



Service Processor Installation and User's Guide

Note

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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, the serial ports, or if the SP needs to be re-booted.

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

This book, when used with your server documentation, will help you install the Service Processor (SP) and the associated software.

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

Related Publications

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

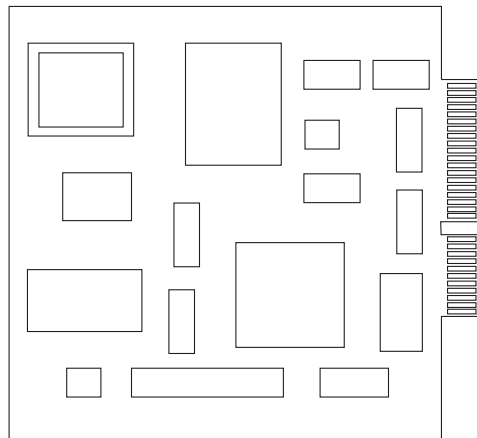
ISO 9000

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

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
- 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

In order to fully utilize SP, you must have the following software:

- An operating system that includes an SP device driver, for example:
 - AIX version later than 4.1.4
 - Windows NT (PowerPC Edition) version 4.0 or later
- System firmware dated 3/26/96 or later. For more information, refer to step 19 on page 3-3.

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.
- The diskette "Sample Modem Configuration Files."
- Your operating system installation media, or your server's stand-alone diagnostics CD-ROM (later than version 4.1.4).

Refer to Appendix A, “SP Installation Checklist” 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 6-7.

Device Driver Installation on AIX Systems

1. Turn the server on.
2. Log in as **root**.
3. Insert the AIX installation CD-ROM (later than version 4.1.4) 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. To install the sample modem configuration files:

a. Insert the diskette containing the sample modem configuration files.

b. Type:

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

c. Press Enter.

d. Remove 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.

Note: System Firmware includes a set of utilities called System Management Services (SMS). Some of those utilities support SP.

After the device drivers are installed, you may now need to update the system firmware.

19. To determine your version of system firmware, turn on your server and do the following:

- If you are using a graphics display:

Press F4 as soon as the test icons start appearing. When the tests have completed, and any required passwords have been entered, the SMS utilities menu will appear. On the second line of the heading is a version number, date, and time. The date must be 03/26/96 or later.

- If you are using an ASCII terminal:

Press number 4 when the test list starts appearing. When the tests have completed, and any passwords have been entered, the SMS utilities menu will appear. In the heading, the line "Flash Composite Block Date and timestamp..." must contain the date 03/26/96 or later.

Refer to your server's User's Guide for information on how to update the system firmware, if an update is needed.

You are ready to install the new hardware.

Device Driver Installation on Windows NT (PowerPC Edition) Version 4.0

1. Turn the server on.
2. Log on to Windows NT (PowerPC Edition) as Administrator.
3. Insert the diskette containing the Windows NT (PowerPC Edition) device driver for the SP into the diskette drive.
4. Open a MSDOS Prompt window.
5. Change directory to your diskette drive directory.
6. Type the command `install` and press Enter.
7. The installation menu is displayed.
8. Select the install option.
9. After the driver is installed, return to Windows NT (PowerPC Edition).

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

The SP Service 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 Task and Configure Support Processor Task. These tasks are further explained in this chapter. Values shown in the menus are default values.

Starting the Diagnostic Controller Program

Note

If you are configuring the SP on an operating system other than AIX, or diagnostics are not loaded on your system, you must reboot using the Stand-alone diagnostics CD-ROM. If you plan to configure your modem at this time, you must tell the diagnostic controller that there is a supplemental diagnostics diskette. Refer to "Supplemental Diagnostics Diskette" on page B-1 for instructions on how to do this.

To start the program

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 on starting 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. Move the cursor down the list of tasks to select:
 - a. "Configure Ring Indicate Power-On."
 - b. "Configure Support Processor."

Selecting the "Configure Ring Indicate Power-On" option allows you to enable or disable Ring Indicate Power-On.

Selecting the "Configure Support Processor" option allows you to do Surveillance Set-up, Modem Configuration, Call-In/Call-Out Set-up.

