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and SP does not detect any heartbeats from the operating system, SP assumes the system is hung and takes action according to the reboot/restart policy settings. See “Service Processor System Monitoring - Surveillance” on page 7-5.

Call Out (Call-Home)

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

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

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

- Have a modem connected to serial port 1 or 2.
- Set up the following using the SP Menus or Diagnostic Service Aids:
 - Enable call out for the serial port where the modem is connected.
 - Set up serial port line speed.
 - Enter the modem configuration filename.
 - Set up site specific parameters (i.e. phone numbers for call out, call out policy, etc).

To enable call out before restart, set Call-Out (before restart) to Enabled from the Reboot/Restart Policy Setup Menu.

Console Mirroring

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

System Configuration:

- Service Processor
- Modem connected to one serial port 1 or 2 and enabled for incoming calls
- ASCII terminal connected to the other serial port. This terminal may be connected directly to your server or connected through another modem.

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

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

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

SP Flash EPROM Updates

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

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

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

Firmware Updates

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

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

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

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

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

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

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

Updates can be acquired from the Support page on the Internet or from your service team. The Internet address is:

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

The update image file must be transferred to a DOS-formatted diskette. You should format the diskette just prior to processing the update to be sure it is clean. Reformatting is worth the time and effort.

Updating Firmware from the Service Processor Menus: The Service Processor Menus are available while the server is powered off. From the Service Processor Main Menu, select Service Processor Setup to bring up a menu containing the item, Reprogram Service Processor Flash EPROM. Selecting that item starts the update process. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested. Unless you still have the diskette(s) from your current update, it is recommended you make a recovery diskette when that opportunity is offered by the update program. This is useful if the update process is interrupted for fails for some reason.

Updating Firmware from the SMS Utilities: From a powered down or reset condition, bring up the SMS Utilities and select the menu item for updating Service Processor firmware. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested. Unless you still have the diskette(s) from your current update, it is recommended you make a recovery diskette when that opportunity is offered by the update program. This is useful if the update process is interrupted for fails for some reason.

Updating Firmware from the Service Aids

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

Refer to the update instructions or Service Processor menus on page 6-7, to determine the level of the system unit or service processor flash. Using this service aid to update the system or service processor flash will not save the current contents of the flash.

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

system to reboot and return to the AIX login prompt. After the system unit reboots, the file **/var/update_flash_image** can be removed to conserve space in the **/var** file system.

Updating Firmware from AIX

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

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

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

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

Appendix A. SP Setup and Test

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

SP Setup Checklist

- ___ 1. **Unplug** the power cord from the server.
- ___ 2. Attach a local terminal for this setup procedure.
- ___ 3. Plug in the server, and power on the local terminal.
Attention: Server power should remain off.
- ___ 4. Bring up the SP Menus, see Chapter 6, “Service Processor Menus” on page 6-1.
- ___ 5. Set the System Name, “Privileged User Menu” on page 6-6.
- ___ 6. Enable Surveillance, see 6-8, and Chapter 7, “Service Processor Features and Functions” on page 7-1
- ___ 7. Configure Call-In/Call-Out, see “CALL-IN/CALL-OUT SETUP MENU” on page 6-16
- ___ 8. Exit the SP menus
- ___ 9. **Unplug** the power cord from the server.
- ___ 10. Attach modem(s) (if needed), page 6-3
- ___ 11. Plug in the server

Attention: Server power should remain off.

- ___ 12. Test

Call-In, page A-2
Call-Out, page A-2

Your SP is ready to go to work.

Testing the Setup

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

Since these tests include communicating with the server's operating system, be sure the necessary port(s) is configured. If you require help with serial port configuration, see "Serial Port Configuration" on page A-4.

Call-In:

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

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

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

Call-Out:

During the setup, you entered your phone number for the Pager (on page 6-19) and Customer Voice (on page 6-19) phone numbers. These numbers are used for this test.

1. Your remote terminal should be disconnected as a result of the Call-In test.
2. Call your server again.
3. From the Call-In Call-Out Setup Menu, select Number 6 (Call-Out Test).

4. When your telephone rings, answer the call. You should hear the sound of a telephone being dialed. This is your computer trying to page you.

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

You now need to go back through the "Telephone Number Setup Menu" on page 6-18 to enter the actual telephone numbers your server will use for reporting problems.

