Bull ESCALA EPC810 and PL 800R

User’s Guide

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Bull ESCALA EPC810 and PL 800R

User's Guide

Hardware

September 2001

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Safety Notices

A *danger* notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. *Danger* notices appear on the following pages:
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A *caution* notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. A Caution notice appears on the following pages:
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Electrical Safety

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

DANGER

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

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

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

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

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

CAUTION:
This product is equipped with a three–wire power cable and plug for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.

DANGER

To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

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

Laser Safety Information

The optical drive in this system unit is a laser product. The optical drive has a label that identifies its classification. The label, located on the drive, is shown below.

The optical drive in this system unit is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 (1st edition 1984) and CENELEC EN 60 825:1991 for Class 1 laser products.

CAUTION:
A class 3 laser is contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive as it is not serviceable and is to be replaced as a unit.

Class 1 laser products are not considered to be hazardous. The optical drive contains internally a Class 3B gallium–arsenide laser that is nominally 30 milliwatts at 830 nanometers. The design incorporates a combination of enclosures, electronics, and redundant interlocks such that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing conditions.

Environmental Notices

Product Recycling and Disposal

This unit contains materials such as circuit boards and connectors with lead that require special handling and disposal at end of life. Before this unit is disposed, these materials must be removed and recycled or discarded according to applicable regulations. This manual contains specific information on batteries where applicable. Contact your account representative for more information. This product may contain nickel–cadmium and /or lithium batteries. The battery(s) must be recycled or disposed of properly. Recycling facilities may not be available in your area.

For information on reuse, recycling or proper battery disposal procedures, contact your sales representative or local waste disposal facility.

Unit emissions

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

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

About this Book

This book provides information about the ESCALA EPC810 and PL 800R, specifically how to use the system, use diagnostics, use service aids, and verify system operation. This book also provides information to help you solve some of the simpler problems that might occur. In this book, the ESCALA EPC810 and PL 800R are hereafter reffered to as the “system”.

ISO 9000

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

Related Publications

The following publications are available:

- The *System Unit Safety Information*, order number 86 X1 11WD, contains translations of safety information used throughout this book.
- The *Installation Guide*, order number 86 A1 93KX, contains information on how to set up and cable the system, install and remove options, and verify system operation.
- The *Service Guide*, order number 86 A1 37KX, contains reference information, maintenance analysis procedures (MAPs), error codes, removal and replacement procedures, and a parts catalog.
- The *T00 Rack Installation and Service Guide*, order number 86 A1 94KX, contains information regarding the Model T00 Rack, in which the EPC810 may be installed.
- The *Diagnostic Information for Multiple Bus Systems*, order number 86 A1 26HX, contains information and procedures that are common to all systems.
- The *Adapters for Multiple Bus Systems*, order number 86 A1 27HX, contains cabling and technical information about some of the adapters and devices available for your system unit.
- The *Site Preparation for Rack Systems*, order number 86 A1 30PX, provides a step–by–step approach to prepare a customer site dor the installation of single and multiple rack–mounted machines together with their subsystems and peripherals.
- The *Disks and Tapes Configuration Information*, order number 86 A1 88GX, gives the jumper and switch settings to configure disks and tapes peripherals that use the Small Computer System Interface (SCSI).

Chapter 1. Introducing the System

This system is a multiprocessor, multibus system packaged in two to five drawers. The processors and memory are packaged in an 8 EIA–unit central electronics complex (CEC) drawer, and the optional DASD and I/O devices are in 5 EIA–unit I/O drawers. The basic system consists of one CEC drawer and one I/O drawer in the same rack. You can expand the system by adding up to three additional I/O drawers in a minimum of two racks.

A number of cables connect the CEC and I/O drawers. These cables include:

- SPCN (System Power Control Network) cables
- V/S COMM cables
- RIO (Remote Input Output) cables
- JTAG cable

An ac power cord is connected to the CEC drawer (drawer 1), primary I/O drawer (drawer 0), and secondary I/O drawer (drawer 2). You can also connect two additional secondary drawers (drawers 3 and 4) in another rack with a separate power distribution unit and ac power cord.

System Features

Processors

The CEC drawer is powered independently from the I/O drawer and supports two processor cards. The ESCALA EPC810 can have any combination of 2–way or 4–way processor cards running at 500MHz. The ESCALA PL 800R can be ordered with 500MHz processors or 750MHz processors. Systems with 500MHz processors can have one or two 2–way processor cards. Systems with 750MHz processors can have any combination of 2–way and 4–way processor cards.

Note: The first processor card slot must be populated for the system to boot.

Memory

- ESCALA EPC810: 1 GB (minimum) to 64 GB (maximum)
- ESCALA PL 800R: 1 GB (minimum) to 64 GB (maximum)
- One or two memory riser cards: each riser card has thirty–two sockets. 128 MB, 256 MB, 512 MB and 1 GB dual inline memory modules (DIMMs) are available.
- Certain 32 MB DIMMs from older ESCALA systems can also be used when upgrading the system memory.

Primary I/O Drawer

The primary I/O drawer has the following:

- 14 PCI slots
- System operator panel
- SPCN controller
- System media
- Service processor
- Optional boot DASDs that occupy PCI slots 13 and 14

- Various connectors, including four serial port connectors, on the back of the drawer for the attachment of external devices.

Note: Serial ports 1 and 2 can only be used to access the service processor menus. No “heartbeat”–type devices or cables can be used on these ports.
“Heartbeat”–type devices or cables must be installed on serial port 3 or serial port 4.

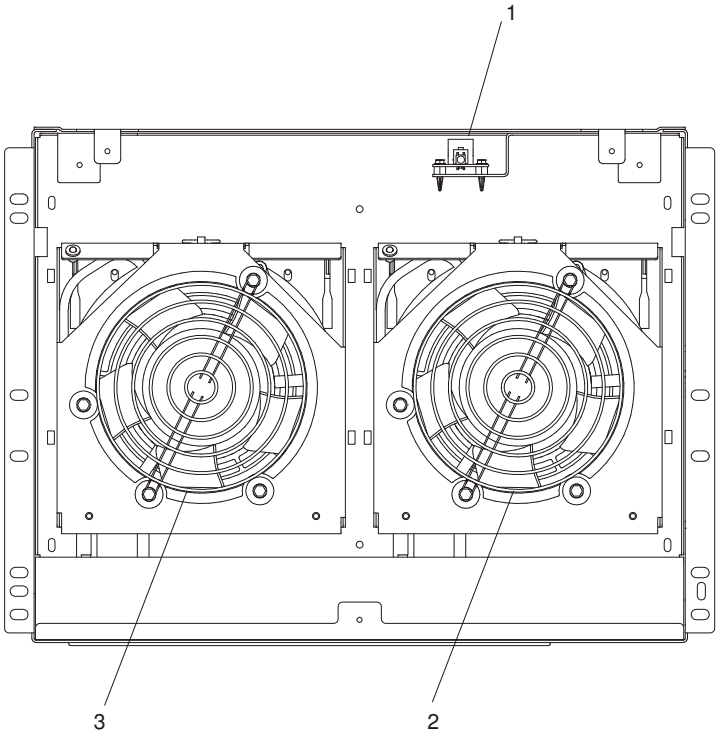
The PCI bus speeds are as follows:

- Up to 33 MHz for the four 32–bit slots at 5V
- Up to 66 MHz for the ten 64–bit slots at 3.3 V

Slots 1–5, 8–10, 13 and 14 support either 32– or 64–bit PCI adapters. The remaining slots are 32–bit only.

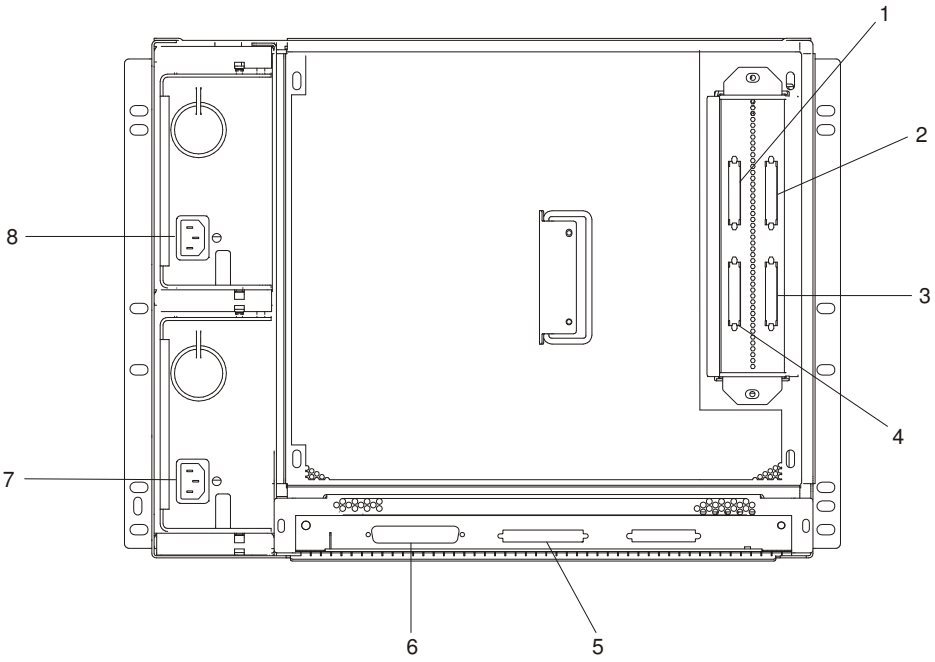
The primary I/O drawer has space for up to three media devices. The diskette drive and CD–ROM drive are standard; the third media device is optional.

CEC Drawer Front View With Bezel Removed



1	Power On/Off LED	2	Fan 2
3	Fan 1		

CEC Drawer Rear View



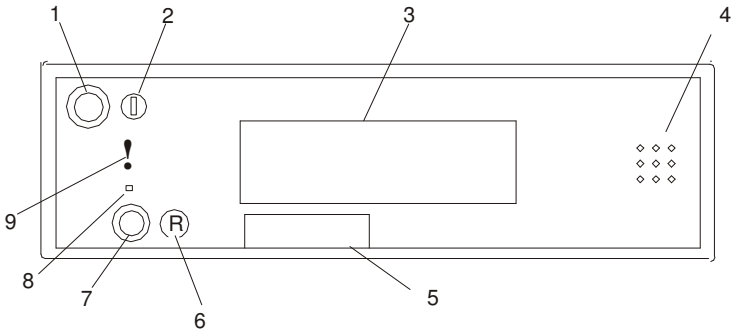
1	RIO connector A0	2	RIO connector B0
3	RIO connector B1	4	RIO connector A1
5	V/S COMM	6	JTAG
7	Power supply 1	8	Power supply 2

Chapter 2. Using the System

This chapter discusses system power control and use of options such as the keyboard, mouse, and drives supported by the system.

Operator Panel

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



1	Power On/Off Button	6	Reset Icon
2	Power On/Off LED	7	Reset button
3	Operator Panel Display	8	Service use only
4	Speaker	9	Disturbance or system attention LED
5	Serial number plate		

Powering Off and Powering On the System

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

Powering Off the System

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

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

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

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

When the power–off sequence is complete, the system goes into standby power mode, as evidenced by the following:

- `OK` displays in the primary operator panel.
- The primary I/O drawer operator panel LED will start blinking at a slow rate.
- The CEC drawer power LED will start blinking at a slow rate.
- If one or more secondary I/O drawers are present, the power LED on each one will be off.

Powering On the System

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

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

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

When the power–on sequence is complete, the following will occur:

- The power LED on the primary I/O drawer operator panel stops blinking and stays on.
- The power LED on the CEC drawer stops blinking and stays on.
- If one or more secondary I/O drawers are present, the power LED on each one stays on.

Powering Off and Powering On the System Using the Service Processor

The system can be powered off and on using the System Power Control menu, which is a Service Processor menu that is available to the privileged user. See ”System Power Control Menu”, on page 3-8

POST Indicators

POST (Power–On–Self–Test) indicators indicate tests that are being performed as the system is preparing to load the operating system. The POST indicators are words that display on the system console. Each time that the system starts a different step in the POST, a POST indicator word appears on the console. Each word is an indicator of the tests that are being performed.

The POST screen displays the following words:

Memory	Memory test
Keyboard	Initialize the keyboard and mouse. The time period for pressing a key to access the System Management Services, or to boot from a default boot list is now open. See “POST Keys”, on page 2-2 for more information.
Network	Self–test on network adapters
SCSI	Adapters are being initialized
Speaker	Sounds an audible tone at the end of POST

POST Keys

The POST keys, if pressed *after* the **keyboard** POST indicator displays and *before* the last POST indicator displays, cause the system to start services or boot modes used for configuring the system and diagnosing problems. The keys are described below:

Note: The program function keys (F1–F12) on a keyboard attached to the I/O drawer are no longer used and will be ignored. After the keyboard POST indicator displays, you must use the numeric number keys to enter input.

1 Key

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

5 Key

The numeric 5 key, when pressed during POST, starts the default boot list mode, located in firmware.

This mode attempts to boot from the first device of each type found in the list. It does not search for other bootable devices of that type if the first device is not bootable. Instead, it continues to the next device type in the list. The firmware supports up to five entries in the boot list.

The default boot sequence is:

1. Diskette
2. CD–ROM
3. Hard File
4. Tape Drive (if installed)
5. Network
   a. Token Ring
   b. Ethernet

6 Key

The numeric 6 key works like the numeric 5 key, except that firmware looks for a boot record according to the custom bootlist that was set up by System Management Services.

8 Key

To enter the Open Firmware command line, press the numeric 8 key *after* the word `keyboard` displays and before the last word (`speaker`) displays during startup. After you press the 8 key, the remaining POST indicators display until initialization completes.

When initialization and POST are complete, the Open Firmware command line (an `OK` prompt) displays.

Use the Open Firmware command line to set up adapters that are not configurable with the System Management Services. Your adapter documentation directs you to use this option if it is needed.

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

Console Strategy

The firmware starts a console–selection sequence at system boot time if any of the following are true:

- A console has not yet been selected
- A previous console–selection sequence timed–out
- A change in the system configuration has affected the console (keyboard installed/removed, mouse installed/removed, graphics adapter installed/removed or moved to another PCI slot).

The console–selection sequence allows you to select (from the appropriate input device) any one of the available console devices. If no console is selected within approximately 60 seconds, serial port 1 (S1) is selected as the console and the selection sequence times–out.

Attention: If an ASCII terminal is attached to serial port 1 (S1), and there is any interaction with this terminal:

- After `OK` displays in the operator panel

AND

- Before the power–up sequence is initiated

the firmware will still use this terminal as the console, regardless of the previous console selection.

After a console has been selected, the console–selection sequence is only started at boot time if there is a change in the system configuration (as described above), or the contents of the system's nonvolatile memory (NVRAM) are lost.

Note: Moving an ASCII terminal from one serial port to another (from S1 to S2) cannot be detected by the firmware, so it does not constitute a configuration change.

You can also initiate a system console selection sequence from the SMS menus.

Reading the I/O Drawer Operator Panel Display

The operator panel display is used to:

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

Checkpoints

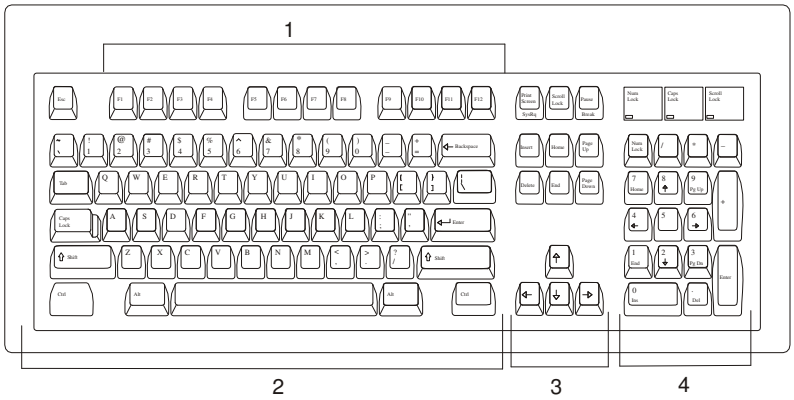
During power–on self–test (POST), four–digit checkpoints are displayed indicating the progress of the testing. If an error is detected that requires attention, the system unit halts with an eight–digit error code displayed in the upper row of the operator panel display, starting in the leftmost position.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

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

Using the Keyboards

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

The functions of each keyboard depends on the software used. The character sets for the keyboards are contained and explained in the documentation for your operating system.



The keyboard is divided into four sections:

1. Function keys are multipurpose keys, and their function is controlled by the operating system.
2. Typewriter keys are similar to those on a standard typewriter. Their function is controlled by the software.
3. Control keys move the cursor on the screen and do programmed control functions. The movement and functions depend on the application used.
4. Numeric keypad is arranged like a calculator to help when typing numbers.

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

The keyboard cable plugs into the keyboard connector at the rear of the primary I/O drawer.

Using the Three–Button Mouse

The mouse is a hand–operated locating device. A three–button mouse is available for use with the system unit. Consult your application publication for the exact use of the three–button mouse.