The screens used to perform the above tasks are described in the remainder of this chapter.

Configure Ring Indicate Power-On

Ring Indicate Power-On is an alternate method of dialing in, without establishing an SP session. If the system is powered off, and 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.

Configure Ring Indicate Power-On Task Selection - Stand By

The following screen displays for a short time when you choose menu task "Configure Ring Indicator Power-On." Then the Ring Indicate Power-On menu displays.

Note: This selection may be accessed directly from the AIX command line while in the /usr/lpp/diagnostics/bin subdirectory 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 may be set to 'on' or 'off'

Number of Rings to Power-on may be set to any number from 1 to 255.

Configure Support Processor

Configure Support Processor - Stand By

The following screen displays for a short time when you choose task selection "Configure Support Processor." Then the Support Processor selection menu displays.

Note: This selection may be accessed directly from the AIX command line while in the /usr/lpp/diagnostics/bin subdirectory 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 may be set to 'on' or 'off'.

Surveillance time interval, in minutes may be set to any number from 2 to 128

Surveillance time delay, in minutes may be set to any number from 0 to 128

Note: When surveillance is configured or modified using this menu, the changes will take place beginning with the next system boot. For more information on Surveillance, see "Service Processor System Monitoring - Surveillance" on page 7-2.

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 must be 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 (where a modem, if any, is connected). Refer to “Access SP menus remotely” on page 6-3 for more information on connecting modems.

Configure Support Processor - Modem Configuration Stand By

This menu displays while the modem configuration file is read, converted, and loaded into non-volatile random access memory (NVRAM). If an error occurs, a pop-up error message allows you to try again from the modem configuration menu, cancel to 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 may be set to 'On' or 'Off'.

Call-Out allows SP to place calls for maintenance.

Serial Port 2 Call-In may be set to 'On' or 'Off'.

Call-In allows SP to receive a call from a remote terminal.

Serial Port 2 Call-Out may be 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** may be any of the following line speeds: 300, 600, 1200, 2000, 2400, 3600, 4800, 9600, 19200, 38400. For more information about line speeds, refer to "Line Speed Consideration" on page A-2.

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 while busy               [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 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 Admin Center phone 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.

Pager phone number is the number for a 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 System phone 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.

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 completed.

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 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

Customer RETAIN login id 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 you do not use RETAIN.

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

Number of retries while busy is the number of times you want the server to retry calls that resulted in busy signals.

System name (System Administrator aid) is the name your server can report in the problem messages. This helps your support team more quickly identify the location, configuration, history, etc., of your server. Contact your system administrator or service provider for this name or leave this field blank.

Chapter 6. SP Startup and 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 loss of surveillance).

During the first power up (i.e. power cord is plugged back into the outlet after installing the SP), 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 15 seconds.

The table on page 6-2 summarizes the various SP support menus.

Option/ Menu Description	SP Service Aids (ASCII or graphics terminals)	SP Menus (ASCII terminals)	SMS (ASCII or graphics terminals)
Modem Enable/Disable	Y ¹	Y ²	
Ring Indicate Power-On	Y ¹	Y ²	
Setup Dial-out Phone Numbers	Y ¹	Y ²	
Setup Runtime Surveillance Parameters	Y ¹	Y ²	
Setup Site Specific Parameters	Y ¹		
Setup Modem Configuration Parameters	Y ¹		
Access SP Error Logs		Y ³	
Read NVRAM		Y ³	
Enable/Disable Console Mirroring		Y ²	
Enable/Disable Fast System Boot		Y ²	
Power-on		Y ³	
Power-off System		Y ²	
Read VPD		Y ³	
View Boot Progress Indicators from last IPL		Y ²	
View System Environmental Conditions		Y ³	
Change General/Power-on Password		Y ²	Y ²
Change Privileged Access Password		Y ²	Y ²
Language Selection		Y ²	Y ²
SP Flash Update		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 (general access password required)
- Privileged user menus (privileged access password required)

General and Privileged user menus, menu access and associated menu function are described below.

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

Maintenance Console

To use SP menus for maintenance functions, use serial port 1.