Serial Port Configuration

On an AIX console,

1. Login as **root**
2. Type
`lsdev -C | grep tty`
3. Press Enter.
4. Identify the serial port(s) with the modem(s) connected.
5. Type
`smit tty`
6. Press Enter.
7. Select **RS232**
8. Select **baud rate 9600 (or higher)**
9. Select **login enable**
10. Commit selections and exit smit.

Appendix B. Modem Configurations

Sample Modem Configuration Files

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

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

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

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

Configuration File Selection

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

If yes, go to step 3.

If not, continue with step 2 below.

2. Does your modem respond to:

- a. ATZ reset command, or

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

If ATZ, configuration file modem_z.cfg is recommended.

If ATZn, configuration file modem_z0.cfg is recommended.

Selection is complete. If you find it necessary to adjust either of these configuration files, do so with reference to the manual that came with your modem.* It is recommended that you select settings that enable hardware flow control and respond to DTR.

3. Does your modem respond to:

- a. AT&F reset command, or

- b. AT&Fn reset commands, where n can be 0, 1, etc.?

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

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

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

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

Examples

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 **				X	
Bocamodem 1440E			X		
Hayes Smart Modem 300	X				
IBM 5841	X				
IBM 5843	X				
IBM 7851				X	
IBM 7852			X		
IBM 7855					X
USRobotics 36.6K Sportster					X
Zoom V.32			X		

Note: ** Ring interrupt only on first ring.

Customizing the Modem Configuration Files

You can create your own modem configuration file(s) or modify the samples provided. After you customize your modem configuration files, you **MUST** access them via the Configure Remote Maintenance Policy Service Aid rather than from the SP menus. The service aid in AIX 4.1.x is Configure Support Processor Option. In AIX 4.2.x, it is Configure Remote Maintenance Policy.

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

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

Ring Detection

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

The SP uses the ring interrupt request to count the number of rings when Ring Indicate Power-On (RIPO) is enabled. If your modem produces an interrupt on only the first ring, set Ring Indicate Power-On to start on the first ring. Otherwise, you

may choose to start Ring Indicate Power-On on any ring count that makes your operation convenient.

Terminal Emulators

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

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

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

Recovery Procedures

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

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

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

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

Seamless Transfer of a Modem Session

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

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

Usually the command `&D2` will work, but not always. The sample modem configuration files¹ take this high percentage position. You should consult your modem's manual for its specific response scheme for the `&Dn` command.

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

1. Recovery
2. Prevention

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

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

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

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

If no, try another &Dn setting for your server's modem. See your modem manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files¹.

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

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

If no, try another &Dn setting for your server's modem. See your modem manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files¹.

Recovery Strategy

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

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

¹ Only the following sample modem configuration files contain the &Dn command (in three places each):

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

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

Prevention Strategy

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

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

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

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

Modem Configuration Samples

Sample File modem_z.cfg

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

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

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

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

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

```

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

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

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

ignore "0\r" timeout 1
done

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

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

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

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

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

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

```

Sample File modem_z0.cfg

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

ICDelay 1
DefaultT0 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 "\r" or "OK\r\n" timeout 2 # Ignore modem response.
          send "ATE0T\r"        # Initialize modem: Echo OFF,
          expect "\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
          send "ATQ0V0X0T\r"    # Limit response codes.
          expect "\r" timeout 2  # Confirm commands successful.
          send "ATS0=0\r"       # Set AutoAnswer OFF
          expect "\r" timeout 2  # Confirm command successful.
          done

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

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

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

          # Expect a connection response.
```

```

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

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

    ignore "0\r" timeout 1
done

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

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

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

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

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

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

```

Sample File modem_f.cfg

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

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

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

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

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

```

done

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

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

disconnect:
    delay 2                                         # Separate from previous data.
    send "+++"                                     # Assure command mode.
    delay 2                                         # Allow mode switching delay.
    send "ATH0T\r"                                 # Set modem switch-hook down
                                                # (i.e., hang up).
    ignore "0\r" or "OK\r" timeout 2              # Ignore modem response.
    send "ATEQ01\r"                               # Initialize modem: Echo OFF,
                                                # Disable responses.

    ignore "0\r" timeout 1
done

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

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

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

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

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

error:                                         # Handle unexpected modem
                                                # responses.

```

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

Sample File modem_f0.cfg

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

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

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

connect: send "ATDT%N\r" # Tone dialing command.
          # %N from Call Home setup.
          # Expect a connection response.
```

```

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

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

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

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

    ignore "0\r" timeout 1
done

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

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

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

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

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