You can use the mouse to perform such functions as positioning a cursor, selecting items from a menu, or moving around in your document much easier and faster than if you used only the keyboard. The cursor moves exactly as you move the mouse on a flat surface, such as a desktop.

When you move the mouse around on a flat surface, the cursor moves on the display screen; the movement changes the position of the cursor.

With the mouse buttons, you can perform functions such as selecting and deselecting options, extending your selection, or choosing a command. The precise function of your mouse depends on the software you are using.

The mouse has a cable that plugs into the mouse connector at the rear of the primary I/O drawer.

Handling the Mouse Correctly

For best operation, handle the mouse with care. Incorrect handling can damage the mouse.

Do not:

- Operate the mouse on cloth, unfinished wood, newspaper, or carpet
- Drop or hit the mouse
- Carry the mouse by holding onto the cable
- Expose the mouse to extreme temperatures or direct sunlight
- Place the mouse in liquid spills

Caring for the Mouse

Make sure that the operating surface for the mouse is smooth, clean, and flat. For example, you can operate the mouse on the following surfaces:

- Finished wood
- Glass
- Enamel
- Plastic

- Paper (except newspaper)
- Metal

Rough surfaces collect contaminants that can be transferred to the interior of the mouse by the ball. Rough surfaces can also cause the pads located on the bottom of the mouse to prematurely wear. A deeply pitted surface could cause erratic operation of the mouse. The surface you use should be free from spills, dirt, dust, lint, wax, eraser dust, and other foreign matter.

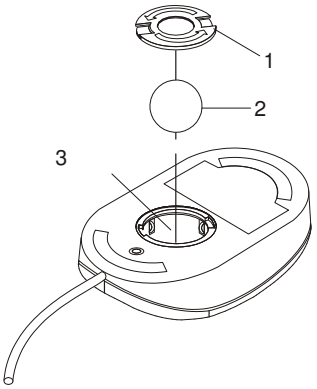
Additional things to check:

- Inspect the work surface for spills or other contaminants.
- Dust the work surface.
- If you are using a paper pad, inspect it for wear and replace it if necessary.

Cleaning the Mouse

To clean the mouse, do the following:

1. Remove the retaining ring (1) by turning it counterclockwise, in the direction of the arrow as shown in the illustration.



2. Remove the ball (2).
3. Inspect the ball for contaminants. Wipe it clean with a dry, lint–free cloth.
4. If the ball is dirty, wash it in warm, soapy water. Rinse and wipe the ball with a lint–free cloth until dry.
5. Inspect the ball cavity (3) in the mouse for foreign materials. If there are any foreign materials, remove them.
6. Replace the ball.
7. Replace the retaining ring on the mouse and align it with the open slots in the ball cavity.
8. Turn the retaining ring clockwise until the open slots are covered and you hear the ring snap into place.

Using the 3.5–Inch Diskette Drive

The 26M/8 has a 1.44MB diskette drive installed vertically in the front.

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

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

Format the diskette according to its specified capacity.

Write–Protecting 3.5–Inch Diskettes

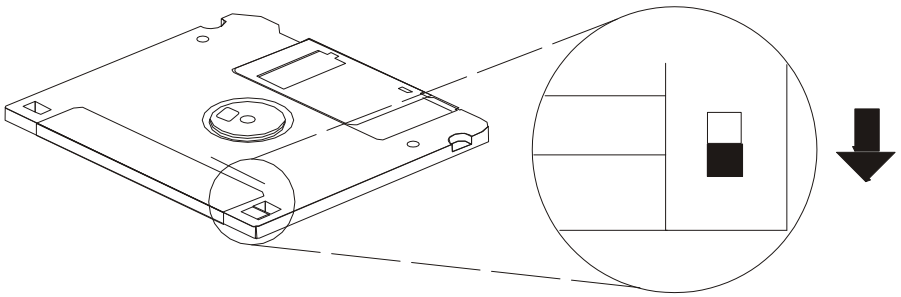
Write–protecting diskettes is necessary so that important information is not accidentally lost.

When diskettes are write–protected, you can read information from the diskettes, but you cannot write information onto them.

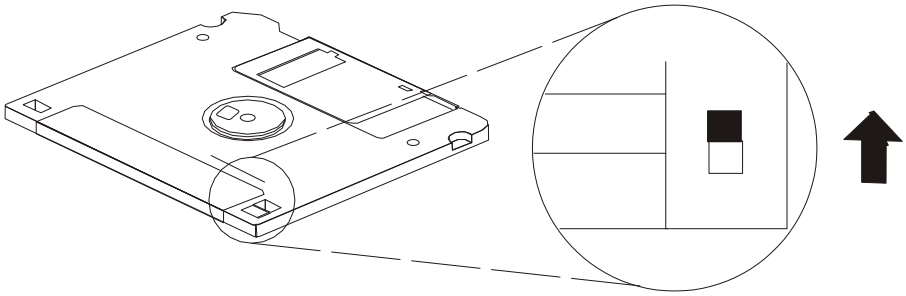
There is a write–protect tab on the 3.5–inch diskette.

To locate the write–protect tab, turn the diskette over with the label facing down.

- To prevent writing onto a diskette, slide the write–protect tab to open the protect slot, as shown in the following illustration.



- To allow writing onto a diskette, slide the write–protect tab to cover the protect slot, as shown in the following illustration.



Loading and Unloading the 3.5–Inch Diskette

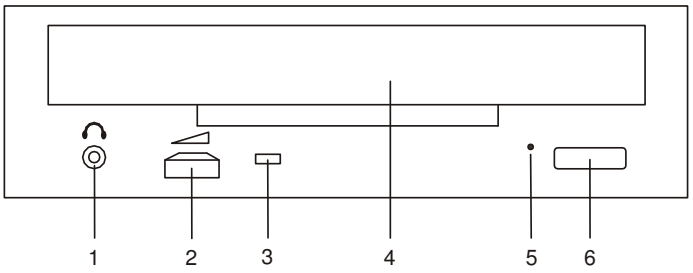
To load a diskette into the drive, insert the diskette in the diskette drive with the labeled metal shutter first. Push the diskette into the drive until you hear a click. The click indicates that the diskette is securely in position in the drive.

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

Using the CD–ROM Drive

CAUTION:
A Class 3 laser is contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive, as it is not serviceable and is to be replaced as a unit.

Your CD–ROM drive looks like the one shown in the illustration, and the controls are located as indicated.



1	Headphone Jack	4	Tray Opening
2	Volume Control	5	Emergency Eject Button
3	Status Light	6	Load/Unload Button

When the CD–ROM is set to On, the status light indicates one of several conditions. The following are status light states and the respective conditions of the CD–ROM drive:

- Off during standby with the tray loaded or unloaded
- Blinks from insertion of the tray to completion of initialization
- Blinks slowly when disc is dusty
- Blinks fast when in the audio mode
- Lights during data transfer operations
- Lights steadily when:
  - No disc is in the tray
  - The disc is in the tray upside down
  - Some condition exists that should be checked. If this occurs, contact your service representative.

Loading the CD–ROM Drive

Press the unload button to open the tray. Place the disc, with the printed side away from the tray, into the tray. Slip out the bottom tabs to hold the disc in place. Push gently on the load/unload button. The drive automatically pulls the tray into the drive and prepares the disc for reading.

Unloading the CD–ROM Drive

Push and hold the unload button until the drawer comes out, and then remove the disc.

Cleaning the CD–ROM Drive

This CD–ROM drive has an internal head–cleaning mechanism, and therefore does not require an external cleaning device. The internal cleaning mechanism cleans the head every time the tray is operated.

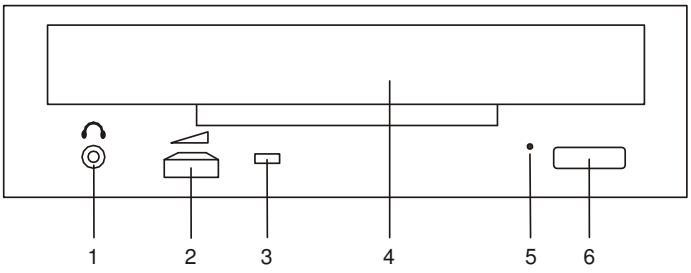
Always handle discs carefully by the edges to avoid leaving fingerprints or scratching the disc. This helps the disc to maintain good readability. Discs can be wiped with a soft, lint–free cloth or lens tissue. Always wipe in a straight line from the inner hub to the outer rim.

Emergency Eject

Note: Execute the following procedure only in an emergency (such as when the tray will not eject even though you have pressed the unload button).

1. Insert a small diameter rod, such as a straightened paper clip, into the emergency eject hole. (Refer to the illustration below for the location of the emergency eject hole.)
2. Push in the tool until you feel resistance.

3. Maintain a small amount of pressure on the rod while pulling on the tray with your fingernail.
4. Pull the tray open and remove the disc.



1	Headphone Jack	4	Tray Opening
2	Volume Control	5	Emergency Eject Button
3	Status Light	6	Load/Unload Button

Note: Normally the tray makes a ratcheting sound when you pull it open using the above procedure.

Chapter 3. Using the Service Processor

The service processor menus make it possible for you to configure service processor options, as well as enable and disable functions.

Service processor menus are available using an ASCII terminal when `OK` is displayed on the primary I/O drawer operator panel or when the service processor has detected a server problem (such as a surveillance failure).

For a summary of the service processor functions and the methods used to invoke them, see the following table.

SP Functions

Service Processor Functions	Service Processor Menus (ASCII terminals)	Service Processor Service Aids (ASCII or graphics terminals)	SMS (ASCII or graphics terminals)
Read VPD image from last system boot	Y[3]		
Read System POST Errors	Y[3]		
Read Service Processor Error Logs	Y[3]		
View Progress Indicators from last Boot	Y[3]		
Power–off System	Y[2]		
Read NVRAM	Y[2]		
Start Talk Mode	Y[2]		
Enable/Disable Console Mirroring	Y[2]		
Setup Reboot/Restart Policy	Y[2]	Y[1]	
Enable/Disable Modem	Y[2]	Y[1]	
Setup Modem Configuration	Y[2]	Y[1]	
Setup Dial–out Phone Numbers	Y[2]	Y[1]	
Setup Surveillance	Y[2]	Y[1]	
Select Modem Line Speed	Y[2]	Y[1]	
Update Service Processor Flash EPROM		Y[1]	
Save/Restore Hardware Maintenance Policies		Y[1]	
Change General Access Password	Y[2]		
Change Privileged Access Password	Y[2]		Y[2]
Select Language	Y[2]		Y[2]
Enable/Disable Unattended Start Mode	Y[2]	Y[1]	Y[2]

Passwords required (if set):

[1] Operating system root password
[2] Privileged access password
[3] General access (power–on) password

Service Processor Menus

The service processor menus are divided into two groups:

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

If the server is powered off, the service processor menus can be accessed locally or remotely.

Accessing the Service Processor Menus Locally

Service processor menus can be accessed locally by connecting an ASCII terminal to serial port 1 (S1) or serial port 2 (S2). Access to the service processor menus is not available on serial port 3 (S3) or serial port 4 (S4). Because the presence of the ASCII terminal cannot be confirmed by the service processor, you must press a key (any key) on the ASCII keyboard to confirm its presence after `OK` appears in the primary drawer operator panel display.

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

The service processor menu prompt, represented by `0`, or `1` indicates the serial port to which the terminal is connected.

- `0` indicates serial port 1 (S1)
- `1` indicates serial port 2 (S2)

Accessing the Service Processor Menus Remotely

If your system has a modem connected and is configured for call–in (see ”Modem Configuration Menu”, on page 3-18), the service processor menus can be accessed remotely as follows:

1. With the system powered off, call in from a remote terminal.
2. The Service Processor detects ring–indicate and prompts you for a password (if set). When verified, the service processor menus display remotely.

Saving and Restoring Service Processor Settings

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

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

It is strongly recommended that you use this service aid for backing up service processor settings to protect the usefulness of the service processor and the availability of the server. Refer to “Save or Restore Hardware Management Policies” in the “Introducing Tasks and Service Aids” section of the “*Diagnostic Information for Multiple Bus Systems*”, order number 86 A1 26HX.

Menu Inactivity

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

General User Menu

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

```
+--------------------------------------------------------------------------------+
|                                                                                |
|          GENERAL USER MENU                                                     |
|                                                                                |
|    1. Power-on System                                                          |
|                                                                                |
|    2. Power-off System                                                         |
|                                                                                |
|    3. Read VPD Image from Last System Boot                                     |
|                                                                                |
|    4. Read Progress Indicators from Last System Boot                           |
|                                                                                |
|    5. Read Service Processor Error Logs                                        |
|                                                                                |
|    6. Read System POST Errors                                                  |
|                                                                                |
|   99. Exit from Menus                                                          |
|                                                                                |
|   1                                                                            |
+--------------------------------------------------------------------------------+
```

- **Power–on System**

  Allows the user to start up the system using the current ASCII terminal as the active console.

- **Power–off System**

  Allows the user to power down the system using the current ASCII terminal as the active console.

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

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

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

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

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

  This information is not stored in nonvolatile storage. If the system is powered down using the power–on button on the operator panel, this information is retained. If the ac power is disconnected from the system, this information will be lost. For an example, refer to “LCD Progress Indicator Log“, on page 3-32.

- **Read Service Processor Error Logs**

  Displays the service processor error logs. For an example, refer to ”Service Processor Error Logs”, on page 3-31.

- **Read System POST Errors**

  This option should only be used by service personnel to display additional error log information.

- **Exit from Menus**

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

Privileged User Menus

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

Main Menu

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

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

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

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

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

```
+------------------------------------------------------------------------------+
|                                                                              |
|          Service Processor Firmware                                          |
|          VERSION: MM000313                                                   |
|          Copyright 1999 IBM Corporation                                      |
|               SYSTEM NAME                                                    |
|                                                                              |
|                                                                              |
|          MAIN MENU                                                           |
|                                                                              |
|   1. Service Processor Setup Menu                                            |
|                                                                              |
|   2. System Power Control Menu                                               |
|                                                                              |
|   3. System Information Menu                                                 |
|                                                                              |
|   4. Language Selection Menu                                                 |
|                                                                              |
|   5. Call-In/Call-Out Setup Menu                                             |
|                                                                              |
|   6. Set System Name                                                         |
|                                                                              |
|  99. Exit from Menus                                                         |
|                                                                              |
|  1                                                                           |
+------------------------------------------------------------------------------+
```

- **Service Processor Setup Menu**

  See "Service Processor Setup Menu", on page 3-5 for more information.

- **System Power Control Menu**

  See "System Power Control Menu", on page 3-8 for more information

- **System Information Menu**

  See "System Information Menu", on page 3-11 for more information.

- **Language Selection Menu**

  See "Language Selection Menu", on page 3-17 for more information.

- **Call–In/Call–Out Setup Menu**

  See "Call–In/Call–Out Setup Menu", on page 3-17 for more information.

- **Set System Name**

  Allows setting of the system name.

Service Processor Setup Menu

The Service Processor Setup menu shown below is accessed from the Main Menu:

```
+-------------------------------------------------------------------------------+
|                                                                               |
|          SERVICE PROCESSOR SETUP MENU                                         |
|                                                                               |
|    1. Change Privileged Access Password                                       |
|                                                                               |
|    2. Change General Access Password                                          |
|                                                                               |
|    3. Enable/Disable Console Mirroring:                                       |
|             Currently Enabled                                                 |
|                                                                               |
|    4. Start Talk Mode                                                         |
|                                                                               |
|    5. OS Surveillance Setup Menu                                              |
|                                                                               |
|    6. Reset Service Processor                                                 |
|                                                                               |
|    7. Reprogram Flash EPROM Menu                                              |
|                                                                               |
|    8. Serial Port Snoop Setup Menu                                            |
|                                                                               |
|   98. Return to Previous Menu                                                 |
|                                                                               |
|   99. Exit from Menus                                                         |
|                                                                               |
|   1                                                                           |
+-------------------------------------------------------------------------------+
```

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

Passwords

Passwords can be any combination of up to eight alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first eight characters. The Privileged Access Password can be set from Service Processor menus or from System Management Services (SMS) utilities (see Chapter 4, ”Using System Management Services). The General Access Password can be set only from Service Processor menus.

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

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

If the error threshold is reached by someone entering passwords remotely, Service Processor commands the server to power down to prevent potential security attacks on the server by unauthorized remote users. The following table lists what you can access with the Privileged Access Password and the General Access Password.

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

Note: If you *forget* the password, you must remove the battery for at least 30 seconds to disable the password.

- **Change Privileged Access Password**

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

- **Change General Access Password**

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

Note: The General Access Password can only be set or changed after the Privileged Access Password is set.

- **Enable/Disable Console Mirroring**

  Console mirroring is supported on serial port 1 (S1) and serial port 2 (S2). When Console Mirroring is enabled, the service processor sends information to all serial ports. The serial port from which console mirroring is enabled is referred to as the *active port*. The *mirror port* is determined when keyboard input is detected from one of the other ports. From this point on, the service processor only sends information to the active port and the mirror port. This capability can be enabled by local or remote users, providing local users the capability to monitor remote sessions. Console mirroring can be enabled for the current session only. For more information, see ”Console Mirroring”, on page 3-30.