Access SP menus locally

SP menus are accessed locally by connecting an ASCII terminal to either serial port. Since the ASCII terminal cannot be confirmed by the SP, press any ASCII terminal key to confirm its presence. If a password is required, the SP prompts you to enter it. When the password is verified, the SP menus display.

Access SP menus remotely

SP menus are accessed remotely by connecting a modem to either serial port.

- While power is disconnected, power off the server, unplug the power cord, and press the power button to drain capacitors.
- 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 “Configure Support Processor - Modem Configuration” on page 5-5.

Call the server's modem via a terminal or terminal emulator. If a password is required, the the SP prompts you to enter it. When the password is verified, the SP menus display.

General User Menus

The menu options presented to the General user are a subset of the options available to the Privileged user. The General Access (Power-On) Password (POP) is required to access the General User Menus.

STANDBY MENU

1. Power-on System
2. Read VPD
3. Access Error Logs
4. Read NVRAM
5. View System Environmental Conditions
99. Exit from Stand-By 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.

- **Access Error Logs**

Displays the SP error logs.

- **Read NVRAM**

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

- **View System Environmental Conditions**

Select this menu to determine the environmental conditions related to a failure. The SP reads all environmental sensors and reports the results. This option is most useful when surveillance fails.

Privileged User Menus

A Privileged Access Password (PAP) is required to access Privileged User Menus.

MAIN MENU

MAIN MENU

1. SP Setup Menu
2. System Bringup Menu
3. System Maintenance Menu
4. Language Selection Menu
99. Exit from Stand-By Menus

SP SETUP MENU

SP SETUP MENU

1. Change Privileged Access Password
2. Change General Access Password
3. Set Dial-out Telephone Numbers
4. Enable/Disable Modem
5. Enable/Disable Console Mirroring
6. Set Surveillance Parameters
7. Reset Support Processor
98. Return to Previous Menu
99. Exit from Stand-By Menus

Passwords

The General Access (Power-On) Password (POP) is set from the SP menu or from the SMS menus. Refer to the server's documentation for more information to set this password from SMS menus.

Note: If the Privileged Access Password (PAP) is set first, the Power-On Password (POP) is equivalent to the Privileged Access Password (PAP) until the POP is changed. POP cannot be set from the SP menus unless PAP has been set. To set POP, enter either the PAP or the POP (if a previous one exists). Clearing the PAP also clears the POP.

- **Change Privileged Access Password**

Set or change the Privileged Access Password (PAP). 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 (Power-On) Password (POP). It provides limited access to SP menus, and is usually available to all users who are allowed to power-on the server.

- **Set Dial-Out Telephone Numbers**

Use this SP option to set or change the telephone numbers for reporting a system failure. Automated reporting can be set for the following:

- Service Center: Enter the telephone number of the maintenance provider's computer.
- System Administrator: Enter telephone number of the local system support provider's computer.
- Pager
- Local voice: Enter the telephone number of service personnel using local voice to reach the system user.
- System Call-In: Enter the telephone number used to connect the server's modem.

- **Enable/Disable Modem**

Use the SP Enable/Disable functions to enable or disable Call-In and Call-Out. Use the SP to also enable Ring Indicate Power-On instead of enabling Call-In.

Note: Ring Indicate Power-On is an alternate dial-in method, but SP does not answer and establish a session with the remote terminal. Ring Indicate Power-On turns on the server, but offers no user feedback.

- **Enable/Disable Console Mirroring**

Enable SP Console Mirroring (local or remote) to mirror menus at both serial ports. This option provides the capability for local users to monitor current remote sessions.

- **Set Surveillance Parameters**

Use this option to configure the following:

- Surveillance Enable/Disable
- Surveillance Interval: This is the maximum time between heartbeats from the operating system. Valid entries are 2 to 128 minutes.
- Surveillance Delay: This is the time the operating system is in control before beginning operating system surveillance. Valid entries are 0 to 128 minutes.

Refer to "Service Processor System Monitoring - Surveillance" on page 7-2 for more information about surveillance.

- **Reset Service Processor** - Allows the user to reinitialize the SP.