```

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

Sample File modem_f1.cfg

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

ICDelay 1
DefaultT0 10
CallDelay 120
# AT Attention Code , Inserts delay in dialing commands
# &F1 Reset. Restore profile 1 Q0 Turn on responses
# E0 Turn echo off Q1 Turn off responses
# V0 Use numeric responses S0=0 Automatic answer inhibit
# +++ Escape to command mode S0=2 Answer on second ring
# H0 Hang-up X0=0 Limit modem response codes
# T = Tone mode. When used as T\r, it is a
# no op to maintain program synchronization
# when modem may/will echo the commands.
#
#
# &C1 Detect CD &D2 Respond to DTR (often the default)
# &R1 Ignore RTS (CTS)
#
# %N Call-Out phone number %P Paging phone number
# %S Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

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

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

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

```

timeout 60
done

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

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

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

    ignore "0\r" timeout 1
done

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

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

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

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

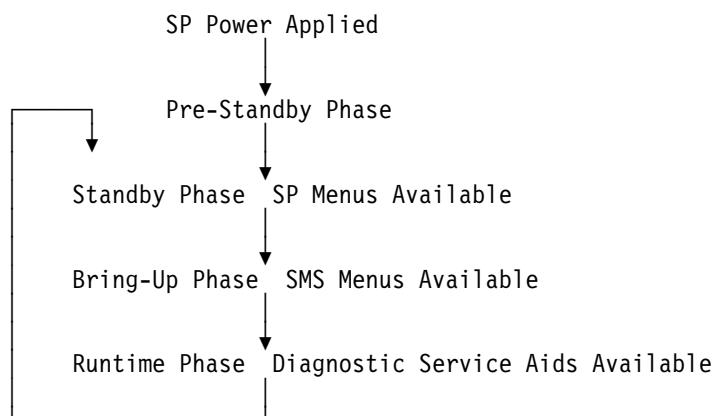
ripo:     send "AT&F1Q0T\r"                # Reset modem. Select profile 1
    ignore "0\r" or "OK\r\n" timeout 2    # Ignore modem response.
    send "ATE0T\r"                        # Initialize modem: Echo OFF,
    expect "0\r" or "OK\r\n" timeout 2    # Enable responses (Numeric),
    send "ATQ0V0X0T\r"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

```

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

Appendix C. Service Processor Operational Phases

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



Pre-Standby Phase

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

The Pre-Standby phase components are:

- SP Initialization
SP performs any necessary hardware and software initializations.
- SP POST
SP conducts Power-On Self Tests on its various work and code areas.
- SP Unattended Start Mode Checks
To assist fault recovery. If unattended start mode is set, the SP automatically reboots the server. SP will not wait for a user-input or power-on command, but will move straight through the phase and into the Bringup Phase. The unattended start mode can be reset by accessing SMS menus, or SP menus.

Standby Phase

The standby phase can be reached in two ways:

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

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

The Standby phase components are:

- Modem Configuration

SP will configure the modem (if installed) so that incoming calls may be received, or outgoing calls may be placed.

- Dial In

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

- Menus

The SP menus are password protected. Before you can access them you need to know either General User password or Privileged User password.

Bring-Up Phase

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

The Bring-up phase components are:

- Retry Request Check

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

- Dial Out

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

- Update Operator Panel

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

- Environmental Monitoring

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

- System Firmware Surveillance (Heartbeat Monitoring)

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

- Responding to System Processor Commands

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

Runtime Phase

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

- Environmental Monitoring

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

- Responding to System Processor Commands

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

- Run-Time Surveillance (Heartbeat Monitoring)

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

Appendix D. Service Processor Problem Determination

SP Reported Errors

The following list contains entries which may be found in the SP error log under the SP maintenance menu. The listed error codes will be displayed on the LCD Operator Panel.