- **Start Talk Mode**

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

- **OS Surveillance Setup Menu**

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

```
+-------------------------------------------------------------------------------+
|                                                                               |
|          OS Surveillance Setup Menu                                           |
|                                                                               |
|    1. Surveillance:                                                           |
|         Currently Enabled                                                     |
|                                                                               |
|    2. Surveillance Time Interval:                                             |
|         2 minutes                                                             |
|                                                                               |
|    3. Surveillance Delay:                                                     |
|         2 minutes                                                             |
|                                                                               |
|                                                                               |
|   98. Return to Previous Menu                                                 |
|                                                                               |
|   1                                                                           |
+-------------------------------------------------------------------------------+
```

  – **Surveillance**

  Can be set to Enabled or Disabled.

  – **Surveillance Time Interval**

  Can be set to any number from 2 through 255.

  – **Surveillance Delay**

  Can be set to any number from 0 through 255.

  Refer to ”Service Processor System Monitoring – Surveillance”, on page 3-28 for more information about surveillance.

- **Reset Service Processor**

  If this option is selected, entering `Y` will cause the service processor to reboot.

- **Reprogram Flash EPROM Menu**

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

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

  – System Power Control Network programming

  – Service Processor programming

  – IPL programming

  – Run–Time Abstraction Services

- **Serial Port Snoop Setup Menu**

  This menu can be used to set up Serial Port Snooping, in which the user can configure serial port 1 as a ”catch–all” reset device.

  From the Service Processor Main Menu, select option 1, Service Processor setup menu, then select option 8 (Serial Port Snoop Setup Menu).

```
+------------------------------------------------------------------------------+
|                                                                              |
|          SERIAL PORT SNOOP SETUP MENU                                        |
|                                                                              |
|    1. System reset string:                                                   |
|         Currently Unassigned                                                 |
|                                                                              |
|    2. Snoop Serial Port:                                                     |
|        Currently Unassigned                                                  |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|1>                                                                            |
+------------------------------------------------------------------------------+
```

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

Use the Snoop Serial Port option to select the Serial Port to Snoop.

Note: Only Serial Port 1 is supported.

After Serial Port Snooping is correctly configured, at any point after the system unit is booted to AIX, whenever the reset string is typed on the main console, the system unit reboots.

Pressing Enter after the reset string is not required, so make sure that the string is not common or trivial. A mixed–case string is recommended.

System Power Control Menu

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

```
+------------------------------------------------------------------------------+
|                                                                              |
|          SYSTEM POWER CONTROL MENU                                           |
|                                                                              |
|    1. Enable/Disable Unattended Start Mode:                                  |
|          Currently Enabled                                                   |
|                                                                              |
|    2. Ring Indicate Power-On Menu                                            |
|                                                                              |
|    3. Reboot/Restart Policy Setup Menu                                       |
|                                                                              |
|    4. Power-On System                                                        |
|                                                                              |
|    5. Power-Off System                                                       |
|                                                                              |
|    6. Enable/Disable Fast System Boot                                        |
|          Currently Enabled                                                   |
|                                                                              |
|    7. Boot Mode Menu                                                         |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   99. Exit from Menus                                                        |
|                                                                              |
|   1                                                                          |
+------------------------------------------------------------------------------+
```

- **Enable/Disable Unattended Start Mode**

  Use this option to instruct the service processor to restore the power–state of the server after a temporary power failure. Unattended Start Mode can also be set through the System Management Services (SMS) Menus. It is intended to be used on servers that require automatic power–on after a power failure. For more information, see “System Power–On Methods”, on page 3-23.

- **Ring Indicate Power–On Menu**

```
+------------------------------------------------------------------------------+
|                                                                              |
|         RING INDICATE POWER-ON MENU                                          |
|                                                                              |
|   1. Ring indicate power-on :                                                |
|       Currently Enabled                                                      |
|                                                                              |
|   2. Number of rings:                                                        |
|       Currently  3                                                           |
|                                                                              |
|  30. Refresh Modem Settings                                                  |
|                                                                              |
|  98. Return to Previous Menu                                                 |
|                                                                              |
+------------------------------------------------------------------------------+
```

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

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

If the ring indicate power–on setting is changed, you must select option 30, **Refresh Modem Settings** to update the modem settings. If option 30, Refresh Modem Setting is selected, and the modem(s) have not been configured, you will be asked to configure the modems first. See ”Call–In/Call–Out Setup Menu”, on page 3-17 for information on configuring modems.

Option 2 is used to set the number of rings.

- **Reboot/Restart Policy Setup Menu**

The following menu controls Reboot/Restart Policy:

```
+------------------------------------------------------------------------------+
|                                                                              |
|         Reboot/Restart Policy Setup Menu                                     |
|                                                                              |
|   1. Number of reboot attempts:                                              |
|        Currently 1                                                           |
|                                                                              |
|   2. Use OS-Defined restart policy?                                          |
|        Currently Yes                                                         |
|                                                                              |
|   3. Enable supplemental restart policy?                                     |
|        Currently No                                                          |
|                                                                              |
|   4. Call-Out before restart:                                                |
|        Currently Disabled                                                    |
|                                                                              |
|  98. Return to Previous Menu                                                 |
|                                                                              |
|  1                                                                           |
+------------------------------------------------------------------------------+
```

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

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

– **Use OS–Defined restart policy** – Allows the service processor to react or not react in the same way as the operating system to major system faults by reading the setting of the operating system parameter Automatically Restart/Reboot After a System Crash. This parameter may or may not be defined, depending on the operating system or its version/level. If the operating system automatic restart setting is defined, then it can be set to respond to a major fault by restarting or by not restarting. See your operating system documentation for details on setting up operating system automatic restarts. The default value is YES.

– **Enable supplemental restart policy** – The default setting is NO. If set to YES, the service processor restarts the system when the system loses control as detected by service processor surveillance, and either:

  – The **Use OS–Defined restart policy** is set to NO.

  OR

  – The **Use OS–Defined restart policy** is set to YES, and the operating system has NO automatic restart policy.

  Refer to ”Service Processor Reboot/Restart Recovery”, on page 3-24.

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

- **Power–On System**

  Allows immediate power–on of the system. For other power–on methods, see ”Powering On the System”, on page 2-2.

- **Power–Off System**

  Allows the user to power–off the system.

- **Enable/Disable Fast System Boot**

  Allows the user to select the speed of the system boot.

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

- **Boot Mode Menu**

  The Boot Mode Menu allows you to select a boot mode.

```
+------------------------------------------------------------------------------+
|                                                                              |
|          Boot Mode Menu                                                      |
|                                                                              |
|    1. Boot to SMS Menu:                                                      |
|         Currently Disabled                                                   |
|                                                                              |
|    2. Service Mode Boot from Saved List:                                     |
|         Currently Disabled                                                   |
|                                                                              |
|    3. Service Mode Boot from Default List:                                   |
|         Currently Disabled                                                   |
|                                                                              |
|    4. Boot to Open Firmware Prompt:                                          |
|         Currently Disabled                                                   |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   1                                                                          |
+------------------------------------------------------------------------------+
```

  To select a boot mode, select a number and press Enter. The item corresponding to the selected number toggles from Disabled to Enabled. If the same number is selected again, the item toggles from Enabled to Disabled. If a boot mode is Enabled, the Boot mode selected is performed, and the Disabled/Enabled selection is reset to Disabled. Following is a description for each boot mode:

  – **Boot to SMS Menu**

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

  – **Service Mode Boot from Saved List**

  This selection causes the system to boot from the saved service mode boot list (saved in NVRAM). This is normally used to try to boot Customer Diagnostics from the CD–ROM drive. If the system boots AIX from the disk drive and AIX diagnostics are loaded on the disk drive, AIX boots to the diagnostics menu.

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

– **Service Mode Boot from Default List**

This selection is similar to ”Service Mode Boot from Saved List”, except the system boots from the default boot list that is stored in the system firmware.

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

– **Boot to Open Firmware**

When this selection is enabled, the system boots to the Open Firmware prompt.

System Information Menu

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

```
+------------------------------------------------------------------------------+
|                                                                              |
|          SYSTEM INFORMATION MENU                                             |
|                                                                              |
|    1. Read VPD Image from Last System Boot                                   |
|                                                                              |
|    2. Read Progress Indicators from Last System Boot                         |
|                                                                              |
|    3. Read Service Processor Error Logs                                      |
|                                                                              |
|    4. Read System POST Errors                                                |
|                                                                              |
|    5. Read NVRAM                                                             |
|                                                                              |
|    6. Read Service Processor Configuration                                   |
|                                                                              |
|    7. Processor Configuration/Deconfiguration Menu                           |
|                                                                              |
|    8. Memory Configuration/Deconfiguration Menu                              |
|                                                                              |
|    9. Power Control Network Utilities Menu                                   |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   99. Exit from Menus                                                        |
|                                                                              |
|   1                                                                          |
+------------------------------------------------------------------------------+
```

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

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

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

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

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

  This information is not stored in nonvolatile storage. If the system is powered down using the power–on button on the operator panel, this information is retained. If the ac power is disconnected from the system, this information will be lost. For an example, refer to “LCD Progress Indicator Log“, on page 3-32.

- **Read Service Processor Error Logs**

  Displays error conditions detected by the service processor. Refer to ”Service Processor Error Logs”, on page 3-31 for an example of this error log.

- **Read System POST Errors**

  This option should only be used by service personnel to display additional error log information.

- **Read NVRAM**

  Displays Non Volatile Random Access Memory (NVRAM) content.

- **Read Service Processor Configuration**

  Displays current service processor configuration.

- **Processor Configuration/Deconfiguration Menu**

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

```
+------------------------------------------------------------------------------+
|                                                                              |
|         PROCESSOR CONFIGURATION/DECONFIGURATION MENU                         |
|                                                                              |
|  77. Enable/Disable CPU Repeat Gard: Currently Enabled                       |
|                                                                              |
|   1.  0  3.0  (00)  Configured by system                                     |
|   2.  1  3.1  (31)  Deconfigured by system                                   |
|   3.  2  3.2  (00)  Configured by system                                     |
|   4.  3  3.3  (00)  Configured by system                                     |
|   5.  4  4.0  (00)  Configured by system                                     |
|   6.  5  4.1  (00)  Configured by system                                     |
|   7.  6  4.2  (00)  Configured by system                                     |
|   8.  7  4.3  (00)  Configured by system                                     |
|  98. Return to Previous Menu                                                 |
|                                                                              |
|  1                                                                           |
+------------------------------------------------------------------------------+
```

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

The fields of the previous table represent the following:

Column 1 (1.) Menu selection index.

Column 2 (0) Logical processor device number assigned by AIX. You can display these logical device numbers by issuing the command `lsdev -C | grep proc` on the AIX command line.

Column 3 (3.0) Processor address list used by the service processor and should be ignored.

Column 4 (00) Error status of the processors.

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

```
1:  Bring-up failure

2:  Run-time non-recoverable failure

3:  Run-time recoverable failure
```

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

To enable or disable CPU Repeat Gard, use menu option 77. CPU Repeat Guard is enabled by default.

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

The failure history of each CPU is retained. If a processor with a history of failures is brought back online by disabling Repeat Gard, it remains online if it passes testing

during the boot process. However, if Repeat Gard is enabled, the processor is taken offline again because of its history of failures.

Note: The processor numbering scheme used by the Service Processor is different from the numbering scheme used by AIX. Consult the AIX documentation before configuring or deconfiguring a processor to ensure that the correct processor is selected.

Contact your marketing representative for information about obtaining and installing system firmware update packages.

- **Memory Configuration/Deconfiguration Menu**

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

  When this option is selected, a menu displays, showing the memory riser cards in the system. Type the number of the memory riser card on which the DIMM is plugged that you want to configure or deconfigure. An example of this menu is shown below:

```
+------------------------------------------------------------------------------+
|                                                                              |
|         MEMORY CONFIGURATION/DECONFIGURATION MENU                            |
|                                                                              |
|  77. Enable/Disable Memory Repeat Gard: Currently Enabled                    |
|                                                                              |
|   1. Memory riser card 1                                                     |
|   2. Memory riser card 2                                                     |
|  98. Return to Previous Menu                                                 |
|                                                                              |
|                                                                              |
+------------------------------------------------------------------------------+
```

  After you select a memory riser card, a menu allowing the selection of a memory DIMM is displayed. The following is an example of this menu.

```
+------------------------------------------------------------------------------+
|                                                                              |
|         MEMORY CONFIGURATION/DECONFIGURATION MENU                            |
|                                                                              |
|                                                                              |
|   1. 11.16(00)  Configured by system   2. 11.17(00) Configured by system     |
|   9. 11.18(00)  Configured by system  10  11.19(00) Configured by system     |
|  17. 11.20(00)  Configured by system  18. 11.21(00) Configured by system     |
|  25. 11.22(00)  Configured by system  26. 11.23(00) Configured by system     |
|                                                                              |
|   3. 11.24(00)  Configured by system   4. 11.25(00) Configured by system     |
|  11. 11.26(00)  Configured by system  12. 11.27(00) Configured by system     |
|  19. 11.28(00)  Configured by system  20. 11.29(00) Configured by system     |
|  27. 11.30(00)  Configured by system  28. 11.31(00) Configured by system     |
|                                                                              |
|  98. Return to Previous Menu                                                 |
|                                                                              |
|Memory DIMMs are managed as a group.                                          |
|Deconfiguring a DIMM will make the whole group unavailable.                   |
|                                                                              |
|  0>                                                                          |
+------------------------------------------------------------------------------+
```

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

The DIMMs in the system are presented by group. Octal A is shown first, followed by octals B, C, and D, if present. The menu selection index/DIMM number and the DIMM address correspond to the numbers shown in "Memory Riser Card 1 Memory DIMM Locations for Service Processor Menus" on page 3-14 and "Memory Riser Card 2 Memory DIMM Locations for Service Processor Menus" on page 3-15.

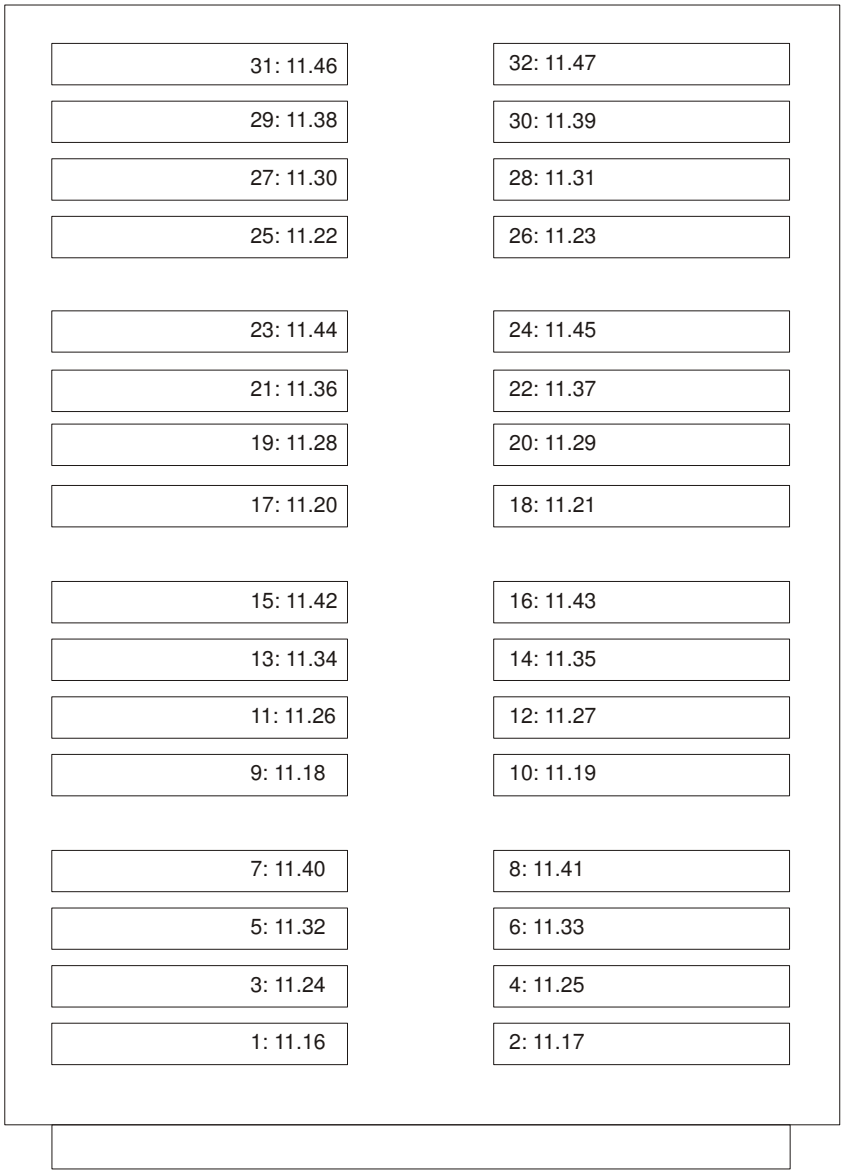
The fields in the previous table represent the following:

```
Column 1:  1. Menu selection index/DIMM number
```