Note

Settings become effective when the menu is exited using option 98 or 99.

SYSTEM BRINGUP MENU

SYSTEM BRINGUP MENU

- 1. Power-on System
- 2. Enable/Disable Fast System Boot
- 3. Enable/Disable Unattended Start Mode
- 4. Power-off System
- 98. Return to Previous Menu
- 99. Exit from Stand-By Menus

- **Power-on System**

Allows the user to power-on the system.

- **Enable/Disable Fast System Boot**

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

- **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.

- **Power-off System**

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

SYSTEM MAINTENANCE MENU

SYSTEM MAINTENANCE MENU

1. Read VPD
2. View Boot Progress Indicators from last IPL
3. Access Error Logs
4. Read NVRAM
5. View System Environmental Conditions
6. Reprogram SP Flash Eprom
98. Return to Previous Menu
99. Exit from Stand-By Menus

- **Read VPD**

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

- **View Boot Progress Indicators from last IPL**

Displays the boot progress indicators (check points), up to a maximum of 80, from the last system initial program load (IPL).

- **Access Error Logs**

Displays error conditions detected by the SP.

- **Read NVRAM**

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

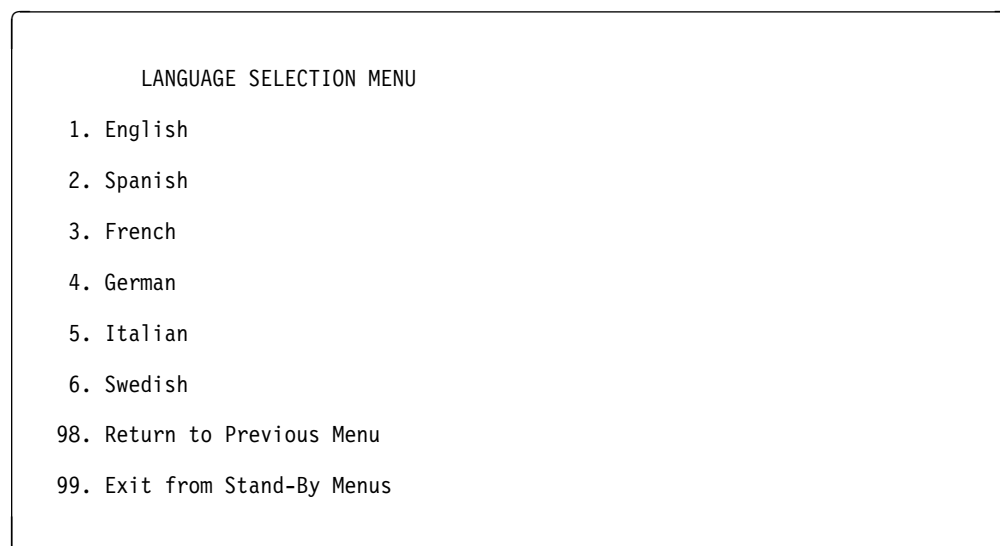
- **View System Environmental Conditions**

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.

- **Reprogram SP Flash Eprom**

This option may be used to program the SP Flash image. On selection of this option, the SP will power-on the system and instruct system firmware to update the SP image from diskette. This option should only be selected if a **new** SP image is to be installed.

LANGUAGE SELECTION MENU



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

Chapter 7. SP Features

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

Call Out (Call-Home)

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

- System firmware surveillance failure.
- Operating system surveillance failure (if supported by Operating System using an SP device driver).
- Critical environmental failures.

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 Diagnostic Service Aids:
 - Enable call out for the serial port where the modem is connected.
 - Set up serial port line speed. For more information on line speeds, refer to “Line Speed Consideration” on page A-2.
 - Enter the modem configuration filename.
 - Set up site specific parameters (i.e. phone numbers for call out, call out policy, etc).

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 and enabled for incoming calls
- Local ASCII terminal connected to the other serial port. This local 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.

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.

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. This function requires an SP device driver in the operating system, such as AIX (versions later than 4.1.4).

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 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.