Error Code	Reported Error	FRU Description
40100005	A loss of system power detected.	Possible main power loss. If not, replace Power Supply.
40100007	Immediate shutdown	Possible main power loss. If not, replace Power Supply.
40110001	Power supply fail	1. Power Supply 2. System Board 3. SP
40111002	An unknown power problem detected.	1. Power Supply 2. System Board 3. SP
40111022	A high 5.0 voltage reading detected.	1. Power Supply 2. Processor Card
40111032	A high 3.3 voltage reading detected.	1. Processor Card 2. Power Supply
40111042	A high 2.5 voltage reading detected.	1. Processor Card 2. Power Supply
40111052	A high +12 voltage reading detected.	1. Power Supply 2. System Board
40111062	A high -12 voltage reading detected.	1. Power Supply 2. System Board
40111082	A low 5.0 voltage reading detected.	1. Power Supply 2. Processor Card
40111092	A low 3.3 voltage reading detected.	1. Processor Card 2. Power Supply
401110A2	A low 2.5 voltage reading detected.	1. Processor Card 2. Power Supply
401110B2	A low +12 voltage reading detected.	1. Power Supply 2. System Board
401110C2	A low -12 voltage reading detected.	1. Power Supply 2. System Board
40200001	An unknown cooling problem detected.	Cooling problem; check system fans.
40200021	A CPU temperature warning detected.	Over temperature on Processor Card.

Error Code	Reported Error	FRU Description
40200023	A critical CPU temperature condition detected.	Critical temperature on Processor Card.
40200031	An I/O planar temperature warning detected.	Over temperature on System Board.
40200033	A critical I/O planar temperature condition detected.	Critical temperature on System Board.
40200041	A memory temperature warning detected.	Over temperature on System Board.
40200043	A critical memory temperature condition detected.	Critical temperature on System Board.
40210011	A slow fan detected.	Check: 1. Room operating temperature 2. System fans
40210014	A stopped fan detected.	Failing fan.
40A00000	System firmware IPL failure.	1. Surveillance mode control is from the Service Processor (SP) Menus. 2. Verify that the system firmware supports SP surveillance. 3. CPU card. 4. I/O planar. 5. Service processor. 6. If the problem persists, call the support center for assistance.
40B00000	The operating system surveillance interval exceeded.	1. Surveillance mode control is from the Service Processor(SP) Menus. 2. Verify that the Operating System (OS) Heartbeat Utility is installed and has been activated. 3. Check for errors or unusual conditions that might prevent the OS from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the error log. 4. I/O planar. 5. Service processor. 6. If the problem persists, call the support center for assistance.

Error Code	Reported Error	FRU Description
40D00003	An unknown slow shutdown commanded.	Critical cooling problem. Check to ensure the the temperature is in the ambient range
40D00004	An unknown fast shutdown commanded.	Locked fan failure detected. Make sure all fans are operating normally.
4B201000	Checkstop	Refer to map 1540 in the system unit's Service Guide.
4B2xxx10	Machine Check	Refer to map 1540 in the system unit's Service Guide.
4B201020	TEA Error	Refer to map 1540 in the system unit's Service Guide.
4B2xxx01	Checkstop - Slot 1 Fail	Refer to map 1540 in the system unit's Service Guide.
4B2xxx02	Checkstop - Slot 2 Fail	Refer to map 1540 in the system unit's Service Guide.
4B2xxx41	ABIST fail	Refer to map 1540 in the system unit's Service Guide.
4B2xxx42	ABIST fail	Refer to map 1540 in the system unit's Service Guide.
4B80013	NVRAM	Refer to map 1540 in the system unit's Service Guide.

SP Related System Firmware Error Codes

The following table lists the various error codes and checkpoints along with a description of the error and when the system will halt.

Error Code	Chk Point	Sys Halt	Reported Error	FRU Description
00010000	F147	No	No CPU card VPD data. Module missing or bad CRC.	Processor card
00016000	F146	Yes	Interrupt (IRQ13) stuck high	1. System board 2. SP
	F147	No	No system board VPD data. Module missing or bad CRC.	System board
	F149	Yes	SP reports error 40111022/40111082, 5V high/low. EPOW register could not be cleared.	System board
	F14A	Yes	SP reports 40111052/401110B2 40111062/401110C2, +-12V high/low. EPOW register could not be cleared.	System board
	F14B	Yes	SP reports error 40200021. CPU card over temperature. EPOW register could not be cleared.	System board
	F14F	Yes	SP reports error 40200031/40200041, system board/memory over temperature. EPOW register could not be cleared.	System board
	F151	Yes	SP reports error 40200023, CPU card critical temperature. EPOW register could not be cleared.	System board
	F151	Yes	SP reports error 40200033/40200043, system board/memory critical temperature. EPOW register could not be cleared.	System board