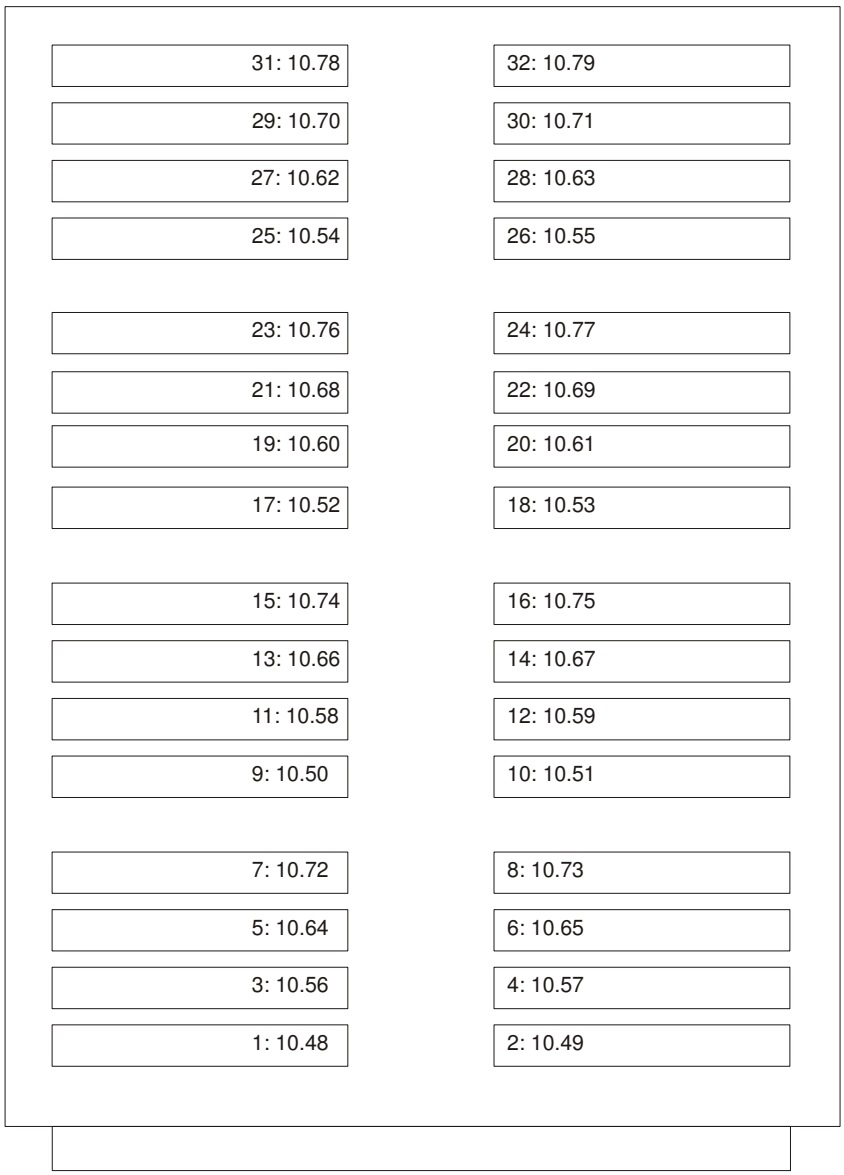
Column 2: 11.xx (riser card 1) or 10.xx (riser card 2)DIMM address used by service processor

Column 3: (00) Error status

Memory Riser Card 1 Memory DIMM Locations for Service Processor Menus



Memory Riser Card 2 Memory DIMM Locations for Service Processor Menus



- **Power Control Network Utilities Menu**

  This menu allows the user to do a lamp test on the operator panels and display or change the I/O type.

```
+------------------------------------------------------------------------------+
|                                                                              |
|         POWER CONTROL NETWORK UTILITIES MENU                                 |
|                                                                              |
|   1. Lamp Test for all Operator Panels                                       |
|                                                                              |
|   2. Display I/O Type                                                        |
|                                                                              |
|   3. Change I/O Type                                                         |
|                                                                              |
|  98. Return to Previous Menu                                                 |
|                                                                              |
|  1                                                                           |
+------------------------------------------------------------------------------+
```

  – **Lamp Test for all Operator Panels**

  Selecting this option tests the operator panel indicators as follows:

Operator Panel Location	Lamp Test Results
Primary I/O drawer	Indicators blink on and off for approximately 30 seconds.
Secondary I/O drawers	Indicators come on and stay on for approximately 30 seconds.

  – **Display I/O Type**

  I/O type and other data displays (blinks in one–second intervals) on all secondary I/O drawer operator panels. All secondary I/O types are 84. Nothing displays on the primary I/O drawer operator panel. After 20–30 seconds the Power Control Network Utilities Menu redisplays on the console.

  – **Change I/O Type**

  Use this option to change the I/O type of the primary I/O drawer after a service action or configuration change if the I/O type is incorrect. If this option is chosen, you are asked to make two entries.

  a. For the I/O drawer address (drawer number),, type
     - `1` for primary I/O drawer,
     - `n` for secondary I/O drawers (n = 2, 3, 4).

  b. For the I/O type, type
     - `87` for primary I/O drawer,
     - 84 for all secondary I/O drawers.

  If you enter an invalid value, a failure message is displays on the console. The Power Control Network Utilities Menu is then redisplayed on the console.

Language Selection Menu

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

```
+------------------------------------------------------------------------------+
|                                                                              |
|          LANGUAGE SELECTION MENU                                             |
|                                                                              |
|    1. English                                                                |
|                                                                              |
|    2. Francais                                                               |
|                                                                              |
|    3. Deutsch                                                                |
|                                                                              |
|    4. Italiano                                                               |
|                                                                              |
|    5. Espanol                                                                |
|                                                                              |
|    6. Svenska                                                                |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   99. Exit from Menus                                                        |
|                                                                              |
|   1                                                                          |
+------------------------------------------------------------------------------+
```

Note: Your ASCII terminal must support the ISO–8859 character set to correctly display languages other than English.

Call–In/Call–Out Setup Menu

This menu is used to configure a modem for the service processor to use to support the system:

```
+------------------------------------------------------------------------------+
|                                                                              |
|          CALL-IN/CALL-OUT SETUP MENU                                         |
|                                                                              |
|    1. Modem Configuration Menu                                               |
|                                                                              |
|    2. Serial Port Selection Menu                                             |
|                                                                              |
|    3. Serial Port Speed Setup Menu                                           |
|                                                                              |
|    4. Telephone Number Setup Menu                                            |
|                                                                              |
|    5. Call-Out Policy Setup Menu                                             |
|                                                                              |
|    6. Customer Account Setup Menu                                            |
|                                                                              |
|    7. Call-Out Test                                                          |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   99. Exit from Menus                                                        |
|                                                                              |
|   1                                                                          |
+------------------------------------------------------------------------------+
```

- **Modem Configuration Menu**, see ”Modem Configuration Menu” on page 3-18.
- **Serial Port Selection Menu**, see ”Serial Port Selection Menu” on page 3-18.
- **Serial Port Speed Setup Menu**, see ”Serial Port Speed Setup Menu” on page 3-19.
- **Telephone Number Setup Menu**, see ”Telephone Number Setup Menu” on page 3-19.
- **Call–Out Policy Setup Menu**, see ”Call–Out Policy Setup Menu” on page 3-20.
- **Customer Account Setup Menu**, see ”Customer Account Setup Menu” on page 3-21.
- **Call–Out Test Menu** tests the configuration after the modem is installed and configured correctly. In order for this test to execute successfully, at least one of the following numbers must be assigned:
  - Service center telephone number
  - Customer administration center telephone number
  - Digital pager telephone number

Modem Configuration Menu

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

Note: Modem configuration is only supported on serial port 1 (S1) and serial port 2 (S2).

```
+------------------------------------------------------------------------------+
|                                                                              |
|          Modem Configuration Menu                                            |
|                                                                              |
|    Port 1 Modem Configuration File Name:                                     |
|    Port 2 Modem Configuration File Name:                                     |
|                                                                              |
|To make changes, First select the port and then the configuration file        |
|name                                                                          |
|                                                                              |
|Modem Ports:                                                                  |
|    1. Serial port 1                                                          |
|    2. Serial port 2                                                          |
|                                                                              |
|Modem Configuration File Name:                                                |
|    5. none                  9. modem_z_sp                                    |
|    6. modem_f_sp           10. modem_m1_sp                                   |
|    7. modem_f0_sp          11. modem_m0_sp                                   |
|    8. modem_f1_sp          12. modem_m1_sp                                   |
|                                                                              |
|   30. Save configuration to NVRAM and Configure modem                        |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   0                                                                          |
+------------------------------------------------------------------------------+
```

For information on choosing a modem configuration file, see “Modem Configurations”, on page B-1.

Serial Port Selection Menu

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

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

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

Serial Port Speed Setup Menu

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

```
+-------------------------------------------------------------------------------+
|                                                                               |
|          Serial Port Speed Setup Menu                                         |
|                                                                               |
|    1. Serial Port 1 Speed:                                                    |
|           Currently 9600                                                      |
|                                                                               |
|    2. Serial Port 2 Speed:                                                    |
|           Currently 9600                                                      |
|                                                                               |
|   98. Return to Previous Menu                                                 |
|                                                                               |
|   1                                                                           |
+-------------------------------------------------------------------------------+
```

A serial port speed of 9600 baud or higher is recommended. Valid serial port speeds are shown below:

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

Telephone Number Setup Menu

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

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

- **Service Center Telephone Number** is the number of the service center computer. The service center usually includes a computer that takes calls from servers with call–out capability. This computer is referred to as ”the catcher.” The catcher expects messages in a specific format to which SP conforms. For more information about the format and catcher computers, refer to the README file in the AIX `/usr/samples/syscatch` directory. Contact your service provider for the correct telephone number to enter here. Until you have that number, leave this field unassigned.
- **Customer Administration Center Telephone Number** is the number of the System Administration Center computer (catcher) that receives problem calls from servers. Contact your system administrator for the correct telephone number to enter here. Until you have that number, leave this field unassigned.

- **Digital Pager Telephone Number** is the number for a numeric pager carried by someone who responds to problem calls from your server. Contact your administration center representative for the correct telephone number to enter here. For test purposes, enter your telephone number here. You can change it later when testing is complete. See note on page 3-29 for information about using certain modems for paging.

Note: At least one of the preceding three telephone numbers must be assigned in order for the call–out test to execute successfully.

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

Call–Out Policy Setup Menu

Callout settings can be set using the following menu:

```
+------------------------------------------------------------------------------+
|                                                                              |
|          CALL-OUT POLICY SETUP MENU                                          |
|                                                                              |
|    1. Call-Out policy (First/All):                                           |
|        Currently First                                                       |
|                                                                              |
|    2. Remote timeout, (in seconds):                                          |
|        Currently 120                                                         |
|                                                                              |
|    3. Remote latency, (in seconds):                                          |
|        Currently 2                                                           |
|                                                                              |
|    4. Number of retries:                                                     |
|        Currently 2                                                           |
|                                                                              |
|   98. Return to Previous Menu                                                |
|                                                                              |
|   1                                                                          |
+------------------------------------------------------------------------------+
```

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

  a. Service Center

  b. Customer Admin Center

  c. Pager

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

  a. Service Center

  b. Customer Admin Center

  c. Pager

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

  Number of retries is the number of times you want the server to retry calls that failed to complete.

Customer Account Setup Menu

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

```
+-------------------------------------------------------------------------------+
|                                                                               |
|          Customer Account Setup Menu                                          |
|                                                                               |
|    1. Customer Account Number:                                                |
|        Currently Unassigned                                                   |
|                                                                               |
|    2. Customer RETAIN Login userid:                                           |
|        Currently Unassigned                                                   |
|                                                                               |
|    3. Customer RETAIN login password:                                         |
|        Currently Unassigned                                                   |
|                                                                               |
|   98. Return to Previous Menu                                                 |
|                                                                               |
|   1                                                                           |
+-------------------------------------------------------------------------------+
```

- **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 unassigned.
- **Customer RETAIN Login UserID** and **Customer RETAIN Login Password** apply to a service function to which your service provider may or may not have access. Leave these fields unassigned if your service provider does not use RETAIN.

Service Processor Procedures in Service Mode

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

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

When service mode is exited, the service processor parameters revert back to the customer settings.

Service Processor Functions

The following section discusses some of the Service Processor features in greater detail.

The Service Processor supports the following functions:

Built–in Functions	Initialization and Test	SP Basic Instructions Test (BIST)
		System Chip Initialization
	Error Data Collection	BIST/POST errors and status
		Isolation to Field Replaceable Unit (FRU) on fail.
	Configuration	CPU Complex validation
		VPD Collection
	System Management	Reset and Reboot on System Firmware fails
		Reboot on system failure
Local User Function	User Interface	Local async console
		Text based menus with NLS
		Operator Panel messages
	Power and Miscellaneous	Power On/Off
		Configurable Reboot Policy
	Status and Data Access	VPD
		Error data (SP)
		Error data (system)
	Service Processor Setup Utilities	Passwords
		Phone numbers
		Language (NLS) selection
		Call–In/Call–Out enable/disable
		System Name
		Modem Configuration
Remote User Functions	Call–Out (Call Home) Reporting	OS termination
		Boot failure
		Surveillance failure
		Checkstop
		Machine check
		Identify system by name
	Call–In	Power–on via ring–indicate
		Password/security check
		Console mirroring

System Power–On Methods

This section discusses the following system power–on methods:

- Power–on Switch
- Service Processor Menus

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

- Remote Power–on via Ring–Indicate Signal

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

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

- Unattended start mode – refer to **Enable/Disable Unattended Start Mode** on page 3-8.

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

  It is recommended that the CEC and I/O drawers both receive their AC power from the same building circuit on the same circuit breaker, if not the same electrical outlet box, in such a way that primary power cannot be lost to one rack separately from the other. If such a condition occurs, Unattended Start Mode may not be able to restart system operation when a primary power interruption is restored.

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

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

  Note: If an AC power loss is in progress when the Timed Power–On attempt occurs, the server is not be able to power on when AC power is restored.

- Follow–up to a Failed Boot Attempt

  The SP initiates a power–on sequence upon detection of a failed boot attempt (due to a hardware or software failure).

- Fast/Slow Boot (IPL) Capabilities

  Using the operator panel functions, you can select the IPL type, mode and speed of your boot capabilities.

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

Service Processor Reboot/Restart Recovery

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

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

Boot (IPL) Speed

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

Failure During Boot Process

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

Failure During Normal System Operation

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

If the operating system is AIX, the menu item under SMIT for setting the restart policy is Automatically Reboot After Crash (True/False), and the default is False. When the setting is True, and if the Service Processor parameter ”Use OS–Defined Restart Policy” is Yes (the default), SP takes over for AIX to reboot/restart after a hardware or Surveillance failure.

Service Processor Reboot/Restart Policy Controls

The operating system’s automatic restart policy (see operating system documentation) indicates the OS response to a system crash. The Service Processor can be instructed to refer to that policy, or not, by the Use OS–Defined Restart Policy menu item.

If the operating system has no automatic restart policy, or if it is disabled, then the Service Processor restart policy can be controlled from the Service Processor Menus by using the Enable Supplemental Restart Policy selection.

Use OS–Defined restart policy – The default setting is YES. This causes the Service Processor to refer to the OS Automatic Restart Policy setting and take action; the same action the OS would take if it could have responded to the problem causing the restart.

When this setting is NO, or if the OS did not set a policy, the SP refers to Enable supplemental restart policy for its action.

Enable supplemental restart policy – The default setting is NO. If set to YES, the SP restarts the server when the OS loses control and either:

1. The **Use OS–Defined restart policy** is set to NO

   OR

2. The **Use OS–Defined restart policy** is set to YES and the operating system has NO automatic restart policy.

The following provides a more thorough understanding of the relations among the OS and Service Processor restart controls:

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

[1] Service Processor default
[2] AIX default

System Firmware Updates

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

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

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

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

General Information on System Firmware Updates

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

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

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

Determining the Level of Firmware on the System

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

The firmware level can be determined by either of two methods:

- On the AIX command line, typing:

  `lscfg -vp|grep -F .MM`

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

- Looking at the top of the Service Processor main menu.

Updating System Firmware from the Service Processor Menus

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

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

Configuring and Deconfiguring Processors or Memory

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

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

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

During boot time, the Service Processor does not configure processors or memory DIMMs that are marked ”bad”.

If a processor or memory DIMM is deconfigured, the processor or memory DIMM remains offline for subsequent reboots until it is replaced or Repeat Gard is disabled. The Repeat Gard function also allows users to manually deconfigure a processor or memory DIMM. For information on configuring or deconfiguring a processor, see the Processor Configuration/Deconfiguration Menu on page 3-12. For information on configuring or deconfiguring a memory DIMM, see the Memory Configuration/Deconfiguration Menu on page 3-13. Both of these are submenus under the System Information Menu.

You can enable or disable CPU Repeat Gard or Memory Repeat Gard using the Processor Configuration/Deconfiguration Menu, which is a submenu under the System Information Menu.