System Firmware Surveillance Failure

If the SP detects no heartbeats during system IPL (for 7 minutes), it cycles the system power to attempt a reboot. If the fail condition repeats, 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 Failure

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, the SP assumes the system is hung. The machine is left powered on and SP enters standby phase, displaying the operating system surveillance failure code on the operator panel. If Call-out is enabled, the SP calls to report the failure.

System Power-On Methods

- Power-on Switch - refer to your server's documentation.
- Timed power-on - refer to the shutdown -t command on servers using AIX.
- Unattended start mode - refer to **Enable/Disable Unattended Start Mode** on page 6-8.
- 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.

- Ring Indicate Power-On

On servers not equipped with the optional SP, this feature allows the user to configure the server to power-on. SP also supports this feature.

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.

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. The update can be initiated via the SP menus or through the SMS menus.

Appendix A. SP Installation Checklist

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. Install the:
 - SP device driver, page 3-1
 - service aid, page 3-1
 - modem configuration files, page 3-3
2. Update Firmware (if needed), page 3-3
3. Install SP card, page 4-1
4. Invoke SP service aid, page 5-1.
5. Select Configure Support Processor Task, page 5-3
6. Enable Surveillance, page 5-4, also see page 7-2
7. Configure modem, page 5-5, also see page B-1
 - Modem Configuration File selection(s)
 - Modem's serial port(s)
8. Setup Call-In/Call-Out
 - Call-In, page 5-6
 - Call-Out, page 5-6
 - Line Speed, page 5-6 (consider system firmware usage, page A-2)
9. Setup site specific parameters, page 5-7
 - Phone numbers
 - (Service) Account number
 - Call-Out policy
 - RETAIN_ID and RETAIN_PW (optional)
 - Take defaults for Remote timeout and Remote latency
 - Number of retries
 - System name
10. Return to operating system prompt
11. Gracefully shutdown, power off and **unplug** the server
12. Attach modem(s) (if needed), page 6-3

13. Plug in the server

14. Test

Call-In, page A-2

Call-Out, page A-3

Your SP is ready to go to work.

Line Speed Consideration

For simplification, the system firmware expects to use the serial ports at the 9600 baud rate. The operating system, the SP and the modem can use the serial ports at higher and lower speeds.

If 9600 baud is satisfactory for your applications, then it is recommended for seamless operation.

If you wish to operate at other speeds, you can do so with the understanding that messages from the system firmware may not be transmitted intelligibly to a remote terminal. This is usually not a problem during an SP initiated system bringup.

Accessing the SMS utilities from a remote terminal will have the same result, since they are contained in system firmware. At speeds other than 9600 baud, SMS utilities will not be useable from a remote terminal.

Testing the Setup

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

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.
2. Enter item 2, **System Bringup Menu**.
3. Enter item 1, **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. 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 (page 5-8) and Customer Voice (page 5-8) 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. At the **SP Main Menu**, enter the numbers 81357.
4. After a few moments, a message appears regarding an illegal entry. Press Enter to clear the message and return to the main menu.
5. When your telephone rings, answer the call. You should hear the sound of a telephone being dialed. This is your computer trying to page you.

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

You now need to go back through the **Site Specific Setup** menus on page 5-7 or the **SP Setup** menus on page 6-6 to enter the actual telephone numbers your server will use for reporting problems.

Appendix B. Modem Configurations

Supplemental Diagnostics Diskette

If you are using the Stand-alone diagnostics CD-ROM to configure your SP, you must make the Diagnostics Controller aware that there is a supplemental diagnostics diskette needed for the modem configuration. This is achieved by doing the following:

1. Insert the Stand-alone Diagnostics CD-ROM in the CD-ROM drive.
2. Reboot your system from the CD-ROM.
3. When prompted, define the system console.
4. Press Enter at the Diagnostics Operating Instructions menu.
5. From the Function Select menu, select option 3 and press Enter.
6. Define the terminal type.
7. From the New Resource menu, select option 1 and press Enter.
8. Select Diagnostic Mode and press Enter.
9. Select System Verification and press Enter.
10. Go to the bottom of the list and select 'Read Supplemental Diskette.'
11. Insert the supplemental diskette into the diskette drive and follow the prompts on the display screen.