Error Code	Chk Point	Sys Halt	Reported Error	FRU Description
00016000 (continued)	F152	Yes	SP reports error 40210011/40210014, slow/locked fan. EPOW register could not be cleared.	System board
	F153	Yes	SP reports error 40210011/40210014, slow/locked fan. EPOW register successfully cleared.	1. Fan(s) 2. System board 3. SP
	F155	Yes	Unsupported EPOW	1. System board 2. SP
	F156	Yes	SP reports error 40111032/40111092 40111042/401110A2, 3.3V/2.5V high/low. EPOW register could not be cleared.	System board
00016010	F147	No	Service Processor reports system VPD access failure.	System board with new System VPD module
00070000	F147	No	SP POST failure	1. Optional SP 2. System board
00070001	F156	Yes	SP reports error 40111032/40111092 40111042/401110A2, 3.3V/2.5V high/low. EPOW register successfully cleared.	1. CPU card 2. Power supply
00070006	F154	No	SP reports error 40210011/40210014. Slow/locked fan. EPOW register successfully cleared.	1. Fan(s) 2. SP 3. System board
00070007	xxx	???	SP reports system over temperature.	1. Fan(s) 2. System board 3. CPU card
00070008	F14F	Yes	SP reports error 40200031/40200041, System Board/Memory over temperature. EPOW register successfully cleared.	1. Over temperature I/O 2. Memory
	F151	Yes	SP reports error 40200033/40200043, System Board/Memory critical temperature. EPOW register successfully cleared.	Critical temperature on system board

Error Code	Chk Point	Sys Halt	Reported Error	FRU Description
00070009	F14B	Yes	SP reports error 40200021. CPU over temperature. EPOW register successfully cleared.	Over temperature processor card
	F151	Yes	SP reports error 40200023, Processor Card critical temperature. EPOW register successfully cleared.	Critical temperature on processor card
00070010	F148	Yes	SP reports error 40100005. AC loss eminent.	1. Power supply 2. System board 3. SP
	F14A	Yes	SP reports 40111052/401110B2 40111062/401110C2, +-12V high/low. EPOW register successfully cleared.	1. Power supply 2. System board
00070011	F149	Yes	SP reports error 40111022/40111082, 5V high/low. EPOW register successfully cleared.	1. Power supply 2. Processor card
00070012	F147	No	SP reports self-test failure	1. Optional SP 2. System board
00070013	F147	No	SP reports bad NVRAM CRC.	1. Battery 2. System board
00070014	F147	No	SP reports bad SP firmware.	Use SP firmware diskette to re-program firmware.
00070015	F147	No	SP reports bad SP VPD.	1. SP 2. System Board
00070016	F147	No	SP reports firmware failure.	1. Retry SP firmware update. 2. Optional SP
00070017	F157	Yes	SP reports bad or low battery.	1. Battery 2. System board
00070018	F159	No	EPOW test failure.	1. Optional SP 2. System board
00070019	F15B	No	Interrupt (IRQ13) test failure.	1. System board 2. Optional SP
80071200	N/A	No	The SP firmware recovery information could not be written to the diskette.	1. Check diskette media write protect tab 2. Diskette drive
80072000	N/A	No	The SP is NOT installed. SP update cancelled.	1. Install the SP 2. Retry operation
80072800	N/A	No	The SP update diskette is not inside the drive.	Insert diskette

Error Code	Chk Point	Sys Halt	Reported Error	FRU Description
888nnnnn	N/A	Yes	Operating System error. See the <i>Diagnostic Information for Multiple Bus Systems</i> for the description and action.	
N/A	STBY	Yes	The power supply did not turn off when instructed.	
None of the error codes listed.	Any		Operating System error. See the <i>Diagnostic Information for Multiple Bus Systems</i> for the description and action.	

SP Progress Messages

A01	Setting up default SP values
A02	SP configuring NVRAM parameters
A04	SP detected environmental failure; attempting Call-out.
A05	SP disconnecting modem
A07	SP configuring modem
A08	SP detected system firmware surveillance failure; attempting Call-out
A09	SP detected operating system surveillance failure; attempting Call-out

Appendix E. Communications Statements

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

Federal Communications Commission (FCC) Statement

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

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

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

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

Responsible Party:

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

European Union (EU) Statement

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

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

International Electrotechnical Commission (IEC) Statement

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

United Kingdom Telecommunications Safety Requirements

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

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

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

VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

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

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

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

Read the instructions for correct handling.

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

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Part Number: 93H9730

Printed in U.S.A.

93H9730