Run–Time CPU Deconfiguration (CPU Gard)

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

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)
2. Operating system runtime (optional).

System Firmware Surveillance

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

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

Operating System Surveillance

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

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

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

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

- Surveillance enable/disable
- Surveillance interval

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

- 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 does not take effect until the next time the operating system is started after setting the parameters.

If desired, surveillance mode can be initiated immediately from Service Aids. In addition to the three options above, a fourth option is available to allow you to select immediate surveillance and rebooting of the system is not necessarily required.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and SP does not detect any heartbeats from the operating system, the SP assumes the system is hung and takes action according to the reboot/restart policy settings. See ”Service Processor Reboot/Restart Recovery” on page 3-24.

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

Call–Out (Call–Home)

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

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

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

- Have a modem connected to serial port 1 (S1) or serial port 2 (S2).
- Set up the following using the Service Processor Menus or Diagnostic Service Aids:
  - Enable call–out for the serial port where the modem is connected.
  - Enter the modem configuration filename.
  - Set up site specific parameters (i.e. phone numbers for call–out, call–out policy, number of call–out retries, etc.).
- To Call–Out before restart, set **"Call–out before restart"** to ENABLED from the Reboot/Restart Policy Setup menu.

Note: Some modems are not designed for the paging function. Although they can be used for paging, they will return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message will cause the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call–Out Policy Setup Menu. These retries result in redundant pages.

Console Mirroring

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

System Configuration

The following describes the configuration for console mirroring:

- 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.

Service Processor Error Logs

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

```
+------------------------------------------------------------------------------+
|                                                                              |
|                           Error Log                                          |
|                                                                              |
|1. 11/30/99    19:41:56 Service Processor Firmware Failure                    |
|   B1004999                                                                   |
|                                                                              |
|   Enter error number for more details.                                       |
|   Press Return to continue, or 'x' to return to menu.                        |
|     Press "C" to clear error log, any other key to continue.                 |
+------------------------------------------------------------------------------+
```

Note: The time stamp in this error log is Coordinated Universal Time (CUT), which is also referred to as Greenwich Mean Time (GMT). AIX error logs have additional information available and can time stamp with local time.

Entering an error number provides nine words of system reference code (SRC) data; an example screen is shown below.

```
+------------------------------------------------------------------------------+
|                                                                              |
|Detail:    6005                                                               |
|                                                                              |
|SRC                                                                           |
|- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -   |
|word11:B1004999      word12:0110005D      word13:00000000                     |
|word14:00000000      word15:00001111      word16:00000 000                    |
|word17:B1004AAA      word18:0114005D      word19:A4F1E909                     |
|                                                                              |
|B1004999                                                                      |
|                                                                              |
|   Press Return to continue, or 'x' to return to menu.                        |
+------------------------------------------------------------------------------+
```

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

LCD Progress Indicator Log

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

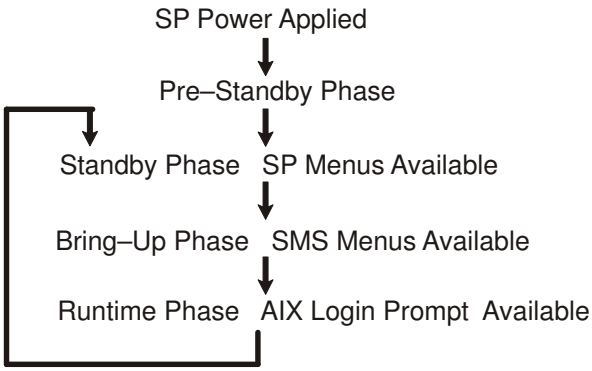
The progress indicator codes are listed from top (latest) to bottom (oldest).

```
                        LCD Progress Indicator Log
          BoFF
          0539..17
          0538..17
          0539..17
          0538..17
          0539..17
          0581
          0538..17
          0539..12
          0538..12
          0539..
          0821..01-K1-00
          0539..
          0728..01-R1-00-00
          0539..
          0664..40-60-00-1,0
          0539..
          0777..U0.2-P1-I14/E1
          0539..
          0742..U0.2-P1-I12/E1
          0539..
          0776..U0.2-P1-I10/T1
          E139
          E1FB
          E139
          E183
 Press Return to continue, or 'x' to return to menu.
          EAA1..U0.1-P1-I14
          E172..U0.1-P1
          E172..U0.1-P1-I14
          E172..U0.1-P1
          94BB
          9109
          9380
          9108
          9107
          9106
          9105
          9118
          9104
          9103
          9102
          90FD
```

Service Processor Operational Phases

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

Pre–Standby Phase



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

The Pre–Standby phase components are:

- Service Processor Initialization – Service Processor performs any necessary hardware and software initializations.
- Service Processor POST – Service Processor conducts Power–On Self–Tests on its various work and code areas.
- Service Processor Unattended Start Mode Checks – To assist fault recovery. If unattended start mode is set, the Service Processor automatically reboots the server. Service Processor does not wait for user input or power–on command, but moves through the phase and into the Bring–Up Phase. Access SMS menus or Service Processor menus to reset the unattended start mode.

Standby Phase

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

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

  OR

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

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

The Standby phase components are as follows:

- Modem Configuration

  Service Processor configures the modem (if installed) so that incoming calls can be received, or outgoing calls can be placed.

- Dial In

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

- Menus

  The Service Processor menus are password–protected. Before you can access them, you need either General User (Power–On Password or POP) or Privileged User (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 as follows:

- Retry Request Check

  The Service Processor checks to see if the previous boot attempt failed. If the specified number of failures are detected, the 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 Service Processor can dial a preprogrammed telephone number in the event of an IPL failure. The Service Processor issues an error report with the last reported IPL status indicated and any other available error information.

- Update Operator Panel

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

- Environmental Monitoring

  The Service Processor provides expanded error recording and reporting.

- System Firmware Surveillance (Heartbeat Monitoring)

  The SP monitors and times the interval between system firmware heartbeats.

- Responding to System Processor Commands

  The SP responds 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.

- Responding to System Processor Commands

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

- Run–Time Surveillance (Heartbeat Monitoring)

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

Chapter 4. Using System Management Services

Use the System Management Services menus to view information about your system and to perform tasks such as setting a password, changing the boot list, and setting the network parameters.

The text–based Open Firmware command line (OK prompt), which is available from the System Management Services Utilities menu, allows you to configure certain adapters.

To start the System Management Services, do the following:

1. Turn on or restart the system.
2. Watch for the banner screen to appear on the console display. The banner screen will be lines of text in the form of repeated logos.
3. After the banner screen is displayed, the POST indicator words, `memory`, `keyboard`, `network`, `scsi` and `speaker` appear across the bottom of the screen.

   Press the numeric 1 key after the word `keyboard` appears, and before the last word `speaker` appears.

   For more information on the POST indicator words, refer to ”POST Indicators”, on page 2-2.

Note: The System Management Services can also be started using the Service Processor Boot Mode Menu. See ”Boot Mode Menu”, on page 3-10.

After the System Management Services starts, the following screen displays:

```
+--------------------------------------------------------------------------------+
|                                                                                |
| Utilities                                                                      |
|                                                                                |
| 1  Password Utilities                                                          |
| 2  Display Error Log                                                           |
| 3  Remote Initial Program Load Setup                                           |
| 4  SCSI Utilities                                                              |
| 5  Select Console                                                              |
| 6  MultiBoot                                                                   |
| 7  Select Language                                                             |
| 8  OK Prompt                                                                   |
|                                                                                |
|                                                        .------.                |
|                                                        |X=Exit|                |
|                                                        `------'                |
| ===                                                                            |
+--------------------------------------------------------------------------------+
```

Each option on the System Management Services Utilities menu is described in this section.

Password Utilities

Entering this selection permits access to the options shown on the following screen:

```
+------------------------------------------------------------------------------+
|                                                                              |
|                                                                              |
|Password Utilities                                                            |
|                                                                              |
|                                                                              |
| 1 Set Privileged Access-Password                                             |
| 2 Remove Privileged-Access Password                                          |
| 3 Unattended Start Mode                                                      |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                        .------.              |
|                                                        |X=Exit|              |
|                                                        `------'              |
|===                                                                           |
|                                                                              |
+------------------------------------------------------------------------------+
```

Set Privileged–Access Password: The privileged–access password protects against the unauthorized starting of the system programs. When this option is selected, another screen displays that allows the setting of a password.

You can set the password from either the Service Processor or System Management Services menus. After the password is set, both the Service Processor and System Management Services automatically use the same password. The password is limited to eight characters.

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

Note: If you *forget* your password, you must shut down the system and remove the battery for at least 30 seconds.

Unattended Start Mode <ON>: This selection is used to enable or disable Unattended Start Mode. Use this option to instruct the Service Processor to restore the power–state of the server after a temporary power failure, which is necessary on servers that require automatic power–on after a power failure. The default setting is ON.

Display Error Log

A screen similar to the following displays when you select this option. You can view or clear your system error log.

```
+------------------------------------------------------------------------------+
|                                                                              |
|    .------------------------------------------------------.                  |
|    |                      Error Log                       |                  |
|    |                                                      |                  |
|    |                                                      |                  |
|    |            Date     Time    ErrorCode  Location      |                  |
|    |  Entry 1. 99/06/30 02:15:35 25a80011   U1.1-P1.1/Q1  |                  |
|    |  Entry 2. 99/07/01 03:18:36 20300026   U1.1-P1.1/Q1  |                  |
|    `------------------------------------------------------'                  |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
|  .-----------------.                          .-----------.                  |
|  |C=Clear Error Log|                          |X=Exit Log |                  |
|  `-----------------'                          `-----------'                  |
|                                                                              |
+------------------------------------------------------------------------------+
```

Note: Note: The time stamp in this error log is Coordinated Universal Time (CUT), which is also referred to as Greenwich Mean Time (GMT). AIX error logs have more information available and can time stamp with your local time.

Remote Initial Program Load Setup

This option allows you to enable and set up the remote startup capability of your system. You must first specify the network parameters as shown in the following screen:

```
+-------------------------------------------------------------------------------+
|                                                                               |
|Network Parameters                                                             |
|                                                                               |
| 1. IP Parameters                                                              |
| 2. Adapter Parameters                                                         |
| 3. Ping                                                                       |
|                                                                               |
|                                                                               |
|                                                                               |
|                                                          .------.             |
|                                                          |X=Exit|             |
|                                                          `------'             |
|                                                                               |
|===                                                                            |
|                                                                               |
+-------------------------------------------------------------------------------+
```

Note: Note: Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 129.132.004.020.

IP Parameters

Select the IP Parameters option from the Network Parameters menu to display a screen similar to the following:

```
+-------------------------------------------------------------------------------+
|                                                                               |
|IP Parameters                                                                  |
|                                                                               |
| 1. Client IP Address    [9.3.146.162]                                         |
| 2. Server IP Address    [9.3.146.171]                                         |
| 3. Gateway IP Address   [0.0.0.0]                                             |
| 4. Subnet Mask          [255.255.255.0]                                       |
|                                                                               |
|                                                                               |
|                                                                               |
|                                                                               |
|                                                                               |
|                                                          .------.             |
|                                                          |X=Exit|             |
|                                                          `------'             |
|===                                                                            |
+-------------------------------------------------------------------------------+
```

To set an address using this menu, do the following:

1. Type the number of the selection (1, 2, 3, or 4).
2. Enter the address on the next screen.

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

Adapter Parameters

Select the Adapter Parameters option from the Network Parameters menu to view an adapter's hardware address, as well as configure network adapters that require setup. A screen similar to the following displays when you make this selection:

```
+------------------------------------------------------------------------------+
|                                                                              |
|Adapter Parameters                                                            |
|                                                                              |
|       Device                Slot             Hardware Address               |
|                                                                              |
|    1. Gigabit Ethernet    4: U0.1-P1-I4/E1      0004ac7c0135                 |
|    2. token-ring          5: U0.1-P1-I5/T1      0020357a9105                 |
|    3. ethernet       Integrated:U0.1-P1/E1      0060949d7ac5                 |
|    4. ethernet            2: U0.2-P1-I2/E1      0004ac5e692b                 |
|    5. token-ring          3: U0.2-P1-I3/T1      0004ac634e38                 |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                    .------.                  |
|                                                    |X=Exit|                  |
|                                                    `------'                  |
|    (PRESS ENTER AFTER MAKING A SELECTION) ===                                |
+------------------------------------------------------------------------------+
```

Select an adapter on this screen to display configuration menus for that adapter. If ethernet is selected, you can set parameters that control how the ethernet adapter communicates with the network. For example, the following screen shows the menu for the ethernet adapter configuration:

```
+------------------------------------------------------------------------------+
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
|1. Data Rate [Auto]                                                           |
|2. Full Duplex [No]                                                           |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                                              |
+------------------------------------------------------------------------------+
```

Ping

Select Ping from the Network Parameters menu to test a connection to a remote system unit. After selecting the Ping option, you must first choose an adapter to communicate with the remote system.

```
+------------------------------------------------------------------------------+
|                                                                              |
|Adapter Parameters                                                            |
|                                                                              |
|       Device                Slot             Hardware Address               |
|                                                                              |
|    1. Gigabit Ethernet    4: U0.1-P1-I4/E1      0004ac7c0135                 |
|    2. token-ring          5: U0.1-P1-I5/T1      0020357a9105                 |
|    3. ethernet       Integrated:U0.1-P1/E1      0060949d7ac5                 |
|    4. ethernet            2: U0.2-P1-I2/E1      0004ac5e692b                 |
|    5. token-ring          3: U0.2-P1-I3/T1      0004ac634e38                 |
|                                                                              |
|                                                                              |
|                                                                              |
|                                                    .------.                  |
|                                                    |X=Exit|                  |
|                                                    `------'                  |
|    (PRESS ENTER AFTER MAKING A SELECTION) ===                                |
+------------------------------------------------------------------------------+
```

After determining which adapter to use to ping the remote system, you must provide the addresses needed to communicate with the remote system. Select the appropriate device from the Ping menu to display a screen similar to the following:

```
+-------------------------------------------------------------------------------+
|                                                                               |
|PING IP Address                                                                |
|                                                                               |
| 1. Client IP Address    [9.3.146.162]                                         |
| 2. Server IP Address    [9.3.146.171]                                         |
| 3. Gateway IP Address   [0.0.0.0]                                             |
| 4. Subnet Mask          [0.0.0.0]                                             |
|                                                                               |
|                                                                               |
|                                                                               |
|     .---------.                          .------.                            |
|     |E=Execute|                          |X=Exit|                            |
|     `---------'                          `------'                            |
|                                                                               |
|===                                                                            |
+-------------------------------------------------------------------------------+
```

SCSI Utilities

SCSI Utilities allow you to set delay times for the SCSI hard disk spin–up and to set SCSI IDs for SCSI controllers installed in the system.

```
+-------------------------------------------------------------------------------+
|                                                                               |
|                                                                               |
|SCSI Utilities                                                                 |
|                                                                               |
|1. Harddrive Spin Up Delay                                                     |
|2. Change SCSI Id                                                              |
|                                                                               |
|                                                                               |
|                                     .--------.                                |
|                                     | X=Exit |                                |
|                                     `--------'                                |
|===                                                                            |
+-------------------------------------------------------------------------------+
```

Using the Harddrive Spin Up Delay option allows you to change the spin up delay time for SCSI hard disk drives attached to your system. Spin up delay values can be entered manually, or you can use a default setting (two seconds). All values are measured in seconds.

Attention: Setting the value lower than the default can prevent successful booting because the system power handling capabilities might be exceeded. If the system no longer boots after setting this value, access this utility again and increase the value. It is also possible that adding disk drives can cause similar symptoms. Changing this value changes the surge current requirements on the system. As you increase the value, the surge current requirements on the system are decreased.

Select Console

Select this option to define which display is used by the system for system management. If no console is selected, the console defaults to Serial Port 1.

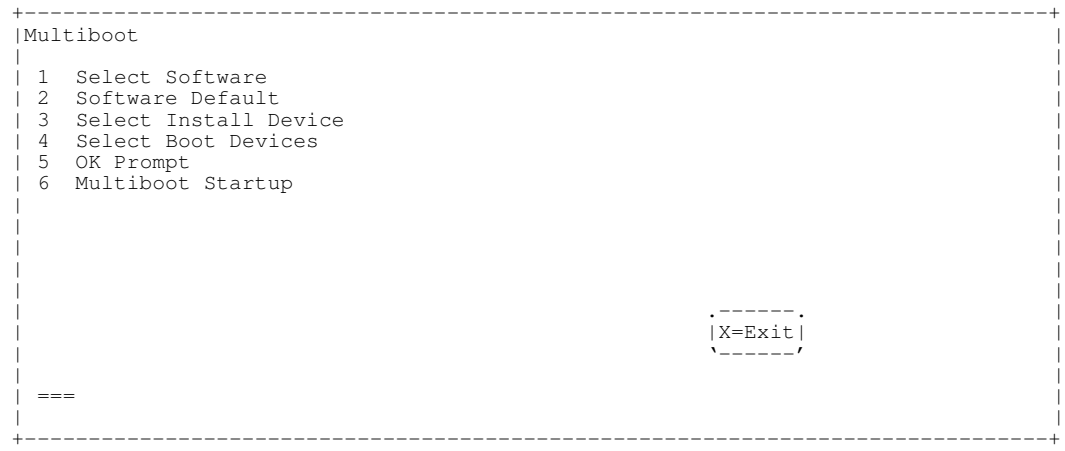
Selecting this option causes a screen similar to the one that follows to display on each console that can be used as a firmware console. Follow the instructions on the screen to select a particular console.