The modem configuration files are loaded, and you are now ready to configure the Support Processor. Return to Chapter 5, "Service Processor Service Aid" on page 5-1 to continue the configuration process.

Sample Modem Configuration Files

With nearly 1000 modems to choose from, and various 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 with the following names:

- modem_z.cfg
- modem_z0.cfg
- modem_f.cfg

- modem_f0.cfg
- modem_f1.cfg

When you loaded the sample modem configuration files from the diskette, they were placed 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.¹ Choose 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.¹ Choose settings that enable hardware flow control and respond to DTR.

Examples

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 ²				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 14.4K Sportster					X
Zoom V.32			X		

¹ 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.

² Ring interrupt only on first ring.

Xon/Xoff Modems

Some modems of the mid-80's vintage assume software flow control (Xon/Xoff) between the computer and the modem. Modems with this design send extra characters during and after the transmitted data. SP cannot tolerate these extra characters. If your configuration includes such a modem, your functional results may be unpredictable.

The sample modem configuration files included in this package do not support these modems, so custom configuration files would be necessary. Anchor Automation 2400E is an example of such a modem.

Most newer modems do not use this design. It is recommended you use modems of newer vintage if you experience unexplainable performance problems that may be due to Xon/Xoff characters.

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. You may also have a commercially available terminal emulation. It is important that the local and host computers select the same or compatible terminal emulators so 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 model 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.
#
# * Trademark of Hayes Microcomputer Products, Inc.
#
# (C) COPYRIGHT International Business Machines Corp. 1996
# All Rights Reserved
# Licensed Materials - Property of IBM
#
# 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 "ATE0Q1\r"                      # Initialize modem: Echo OFF,
                                        # Disable responses.

ignore "0\r" timeout 1
done

condin:   send "AT&F00T\r"              # Reset to factory defaults.
ignore "0\r" or "OK\r\n" timeout 2    # Ignore modem response.
send "ATE0T\r"                        # Initialize modem: Echo OFF,
expect "0\r" or "OK\r\n" timeout 2    # Enable responses (Numeric),
send "ATQ0V0X0T\r"                   # Limit response codes.
expect "0\r" timeout 2                # Confirm commands successful.
send "ATS0=2\r"                       # Set AutoAnswer ON
expect "0\r" timeout 2                # Confirm command successful.
send "AT&C1&D2\r"                    # Detect carrier and DTR.
expect "0\r" timeout 2                # Confirm command successful.
done

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

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

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

```

```

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

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

```


Sample File modem_f0.cfg

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

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

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