Note: The firmware console is independent from the AIX console.

```
+-------------------------------------------------------------------------------+
|                                                                               |
|                                                                               |
|                                                                               |
|              Press 0 to select this console                                   |
|                      as the active console                                    |
|                                                                               |
|                                                                               |
|                                                                               |
+-------------------------------------------------------------------------------+
```

MultiBoot

Multiboot allows you to select a method for booting the system.



Select Software

If this option is supported by the operating system, the names of the operating system installed are shown. This option might not be supported by all operating systems.

If you are running AIX, and you receive the following message:

```
No Operating System Installed
```

this indicates that information in nonvolatile storage could have been lost, as would happen if the battery had been removed. To re–create this value, run the **bootlist** command under AIX with the appropriate parameters. See the **bootlist** command in your AIX documentation. Contact your marketing representative for information about obtaining and installing system firmware update packages.

Software Default

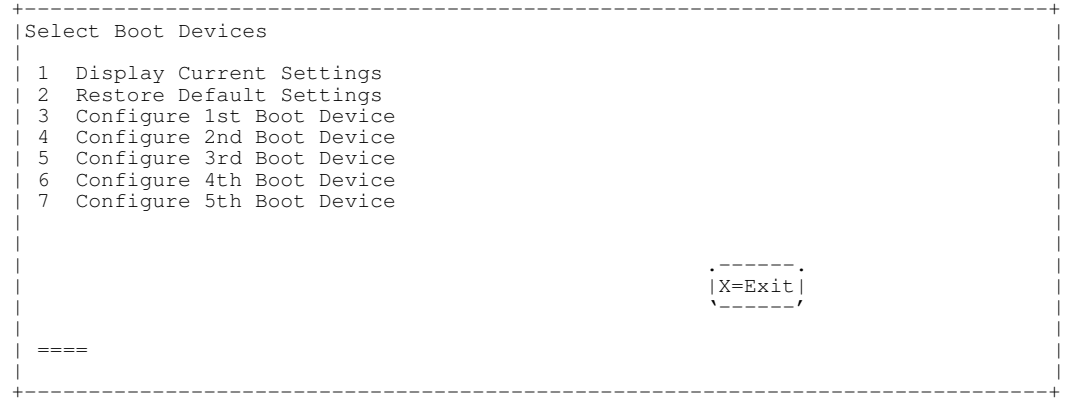
If this option is supported by the operating system, you can select the default operating system to start the system. This option might not be supported by all operating systems.

Select Install Device

Produces a list of devices, such as the CD–ROM, from which the operating system may be installed. Select a device, and the system searches that device for an operating system to install.

Select Boot Devices

Select this option to view and change the custom boot list, which is the sequence of devices read at startup time. The boot list can contain up to five devices. The following is an example of this screen.



Display Current Settings

Lists the current order of devices in the boot list. The following is an example of this screen.

```
+--------------------------------------------------------------------------------+
|Current Boot Sequence                                                           |
|                                                                                |
| 1. Diskette                                                                    |
| 2. SCSI CD-ROM id=1  ( loc=U0.1-P1/Z1 )                                        |
| 3. SCSI 9100 MB Harddisk id=5  ( loc=U0.1-P1/Z1 )                              |
| 4. Ethernet  ( loc=U0.1-I4/E1 )                                                |
| 5.   None                                                                      |
|                                                                                |
|                                                                                |
|                                                                                |
|                                                                                |
|                                                          .------.              |
|                                                          |X=Exit|              |
|                                                          `------'              |
|                                                                                |
| ===                                                                            |
|                                                                                |
+--------------------------------------------------------------------------------+
```

Restore Default Settings

Restores the boot list to the following default sequence:

- Primary diskette drive
- CD–ROM drive
- Tape (if installed)
- Hard disk drive
- Network device

Selecting any of the **Configure Boot Device** options displays a screen similar to the following.

```
+--------------------------------------------------------------------------------+
|                                                                                |
|                                                                                |
|     Configure Nth Boot Device                                                  |
|                                                                                |
| Device     Current       Device                                              |
| Number     Position      Name                                                |
|                                                                                |
| 1             1          Diskette                                            |
| 2             4          Ethernet ( loc=U0.1-P1-I4/E1 )                      |
| 3             -          Token-Ring ( loc=U0.1-P1-I5/T1 )                    |
| 4             2          SCSI CD-ROM id=1 ( loc=U0.1-P1/Z1 )                 |
| 5             3          SCSI 9100 MB Harddisk id=5 ( loc=U0.1-P1/Z1 )       |
|                                                                                |
|                                                                                |
|                                                                                |
|                                                                                |
|                                                                                |
|                                                          .------.              |
|                                                          |X=Exit|              |
|                                                          `------'              |
|                                                                                |
|===                                                                             |
|                                                                                |
+--------------------------------------------------------------------------------+
```

OK Prompt

Provides access to the Open Firmware command prompt.

Multiboot Startup <OFF>

Toggles between off and on to select whether Multiboot menu starts automatically on startup.

Select Language

Select this option to change the language used by the System Management Services screens and the Service Processor menus.

Note: To correctly display languages other than English, your ASCII terminal must support the ISO–8859 character set.

OK Prompt

This option provides access to the Open Firmware command prompt. Use the Open Firmware command prompt to set up an adapter that is not configurable with the System Management Services. Documentation supplied with an adapter may direct you to use this option if it is needed. To exit from the Open Firmware command prompt, type:

```
reset-all
```

or power off the system and reboot.

Exiting System Management Services

After you have finished using the System Management Services, type **x** (for exit) at the utilities menu to exit the System Management Services and boot your system.

Chapter 5. Using the Online and Standalone Diagnostics

The diagnostics consist of Online Diagnostics and Standalone diagnostics.

Online Diagnostics, when they are installed, reside with AIX in the file system. They can be booted:

- in single user mode (referred to as *service mode*)
- run in maintenance mode (referred to as *maintenance mode*)
- run concurrently (referred to as *concurrent mode*) with other applications.

If the system is not booted, the Online Diagnostics have access to the AIX error log and the AIX configuration data.

Standalone Diagnostics are packaged on removable media and must be booted before they can be run. If booted, they have no access to the AIX error log or the AIX configuration data.

Online and Standalone Diagnostics Operating Considerations

Note: When possible, run Online Diagnostics in Service Mode. Online Diagnostics perform additional functions, compared to Standalone Diagnostics. This ensures that the error state of the system is captured in NVRAM for your use in fixing the problem. The AIX error log and certain SMIT functions are only available when diagnostics are run from the disk drive.

The following items identify some things to consider before using the diagnostics.

1. When diagnostics are installed, the device support for some devices may not get installed. If this is the case, that device does not appear in the diagnostic test list when running disk based diagnostics.
2. Support for some TTY terminals is optionally installed. If you attach a TTY terminal to a system to run diagnostics be aware that it may not work properly since the AIX support for the terminal may not be installed.

Selecting a Console Display

When you run Standalone Diagnostics and under some conditions Online Diagnostics, you need to select the console display. The diagnostics display instructions on any graphics display and the terminal attached to the S1 serial port.

Identifying the Terminal Type to Diagnostics

Note: This is not the same as selecting a console display.

When you run diagnostics, the diagnostics must know what type of terminal you are using. If the terminal type is not known when the FUNCTION SELECTION menu is displayed, the diagnostics do not allow you to continue until a terminal is selected from the DEFINE TERMINAL option menu. Select **lft** for graphical displays.

Undefined Terminal Types

If an undefined terminal type from the DEFINE TERMINAL option menu is entered, the menu prompts the user to enter a valid terminal type, and the menu is redisplayed until either a valid type is entered or the user exits the DEFINE TERMINAL option.

Resetting the Terminal

If the user enters a terminal type that is valid (according to the DEFINE TERMINAL option menu) but is not the correct type for the ASCII terminal being used, difficulty may be

encountered in reading the screen, using the function keys or the Enter key. These difficulties can be bypassed by pressing Ctrl–C to reset the terminal. The screen display which results from this resetting action varies with the mode in which the system is being run:

- Online Normal or Maintenance Mode – The command prompt appears.
- Standalone Mode or Online Service Mode –The terminal type is reset to ”dumb”, the Diagnostic Operating Instruction panel is displayed, and the user is required to go through the DEFINE TERMINAL process again.

Running Online Diagnostics

Consider the following when you run the Online Diagnostics from a server or a disk:

- The diagnostics cannot be loaded and run from a disk until the AIX operating system has been installed and configured. After the AIX operating system has been installed, all three modes of operation are available.
- The diagnostics cannot be loaded on a system (client) from a server if that system is not set up to boot from a server over a network. When the system is set up to boot from a server, the diagnostics are run in the same manner as they are from disk.
- If the diagnostics are loaded from disk or a server, you must shutdown the AIX operating system before turning the system unit off to prevent possible damage to disk data. This is done in one of two ways:
  - ·If the diagnostics were loaded in standalone mode, press the F3 key until DIAGNOSTIC OPERATING INSTRUCTIONS displays; then press the F3 key once again to shutdown the AIX operating system.
  - If the diagnostics were loaded in maintenance or concurrent mode, enter the `shutdown -F` command.
- Under some conditions the system may stop, with instructions displayed on attached displays and terminals. Follow the instructions to select a console display.

Running Standalone Diagnostics

Consider the following when you run Standalone Diagnostics:

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

Running the Diagnostics from a TTY Terminal

Consider the following when you run diagnostics using a TTY–type terminal as the console display:

- See the operator manual for your type of tty terminal to find the key sequences you need to respond to the diagnostics.

Refer to *Terminals and Printers Configuration Guide*, order number 86 A1 22WE, for more information about terminals settings.

Online Diagnostics Modes of Operation

The Online Diagnostics can be run in three modes:

- Service Mode
- Concurrent Mode
- Maintenance Mode

Service Mode

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

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

Running the Online Diagnostics in Service Mode

To run Online Diagnostics in service mode, take the following steps:

1. Ask the system operator to stop all programs including the AIX operating system.
2. Turn the power off.
3. Remove all tapes, diskettes, and CD–ROMs.
4. Turn the power on.
   a. When the `Keyboard` indicator appears, press the numeric 6 key on the keyboard to indicate that diagnostics are to be loaded.
   b. Enter any requested passwords.
   c. Follow any instructions to select a console.
5. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.
6. Follow the displayed instructions to checkout the desired resources.
7. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.
8. Press the F3 key (from a defined terminal) or press 99 (for an undefined terminal) to shutdown the diagnostics before turning off the system unit.

Note: Pressing the F3 key (from a defined terminal) produces a ”Confirm Exit” popup menu which offers two options: continuing with the shutdown by pressing F3; or returning to diagnostics by pressing Enter.

For undefined terminals, pressing 99 produces a full screen menu which offers two

options: continuing with the shutdown by pressing 99 and then Enter; or returning to diagnostics by pressing Enter.

Concurrent Mode

Concurrent mode provides a way to run Online Diagnostics on some of the system resources while the system is running normal system activity.

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

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

There are three levels of testing in concurrent mode:

- The **share–test level** tests a resource while the resource is being shared by programs running in the normal operation. This testing is mostly limited to normal commands that test for the presence of a device or adapter.
- The **sub–test level** tests a portion of a resource while the remaining part of the resource is being used in normal operation. For example, this test could test one port of a multiport device while the other ports are being used in normal operation.
- The **full–test level** requires the device not be assigned to or used by any other operation. This level of testing on a disk drive may require the use of the varyoff command. The diagnostics display menus to allow you to vary off the needed resource.

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

To run the Online Diagnostics in concurrent mode you must be logged onto the AIX operating system and have proper authority to issue the commands (if needed, get help).

The `diag` command loads the diagnostic controller and displays the Online Diagnostic menus.

Running the Online Diagnostics in Concurrent Mode

To run Online Diagnostics in concurrent mode, take the following steps:

- Log on to the AIX operating system as root or superuser.
- Enter the `diag` command.
- When the DIAGNOSTIC OPERATING INSTRUCTIONS are displayed, follow the instructions to check out the desired resources.
- When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS. Then press the F3 key again to return to the AIX operating system prompt. Be sure to vary on any resource you had varied to off.
- Press the Ctrl–D key sequence to log off from root or superuser.

Maintenance Mode

Maintenance mode runs the Online Diagnostics using the customer's version of the AIX operating system. This mode requires that all activity on the AIX operating system be stopped so the Online Diagnostics have most of the resources available to check. All of the system resources except the SCSI adapters, memory, processor, and the disk drive used for paging can be checked.

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

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

Running the Online Diagnostics in Maintenance Mode

To run the Online Diagnostics in maintenance mode you must be logged on to the customer's version of the AIX operating system as *root* or *superuser* (su). Use the following steps to run the Online Diagnostics in maintenance mode:

1. Stop all programs except the AIX operating system (if help is needed see the system operator).
2. Log onto the AIX operating system as *root* or *superuser*.
3. Enter the `shutdown -m` command.
4. When a message indicates the system is in maintenance mode, enter the `diag` command.
   Note: It may be necessary to set *TERM* type again.
5. When DIAGNOSTIC OPERATING INSTRUCTIONS is displayed, follow the displayed instructions to checkout the desired resources.
6. When testing is complete; use the F3 key to return to DIAGNOSTIC OPERATING INSTRUCTIONS. Then press the F3 key again to return to the AIX operating system prompt.
7. Press Ctrl–D to log off from *root* or *superuser*.

Standalone Diagnostic Operation

Standalone Diagnostics provide a method to test the system when the Online Diagnostics are not installed and a method of testing the disk drives that cannot be tested by the Online Diagnostics.

No Error Log Analysis is done by the Standalone Diagnostics.

The CD–ROM drive and the SCSI controller that controls it cannot be tested by the Standalone Diagnostics.

Running the Standalone Diagnostics

To run Standalone Diagnostics in service mode, take the following steps:

1. Verify with the system administrator and system users that the system unit may be shut down, then stop all programs including the AIX operating system. (Refer to the AIX operating system documentation shutdown command information.)
2. Remove all tapes, diskettes, and CD–ROMs.
3. Insert the Diagnostic CD–ROM into the CD–ROM drive.
4. Turn off the system unit.
5. Turn the power on.
   a. After the `Keyboard` indicator appears, press the numeric 5 key on the keyboard to indicate that diagnostics are to be loaded.
   b. Enter any requested passwords.
   c. Follow any instructions to select a console.

6. After the diagnostic controller loads, DIAGNOSTIC OPERATING INSTRUCTIONS appear on the console display.
7. Follow the displayed instructions to checkout the desired resources.
8. When testing is complete; use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS.

Chapter 6. Introducing to Tasks and Service Aids

The AIX Diagnostic Package contains programs that are called Tasks. Tasks can be thought of as ”performing a specific function on a resource”; for example, running diagnostics, or performing a service aid on a resource. This chapter refers to the Tasks available in AIX Diagnostics Version 4.2 and later.

Note: Many of these programs work on all system model architectures. Some programs are only accessible from Online Diagnostics in Service or Concurrent mode, others may be accessible only from Standalone Diagnostics. While still other programs may only be supported on a particular system architecture, such as CHRP (Common Hardware Reference Platform).

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

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

A fast path method is also available to perform a task by using the **diag** command and the **–T** flag. This means the user does not have to go through most of the introductory menus just to get to a particular task. Instead, the user is presented with a list of resources available to support the specified task. The current fast path tasks are:

- Certify – certifies media
- Chkspares – checks for the availability of spare sectors
- Download – downloads microcode to an adapter or device
- Disp_mcode – displays current level of microcode
- Format – formats media
- Identify – identifies the PCI RAID physical disks
- IdentifyRemove – identifies and removes devices (Hot Plug)

To run these tasks directly from the command line, specify the resource and other task unique flags. Use the descriptions in Chapter 27 of ”*Diagnostic Information for Multiple Bus Systems*” to understand which flags are needed for a given task.

Tasks:

- Add Resource to Resource List
- AIX Shell Prompt
- Analyze Adapter Internal Log
- Backup and Restore Media
- Certify Media
- Change Hardware Vital Product Data
- Configure Dials and LPFKeys
- Configure Reboot Policy
- Configure Remote Maintenance Policy
- Configure Ring Indicate Power On Policy
- Configure Surveillance Policy
- Create Customized Configuration Diskette
- Delete Resource from Resource List

- Disk Maintenance
- Display Configuration and Resource List
- Display Firmware Device Node Information
- Display Hardware Error Report
- Display Hardware Vital Product Data
- Display Machine Check Error Log
- Display Microcode Level
- Display or Change Bootlist
- Display or Change Diagnostic Run Time Options
- Display Previous Diagnostic Results
- Display Resource Attributes
- Display Service Hints
- Display Software Product Data
- Display System Environmental Sensors
- Display Test Patterns
- Download Microcode
- Fibre Channel RAID Service Aids
- Flash SK–NET FDDI Firmware
- Format Media
- Generic Microcode Download
- Hot Plug Task
- Local Area Network Analyzer
- Log Repair Action
- Periodic Diagnostics
- PCI RAID Physical Disk Identify
- Process Supplemental Media
- Run Diagnostics
- Run Error Log Analysis
- Run Exercisers
- Save or Restore Hardware Management Policies
- SCSI Bus Analyzer
- SCSD Tape Drive Service Aid
- Spare Sector Availability
- SSA Service Aid
- Update Disk Based Diagnostics
- Update System or Service Processor Flash
- 7135 RAIDiant Array Service Aids
- 7318 Serial Communication Network Server

Chapter 7. Using the System Verification Procedure

The system verification procedure is used to check the system for correct operation.

When you are analyzing a hardware problem, you should use Chapter 8. ”Hardware Problem Determination”.

Step 1. Considerations before Running This Procedure

Notes:

1. If this system unit is directly attached to another system unit or attached to a network, be sure communications with the other system unit is stopped.
2. This procedure requires use of all of the system resources. No other activity can be running on the system while you are doing this procedure.

Read the following before using this procedure:

- This procedure requires a display connected to the video port or an ASCII terminal attached to the S1 port.
- Before starting this procedure, you should stop all programs and the operating system.
- This procedure runs the Online Diagnostics in Service mode or Standalone Diagnostics. If the Online Diagnostics are installed, they should be run. See the operator manual for your type of ASCII terminal to find the key sequences you need in order to respond to the diagnostics.
- If you need more information about diagnostics see Chapter 5. ”Using the Online and Standalone Diagnostics”.
- If a console display is not selected, the diagnostics stop. The instructions for selecting a console display are displayed on all of the graphic displays and any terminal attached to the S1 port. Follow the displayed instructions to select a console display.
- Go to Step 2.

Step 2. Loading the Diagnostics

1. Stop all application programs running on the operating system.
2. Stop the operating system.
3. Turn the power off.
4. If you are loading the Standalone Diagnostics and running them from an ASCII terminal:
   - The attributes for the terminal must be set to match the defaults of the diagnostics.
   - If you need to change any settings, record the normal settings, and be sure the terminal attributes are set to work with the diagnostics. If needed, see ”Running the Diagnostics from a TTY Terminal” on page 5-3.
   - Return to substep 5 when you finish checking the attributes.
5. Turn the power on.
   a. When the keyboard indicator appears, press the numeric 5 key on the keyboard to load the Standalone Diagnostics or the numeric 6 key on the keyboard to load the Online Diagnostics.
   b. Enter any requested passwords.

c. Follow any instructions to select a console.

6. When the Diagnostic Operating Instructions display, go to Step 3. If you are unable to load the diagnostics, go to ”Problem Determination When Unable to Load Diagnostics” on page 8-7.

Step 3. Running System Verification

The Diagnostic Operating Instructions should be displayed.

1. Press the Enter key.
2. If the terminal type has not been defined, you must use the Initialize Terminal option on the Function Selection menu to initialize the operating system environment before you can continue with the diagnostics.
3. If you want to do a general checkout without much operator action, Select the Diagnostic Routines option on the Function Selection menu.

   If you want to do a more complete checkout including the use of wrap plugs, select the Advanced Diagnostics option on the Function Selection menu. The advanced diagnostics are primarily for the service representative; they may instruct you to install wrap plugs to better isolate a problem.
4. Select the System Verification option on the Diagnostic Mode Selection menu.
5. If you want to run a general checkout of all installed resources, Select the All Resource option on the Diagnostic Selection menu.

   If you want to check one particular resource, select that resource on the Diagnostic Selection menu.
6. Go to Step 4.

Step 4. Additional System Verification

The checkout programs end with either the Testing Complete menu and a message stating No trouble was found or the A Problem Was Detected On (Time Stamp) menu with an SRN.

1. Press Enter to return to the Diagnostic Selection menu.
2. If you want to check other resources, select the resource. When you have checked all of the resources you need to check, go to Step 5.

Step 5. Stopping the Diagnostics

1. If running Online diagnostics, the system first should be shut down using the following procedure:

   a. Press F3 repeatedly until you get to the Diagnostic Operating Instructions, then follow the displayed instructions.

   b. Press F3 once, and then follow the displayed instructions to shut down system.
2. If you changed any attributes on your ASCII terminal to run the diagnostics, change the settings back to normal.
3. This completes the system verification. Report the SRN to the service organization if you received one. To do a normal boot, turn off the system unit and wait 30 seconds, and then set the power switch of the system unit to On.

Chapter 8. Hardware Problem Determination

This chapter provides information on using Standalone or Online Diagnostics.

Problem Determination Using the Standalone or Online Diagnostics

Use this procedure to obtain a service request number (SRN) when you are able to load the Standalone or Online Diagnostics. If you are unable to load the Standalone or Online Diagnostics, go to ”Problem Determination When Unable to Load Diagnostics” on page 8-7. The service organization uses the SRN to determine which field replaceable units (FRUs) are needed to restore the system to correct operation.

Step 1. Considerations before Running This Procedure

Note: See the operator manual for your ASCII terminal to find the key sequences you need to respond to the diagnostic programs.

- The diagnostics can use a display connected to the video port or an ASCII terminal attached to a serial port.
- This procedure asks you to select the type of diagnostics you want to run. If you need more information about the types, see ”Standalone and Online Diagnostics Operating Considerations” on page 5-1.
- Go to ”Step 2”.

Step 2

Are the Online Diagnostics installed on this system?

NO	Go to ”Step 15”.
YES	Go to ”Step 3”.

Step 3

Determine if the operating system is accepting commands.

Is the operating system accepting commands?

NO	The system must be turned off in order to run diagnostics. Verify with the system administration and users that the system may be turned off. If so, then turn off the system unit and go to ”Step 6”.
YES	Go to ”Step 4”.

Step 4

Diagnostic tests can be run on many resources while the operating system is running. However, more extensive problem isolation is obtained by running Online Diagnostics in Service mode.

Do you want to run the Online Diagnostics in Service mode?

NO	Go to ”Step 5”.
YES	Do the following to shut down your system:

1. At the system prompt, stop the operating system using the proper command for your operating system. For AIX systems, use the `shutdown -F` command.
2. After the operating system is stopped, turn off the system unit.
3. Go to ”Step 6”.

Step 5

This step starts the Online Diagnostics in concurrent mode.

1. Log on as `root` or as `superuser`.
2. Enter the `diag` command.
3. Wait until the Diagnostic Operating Instructions are displayed, or wait for three minutes.

Are the Diagnostic Operating Instructions displayed without any obvious console display problems?

NO	Do the following to shut down your system:

1. At the system prompt, stop the operating system using the proper command for your operating system. For AIX systems, use the `shutdown -F` command.
2. After the operating system is stopped, turn off the system unit.
3. Go to ”Step 6”.

YES	Go to ”Step 9”.

Step 6

This step loads Online Diagnostics in service mode. If you are unable to load the diagnostics, go to ”Step 7”.

1. Turn the power on.
2. When the keyboard indicator (icon or text) appears, press the numeric 6 key on the keyboard to indicate that diagnostics are to be loaded.
3. Enter any requested passwords.
4. Follow any instructions to select a console.

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

NO	Go to ”Step 7”.
YES	Go to ”Step 9”.

Step 7

Starting at the top of the following table, find your symptom and follow the instructions given in the Action column.

Symptom	Action
Display problem.	Go to ”Step 8”.
All other symptoms.	Go to ”Problem Determination When Unable to Load Diagnostics” on page 8-7

Step 8

The following steps analyze a console display problem.

Find your type of console display in the following table, then follow the instructions given in the Action column.

Console Display	Action
Display Device	Go to the display documentation for problem determination.
ASCII terminal	Go to the documentation for problem determination for this type of terminal.

Step 9

The diagnostics loaded correctly.

Press the Enter key.

Is the Function Selection menu displayed?

NO	Go to ”Step 10”.
YES	Go to ”Step 11”.

Step 10

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table, then follow the instructions given in the Action column.

Keyboard Type	Action
101–key keyboard. Identify by the type of Enter key used. The Enter key is within one horizontal row of keys.	Record error code M0KBD001 and report the problem to the service organization.
102–key keyboard. Identify by the type of Enter key used. The Enter key extends into two horizontal rows of keys.	Record error code M0KBD002 and report the problem to the service organization.
Kanji keyboard. Identify by the Japanese characters.	Record error code M0KBD003 and report the problem to the service organization.
ASCII–terminal keyboard. This applies to all attached terminals.	Go to the documentation for problem determination for this type terminal.

Step 11

1. If the terminal type has not been defined, you must use the `Initialize Terminal` option on the Function Selection menu to initialize the operating system environment before you can continue with the diagnostics. This is a separate and different operation than selecting the console display.
2. Select `Diagnostic Routines`.
3. Press the Enter key.
4. In the following table, find the menu or system response you received when you selected `Diagnostics`. Follow the instructions given in the Action column.

System Response	Action
The Diagnostic Mode Selection menu is displayed.	Select Problem Determination and go to ”Step 12”.
The Missing Resource menu is displayed.	Follow the displayed instructions until either the Diagnostic Mode Selection menu or an SRN is displayed. If the Diagnostic Mode Selection menu is displayed, select Problem Determination and go to ”Step 12”. If you get an SRN, record it, and go to ”Step 14”.

The New Resource menu is displayed.	Follow the displayed instructions. Note: Devices attached to serial ports S1 or S2 will not appear on the New Resource menu. If the Diagnostic Mode Selection menu is displayed, select Problem Determination and go to ”Step 12”. If you get an SRN, record it, and go to ”Step 14”. If you do not get an SRN, go to ”Step 17”.
The system does not respond to selecting diagnostics	Go to ”Step 10”.

Step 12

Did the Diagnostic Selection Menu display?

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

Follow the displayed instructions.

If the No Trouble Found screen is displayed, press Enter.

If another resource is tested, repeat this step.

If the Diagnostic Selection menu is displayed, go to ”Step 13”.

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

YES Go to ”Step 13”.

Step 13

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

Select and run the diagnostic tests on the resources you are having problems with or select the All Resources option check all of the configured resources. Find the response in the following table and take the Action for it.

Diagnostic Response	Action
An SRN is displayed.	Go to ”Step 14”.
The system hangs.	Report SRN 109–200.
The Testing Complete menu and the No trouble was found message is displayed, and you have not tested all of the resources.	Press Enter and continue with the testing.
The Testing Complete menu and the No trouble was found message displayed and you have tested all of the resources.	Go to ”Step 17”.

Step 14

The diagnostics produced an SRN for this problem.

1. Record the SRN and other numbers read out.
2. Report the SRN to the service organization.
3. **STOP**. You have completed these procedures.

Step 15

When you are loading the Standalone Diagnostics, the attributes for the terminal must be set to match the defaults of the diagnostic programs. The ASCII terminal must be attached to serial port 1 on the system unit.

Are you going to load Standalone Diagnostics and run them from a ASCII terminal?

NO	Go to ”Step 16”.
YES	Go to ”Running the Diagnostics from a TTY Terminal” on page 5-3 and be sure your terminal attributes are set to work with the diagnostic programs. Return to ”Step 16” when you finish checking the attributes. Record any settings that are changed.

Step 16

This step loads the Standalone Diagnostics. If you are unable to load the diagnostics, go to ”Step 7”.

1. Turn the power on.
2. Insert the diagnostic CD–ROM into the CD–ROM drive.
3. When the keyboard indicator appears, press the numeric 5 key on the keyboard to indicate that diagnostics are to be loaded.
4. Enter any requested passwords.
5. Follow any instructions to select a console.

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

NO	Go to ”Step 7”.
YES	Go to ”Step 9”.

Step 17

The diagnostics did not find a hardware problem. If you still have a problem, contact your software support center.

Problem Determination When Unable to Load Diagnostics

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

Step 1. Considerations before Running This Procedure

- The diagnostics can use a display connected to the video port or an ASCII terminal attached to a serial port.
- Go to ”Step 2”.

Step 2

Are the Online Diagnostics installed on this system?

NO	Go to ”Step 4”.
YES	Go to ”Step 3”.

Step 3

This step attempts to load Online Diagnostics in service mode.

1. Turn the power off.
2. Turn the power on.
3. If the keyboard indicator appears, press the numeric 6 key on keyboard to indicate that diagnostics are to be loaded.
4. Enter any requested passwords.
5. Follow any instructions to select a console.
6. Wait until the diagnostics load or the system appears to stop.

Did the diagnostics load?

NO	Go to ”Step 5”.
YES	Go to ”Step 6”.

Step 4

This step attempts to load the Standalone diagnostics.

1. Turn the power off.
2. Turn the power on.
3. Insert the diagnostic CD–ROM into the CD–ROM drive.
4. If the keyboard indicator appears, press the numeric 5 key on the keyboard to indicate that diagnostics are to be loaded.
5. Enter any requested passwords.
6. Follow any instructions to select a console.
7. Wait until the diagnostics load or the system appears to stop.

Did the diagnostics load?

NO	Go to ”Step 5”.
YES	Go to ”Step 6”.

Step 5

Starting at the top of the following table, find your symptom and follow the instructions given in the Action column.

Symptom	Action
The power LED does not come on, or comes on and does not stay on.	Check the power cable to the outlet. Check the circuit breakers and check for power at the outlet. Assure the room temperature is within 60 – 90°F. If you do not find a problem, record error code M0PS0000 and report the problem to the service organization.
The diagnostics are loaded and there was NO beep heard from the system unit during the IPL sequence.	Record error M0SPK001
The system stops with the Diagnostic Operating Instructions displayed.	Go to ”Step 6”.
The system stops with a prompt to enter a password.	Enter the password. You are not be allowed to continue until a correct password has been entered. When you have entered a valid password, wait for one of the other conditions to occur.
The system stops with a three, four or eight–digit error code(s) displayed on the console.	Record the error code(s) and report the problem to the service organization.
The system login prompt is displayed.	You may not have pressed the correct key or you may not have pressed the key soon enough when you were to indicate a Service Mode boot of diagnostic programs. If this was the case, start over at the beginning of this step. If you are sure you pressed the correct key in a timely manner go to Step 7.

The system does not respond when the password is entered.	Go to Step 7.
The system stopped and an indicator is displayed on the system console and an eight–digit error code is not displayed.	If the indicator represents: • a keyboard, record error code M0KBD000 and report the problem to the service organization. • memory, record error code M0MEM002 and report the problem to the service organization. • SCSI, record error code M0CON000 and report the problem to the service organization. • Network, record error code M0NET000 and report the problem to the service organization. • Speaker/Audio, record error code M0BT0000 and report the problem to the service organization.
The System Management Services menu is displayed.	The device or media you are attempting to boot from may be faulty. 1. Check the SMS error log for any errors. To check the error log: • Choose tools • Choose error log • If an error is logged, check the time stamp. • If the error was logged during the current boot attempt, record it and report it to your service person. • If no recent error is logged in the error log, continue to the next step below. 2. If you are attempting to load the Online Diagnostics, try loading the Standalone Diagnostics. Otherwise, record error code M0SCSI00 and report to the service organization.
The system appears to be stopped. the disk activity light is on continuously, and a beep was heard from the system unit.	Record error code M0MEM001 and report to the service organization.
The system stops and the message ”STARTING SOFTWARE PLEASE WAIT ...” is displayed.	Report error code M0BT0001.
The message ”The system will now continue the boot process” is displayed continuously on the system unit’s console.	Report error code M0SCSI01.

Step 6

The diagnostics loaded correctly.

Go to ”Problem Determination Using the Standalone or Online Diagnostics” on page 8-1.

Step 7

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table, then follow the instructions given in the Action column.

Keyboard Type	Action
101–key keyboard. Identify by the type of Enter key used. The Enter key is within one horizontal row of keys.	Record error code M0KBD001 and report the problem to the service organization.
102–key keyboard. Identify by the type of Enter key used. The Enter key extends into two horizontal rows of keys.	Record error code M0KBD002 and report the problem to the service organization.
Kanji keyboard. Identify by the Japanese characters.	Record error code M0KBD003 and report the problem to the service organization.
ASCII–terminal keyboard. This applies to all attached terminals.	Go to the documentation for problem determination for this type terminal.

Appendix A. Service Processor Setup and Test

For your convenience, a sample SP setup procedure is provided below. Your setup may include more or less of the available features, so you may wish to adjust this checklist for your own application.

SP Setup Checklist

1. Unplug the power cord from the server.
2. Attach a local terminal for this setup procedure.
3. Plug in the server and power on the local terminal.