```

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

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

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

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

    ignore "0\r" timeout 1
done

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

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

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

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

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

```

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

Sample File modem_f1.cfg

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

ICDelay 1
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 "\0K\r\n" timeout 2 # Ignore modem response.
         send "ATE0T\r" # Initialize modem: Echo OFF,
         expect "\0\r" or "\0K\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

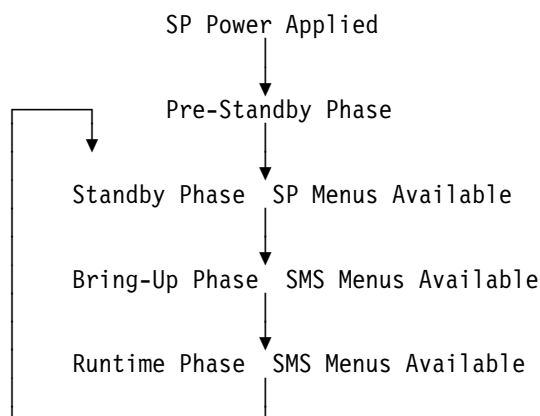
ripo:     send "AT&F1Q0T\r"                # Reset modem. Select profile 1
    ignore "0\r" or "OK\r\n" timeout 2    # Ignore modem response.
    send "ATE0T\r"                        # Initialize modem: Echo OFF,
    expect "0\r" or "OK\r\n" timeout 2    # Enable responses (Numeric),
    send "ATQ0V0X0T\r"                    # 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 (POSTS) and configurations 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 SP enters a wait state which is exited when the user prompts a menu via the ASCII terminal keyboard, or when the SP detects a power-on request.

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.

In order to access the SP menus, the user will be prompted for a password. There are two classes of passwords: General User (known as Power-On Password or POP) and Privileged User (known as Privileged Access Password or PAP).

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. 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.
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.
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.

Error Code	Reported Error	FRU Description
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	The IPL ROS surveillance interval exceeded.	System Firmware IPL failure.
40B00000	The operating system surveillance interval exceeded.	Operating system failure.
40D00004	An unknown fast shutdown commanded.	Locked fan failure detected.
40D00004	An unknown fast shutdown commanded.	Locked fan failure detected.
4B201000	Checkstop	Refer to map 1540 in the system unit's Service Guide.
4B201010	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.
None	A service call was attempted but was unsuccessful.	Call-out unsuccessful. Check phone line and modem setup.

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	F47	No	No CPU card VPD data. Module missing or bad CRC.	Processor card
00016000	F46	Yes	Interrupt (IRQ13) stuck high	1. System board 2. SP
	F47	No	No system board VPD data. Module missing or bad CRC.	System board
	F49	Yes	SP reports error 40111022/40111082, 5V high/low. EPOW register could not be cleared.	System board
	F4A	Yes	SP reports 40111052/401110B2 40111062/401110C2, +-12V high/low. EPOW register could not be cleared.	System board
	F4B	Yes	SP reports error 40200021. CPU card over temperature. EPOW register could not be cleared.	System board
	F4F	Yes	SP reports error 40200031/40200041, system board/memory over temperature. EPOW register could not be cleared.	System board
	F51	Yes	SP reports error 40200023, CPU card critical temperature. EPOW register could not be cleared.	System board
	F51	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)	F52	Yes	SP reports error 40210011/40210014, slow/locked fan. EPOW register could not be cleared.	System board
	F53	Yes	SP reports error 40210011/40210014, slow/locked fan. EPOW register successfully cleared.	1. Fan(s) 2. System board 3. SP
	F55	Yes	Unsupported EPOW	1. System board 2. SP
	F56	Yes	SP reports error 40111032/40111092 40111042/401110A2, 3.3V/2.5V high/low. EPOW register could not be cleared.	System board
00016010	F47	No	Service Processor reports system VPD access failure.	System board with new System VPD module
00070000	F47	No	SP POST failure	1. Optional SP 2. System board
00070001	F56	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	F54	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	F4F	Yes	SP reports error 40200031/40200041, System Board/Memory over temperature. EPOW register successfully cleared.	1. Over temperature I/O 2. Memory
	F51	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	F4B	Yes	SP reports error 40200021. CPU over temperature. EPOW register successfully cleared.	Over temperature processor card
	F51	Yes	SP reports error 40200023, Processor Card critical temperature. EPOW register successfully cleared.	Critical temperature on processor card
00070010	F48	Yes	SP reports error 40100005. AC loss eminent.	1. Power supply 2. System board 3. SP
	F4A	Yes	SP reports 40111052/401110B2 40111062/401110C2, +-12V high/low. EPOW register successfully cleared.	1. Power supply 2. System board
00070011	F49	Yes	SP reports error 40111022/40111082, 5V high/low. EPOW register successfully cleared.	1. Power supply 2. Processor card
00070012	F47	No	SP reports self-test failure	1. Optional SP 2. System board
00070013	F47	No	SP reports bad NVRAM CRC.	1. Battery 2. System board
00070014	F47	No	SP reports bad SP firmware.	Use SP firmware diskette to re-program firmware.
00070015	F47	No	SP reports bad SP VPD.	1. SP 2. System Board
00070016	F47	No	SP reports firmware failure.	1. Retry SP firmware update. 2. Optional SP
00070017	F57	Yes	SP reports bad or low battery.	1. Battery 2. System board
00070018	F59	No	EPOW test failure.	1. Optional SP 2. System board
00070019	F5B	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

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 &typemod. 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
New Orchard Road
Armonk, New York 10504
Telephone: (919) 543-2193



Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

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 est conforme à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

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 product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. 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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