   ATTENTION: Make sure that server power remains off
4. Bring up the Service Processor Menus, see ”Using the Service Processor” on page 3-1.
5. Set the System Name, see ”Privileged User Menus” on page 3-4.
6. Enable Surveillance. See ”Service Processor Functions”, on page 3-22
7. Configure Call–In/Call–Out, see ”Call–In/Call–Out Setup Menu” on page 3-17.
8. Exit the Service Processor menus
9. Unplug the power cord from the server.
10. Attach modems (if needed). See page 3-2.
11. Plug in the server

    ATTENTION: Make sure that server power remains off
12. Test both of the following:
    - Call–In, on page A-2.
    - Test Call–Out, on page A-2.
13. Use the ”Save or Restore Hardware Management Policies,” in the ”Introduction to Tasks and Service Aids” section of the *Diagnostic Information for Multiple Bus Systems* to back up the service processor settings.

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

Your Service Processor is ready to go to work.

Testing the Service Processor Setup

The following is a sample testing procedure to ensure your setup is working.

These tests include communicating with the server's operating system. Be sure the necessary serial port(s) is configured. If you need assistance, refer to "Serial Port Configuration" on page A-3.

The server should still be powered off as a result of the setup checklist steps on page A-1.

Testing Call–In

1. Go to your remote terminal and call in to your server. Your server answers and offers you the Service Processor Main Menu after requesting your privileged access password.
2. Select System Power Control.
3. Select Power–On System.

   When you are asked if you wish to continue powering on the system, type Y.
4. After the system firmware and operating system have initialized the server, the login prompt displays at your remote terminal if you set up Seamless Modem Transfer (refer to page "Transfer of a Modem Session", on page B-5 for more information). This may take several minutes. When the login prompt displays, you have successfully called the Service Processor.
5. Type `logout` to disconnect from the operating system. The message `No Carrier` displays on your remote terminal.
6. Call your server again. The operating system answers and offers you the login prompt.

   If these tests are successful, call–in is working.
7. Login in and type `shutdown -F` to shut down your server.
8. The message `No Carrier` displays on your remote terminal.

Testing Call–Out

During the setup, you entered **your** phone number for the Pager (on page 3-20) and Customer Voice (on page 3-20) phone numbers. These numbers are used for this test.

1. Your remote terminal is disconnected as a result of the Call–In test.
2. Call your server again.
3. At the Service Processor Main Menu, select Call–In/Call–Out Setup menu, then select Call–Out test. This action causes a simulated error condition for the purposes of this test.
4. After a few moments, a message displays, regarding an illegal entry. Press Enter to clear the message and return to the main menu.
5. When your telephone rings, answer the call. You should hear the sound of a telephone being dialed. This is your system unit trying to page you.

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

Return to the "Telephone Number Setup Menu" on page 3-19 to enter the **actual** telephone numbers your server will use to report problems.

Serial Port Configuration

To configure the serial port on an AIX system, enter the following commands from an AIX console:

1. Log in as `root`.
2. To find if you have any serial ports already configured, enter:

   ```
   lsdev -Cc tty
   ```

If no serial ports are configured, none are listed. If you wish to configure serial ports that are not listed, continue with the remaining steps.

3. Identify the serial port(s) with the modem(s).
4. Enter

   ```
   smit tty
   ```

5. Select `add tty`
6. Select `RS232`
7. Select `Baud rate 9600` or higher.
8. Select `login enable` and set the flow control to RTS.
9. Commit the selections and set up any other needed serial ports.
10. Exit SMIT.

Appendix B. Modem Configurations

The SP is designed to place little demand on an attached modem, thereby increasing the setup and connection success rates.

Sample Modem Configuration Files

Several sample modem configuration files are supplied that will either work directly with your modem, or provide a good starting point for a custom setup, if required.

The sample modem configuration files can be found in your system firmware and in the /usr/share/modems subdirectory (if your server is using AIX) with the following names. A listing of each file is included at the end of this appendix.

Generic Modem Configuration Files

AIX File Name	SP Firmware File Name
modem_z_cfg	modem_z_sp
modem_z0_cfg	modem_z0_sp
modem_f_cfg	modem_f_sp
modem_f0_cfg	modem_f0_sp
modem_f1_cfg	modem_f1_sp

Specific Modem Configuration Files

AIX File Name	SP Firmware File Name
modem_m0.cfg	modem_m0_sp
modem_m1.cfg	modem_m1_sp

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

Configuration File Selection

Use the following steps to select a configuration file:

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

   If yes, go to step 3 below.
   If no, 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.

   Go to step 5 below.

3. Does your modem command set include a test for V.42 error correction at the remote modem (often called ”Auto–Reliable Mode”)?

   If yes, this test must be disabled. Sample configuration files `/usr/share/modem_m0.cfg` or `/usr/share/modem_m1.cfg` can be used as models to help you create a file for your particular modem. See ”Customizing the Modem Configuration Files” on page B-3. Go to step 5.

   If no, go to step 4 below.

4. 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.

5. You have completed selection of the configuration file.

   If your modem configuration selection is not available in the Service Processor Modem Configuration Menu, you must access it through the Configure Remote Maintenance Policy Service Aid.

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

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

Some modems are not designed for the paging function. Although they can be used for paging, they return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message causes the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call–Out Policy Setup Menu. These retries result in redundant pages.

Examples For Using the Generic Sample Modem Configuration Files

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

Note: ** Ring interrupt only on first ring.

Customizing the Modem Configuration Files

You can create your own modem configuration file(s) or modify the samples provided. After you customize your modem configuration files, you MUST access them via the Configure Remote Maintenance Policy Service Aid rather than from the SP menus.

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

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

To disable Auto–Reliable Mode testing of the remote modem, use the sample modem configuration file **/usr/share/modems/modem_f.cfg** as a model that you can modify, as follows:

1. Find the necessary command in your modem manual.
2. Copy the **/usr/share/modems/modem_f.cfg** file to a new file with a different name (for example, **modem_fx.cfg**).
3. In the new file (**modem_fx.cfg**), change the line `Send "ATE0T\r"` to `Send "ATcccE0T\r"` where ccc is the added command as specified in your modem manual, as follows.

   Change the third line of each of the following stanzas:

   - `condout`
   - `condin`
   - `ripo`

4. Save the changes.

Xon/Xoff Modems

Some early modems assume software flow control (Xon/Xoff) between the computer and the modem. Modems with this design send extra characters during and after the transmitted data. The Service Processor cannot accept these extra characters. If your configuration includes such a modem, your functional results may be unpredictable.

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

If you experience unexplainable performance problems that may be due to Xon/Xoff characters, it is recommended that you upgrade your modem.

Ring Detection

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

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

Terminal Emulators

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

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

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

Recovery Procedures

Situations such as 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, 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, shut down your system using established procedures. Disconnect the power cable and press the power button to drain capacitance while power is disconnected. Disconnect and reconnect modem power, and then reconnect system power to completely reinitialize your system.

Transfer of a Modem Session

Because many modem command variations exist, the sample modem configuration files that follow 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.

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 files, as follows:

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

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

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

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

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

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

Recovery Strategy

The recovery strategy consists of making **two** calls to establish a remote session. This 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 Service Processor and start the system. After the operating system is loaded and initialized, the connection will be dropped. At this

point, call the server back and the operating system will answer and offer you the login prompt.

Prevention Strategy

The disconnect is caused by the operating system when it initializes the **primary** console. The tests listed 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_m0.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP: modem_m0
#
# FUNCTIONS: Modem configuration file specifically for IBM 7852–400
#  modem with Auto–Reliable feature.  This feature must be turned off
#  for Catcher calls.  This example uses the AT&F reset command to
#  choose the factory defaults.
#
# (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.
#
#
# The modem has configuration switches.  They should be set to the
# factory default settings, except switches 11 and 12.  These must be
# to UP (”AT” responses) and DOWN (Asynchronous operation), respectively.

ICDelay 1
DefaultTO 10
CallDelay 120
#
#  %N  Call–Out phone number    %R   Return phone number
#
#
# PROGRAMMING NOTE: No blanks between double quote marks (”).

condout:    send ”AT&F&E2E0T\r”                  # Reset to factory defaults
                                                 # Reliable mode
                                                 # Echo off
        ignore ”0\r” or ”OK\r\n” timeout 2       # Ignore modem response.
        send ”AT&E12&E14\r”                      # Disable pacing
                                                 # Disable data compression
        expect ”0\r” or ”OK\r\n” timeout 2       # Confirm commands successful.
        send ”AT&SF1&S0S9=1\r”                   # DSR independent of CD
                                                 # Force DSR on.
                                                 # CD respond time=100ms
        expect ”0\r” or ”OK\r\n” timeout 2       # Confirm commands successful.
        send ”ATV0S0=0\r”                        # Numeric response code
                                                 # Auto–Answer off
        expect ”0\r” or ”OK\r\n” timeout 2       # Confirm commands successful.
        done

connect:    send ”ATDT%N\r”                      # Tone dialing command.
                                                 # %N from Call Home setup.
                                                 # Expect a connection response.
        expect ”33\r” or ”31\r” or ”28\r” or ”26\r” or ”24\r” or ”21\r” or
”19\r” or ”13\r” or ”12\r” or ”1\r” busy ”7\r”
        timeout 60
        done

retry:      send ”A/”                            # Repeat the previous command.
                                                 # Expect a connection response.
        expect ”33\r” or ”31\r” or ”28\r” or ”26\r” or ”24\r” or ”21\r” or
”19\r” or ”13\r” or ”12\r” or ”1\r” busy ”7\r”
        timeout 60
        done

disconnect:
        delay 2                                  # Separate from previous data.
```

```
        send "+++"                          # Assure command mode.
        delay 2                             # Allow mode switching delay.
        send "ATH0T\r"                      # Set modem switch–hook down
                                            #  (i.e., hang up).
        ignore "0\r" or "OK\r" timeout 2    # Ignore modem response.
        send "ATE0Q1\r"                     # Initialize modem: Echo OFF,
                                            #  Disable responses.
        ignore "0\r" timeout 1
        done

condin:     send "AT&F&E2E0T\r"             Reset to factory defaults.
                                            # Reliable mode
                                            # Echo off
        ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
        send "AT&E12&E14\r"                 # Disable pacing
                                            # Disable data compression
        expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful
        send "AT&SF1&S0S9=1\r"              # DSR independent of CD.
                                            # Force DSR on.
                                            # CD respond time=100ms
        expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful.
        send "ATV0S0=2\r"                   # Numberic response code
                                            # Answer on 2nd ring
        expect "0\r" timeout 2              # Confirm commands successful.
        done

waitcall:   ignore "2\r" timeout 1          # Ignore first ring.
        expect "2\r" timeout 10             # Pickup 2nd ring or timeout
                                            # Expect a connection response.
        expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
        timeout 60
        done

page:       send "ATDT%N,,,,%R;\r"          # %N = pager call center number
                                            # Add enough commas to wait for
                                            #  time to enter paging number.
                                            # %R = paging number
        expect "0\r" timeout 60             # Confirm successful command.
        delay 2                             # Wait before hanging up.
        send "ATH0\r"                       # Hang up.
        expect "0\r" timeout 2              # Confirm successful command.
        done

ripo:       send "AT&F&E2E0T\r"             # Reset to factory defaults.
                                            # Reliable mode
                                            # Echo off
        ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
        send "AT&E12&E14\r"                 # Disable pacing
                                            # Disable data compression
        expect "0\r" or "OK\r\n" timeout 2  # Confirm successful command.
        send "AT&SF1&S0S9=1\r"              # DSR independent of CD.
                                            # Force DSR on.
                                            # CD respond time=100ms
        expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful.
        send "ATV0S0=0\r"                   # Numeric response code
                                            # Auto Answer OFF
        expect "0\r" timeout 2              # Confirm commands successful.
        done                                #

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

Sample File modem_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.
#
# * Trademark of Hayes Microcomputer Products, Inc.
#
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# 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
DefaultTO 10
CallDelay 120
#  AT  Attention Code                  ,   Inserts delay in dialing commands
# Z0  Reset. Restore Profile 0        Q0   Turn on responses
#  E0  Turn echo off                  Q1   Turn off responses
# V0  Use numeric responses           S0=0 Automatic answer inhibit
# +++  Escape to command mode         S0=2 Answer on second ring
#  H0  Hang–up                        X0=0 Limit modem response codes
#                                     T =  Tone mode.  When used as T\r, it is a
#                                     no op to maintain program synchronization
#                                     when modem may/will echo the commands.
#
#  %N  Call–Out phone number    %P   Paging phone number
#  %S  Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses.  Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (”).

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

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

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

```
 timeout 60
        done

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

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

disconnect:
        delay 2                                # Separate from previous data.
        send ”+++”                             # Assure command mode.
        delay 2                                # Allow mode switching delay.
        send ”ATH0T\r”                         # Set modem switch–hook down
                                               #  (i.e., hang up).
        ignore ”0\r” or ”OK\r” timeout 2       # Ignore modem response.
        send ”ATE0Q1\r”                        # Initialize modem: Echo OFF,
                                               #  Disable responses.
        ignore ”0\r” timeout 1
        done

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

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

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

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

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

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

Sample File modem_f.cfg

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

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

condout:    send ”AT&FQ0T\r”                # Reset to factory defaults.
          ignore ”0\r” or ”OK\r\n” timeout 2 # Ignore modem response.
           send ”ATE0T\r”                   # Initialize modem: Echo OFF,
          expect ”0\r” or ”OK\r\n” timeout 2 #  Enable responses (Numeric),
```

```
        send ”ATQ0V0X0T\r”                  #  Limit response codes.
        expect ”0\r” timeout 2              # Confirm commands successful.
        send ”ATS0=0\r”                     # Set AutoAnswer OFF
        expect ”0\r” timeout 2              # Confirm command successful.
        send ”AT&C1&D2\r”                   # Detect carrier and DTR.
        expect ”0\r” timeout 2              # Confirm command successful.
        done

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

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

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

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

disconnect:
        delay 2                             # Separate from previous data.
        send ”+++”                          # Assure command mode.
        delay 2                             # Allow mode switching delay.
        send ”ATH0T\r”                      # Set modem switch–hook down
                                            #  (i.e., hang up).
        ignore ”0\r” or ”OK\r” timeout 2    # Ignore modem response.
        send ”ATE0Q1\r”                     # Initialize modem: Echo OFF,
                                            #  Disable responses.
        ignore ”0\r” timeout 1
        done

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

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

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

                                            # Confirm successful command.
```

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

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

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

Sample File modem_f0.cfg

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

ICDelay 1
DefaultTO 10
CallDelay 120
#  AT  Attention Code                   ,  Inserts delay in dialing commands
# &F0  Reset. Restore profile 0      Q0   Turn on responses
#  E0  Turn echo off                 Q1   Turn off responses
#  V0  Use numeric responses         S0=0 Automatic answer inhibit
# +++  Escape to command mode        S0=2 Answer on second ring
#  H0  Hang–up                       X0=0 Limit modem response codes
#                                    T =  Tone mode.  When used as T\r, it is a
#                          no op to maintain program synchronization
#                                    when modem may/will echo the commands.
#
```

```
# &C1  Detect CD              &D2  Respond to DTR (often the default)
# &R1  Ignore RTS (CTS)
#
#  %N  Call–Out phone number    %P   Paging phone number
#  %S  Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses.  Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (”).

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

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

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

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

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

disconnect:
        delay 2                                # Separate from previous data.
        send ”+++”                             # Assure command mode.
        delay 2                                # Allow mode switching delay.
        send ”ATH0T\r”                         # Set modem switch–hook down
                                               #  (i.e., hang up).
        ignore ”0\r” or ”OK\r” timeout 2       # Ignore modem response.
        send ”ATE0Q1\r”                        # Initialize modem: Echo OFF,
                                               #  Disable responses.
        ignore ”0\r” timeout 1
        done

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

```
                                        #  Ignore RTS.
        expect ”0\r” timeout 2          # Confirm command successful.
        done

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

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

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

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

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

Sample File modem_f1.cfg

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

```
#
#
# If the modem has configuration switches, they should be set to the
# factory default settings.

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

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

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

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

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

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

disconnect:
        delay 2                                # Separate from previous data.
        send "+++"                             # Assure command mode.
```

```
        delay 2                                 # Allow mode switching delay.
        send "ATH0T\r"                          # Set modem switch–hook down
                                                #  (i.e., hang up).
        ignore "0\r" or "OK\r" timeout 2        # Ignore modem response.
        send "ATE0Q1\r"                         # Initialize modem: Echo OFF,
                                                #  Disable responses.
        ignore "0\r" timeout 1
        done

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

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

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

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

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

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

Sample File modem_m1.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP modem_m1
#
# FUNCTIONS: Modem configuration file specifically for IBM 7857–017 modem with
#  Auto–Reliable feature.  This feature must be turned off for Catcher calls.
#  This example uses the AT&F reset command to choose the factory defaults.
#
#  To allow dial commands for digital pagers, it is necessary to reduce
#  the number of characters in the dial command.  Each comma (delay) has
#  been set to 6 seconds (S8=6) for that reason.
#
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#

ICDelay 1
DefaultTO 10
CallDelay 120
#
#  %N  Call–Out phone number    %R   Return phone number
#
#
# PROGRAMMING NOTE: No blanks between double quote marks (”).

condout:    send ”AT&F*E0E0\r”                  # Reset to factory defaults.
                                                # *E0=data compression disabled
                                                # E0=echo disabled
        ignore ”0\r” or ”OK\r\n” timeout 2      # Ignore modem response.
        send ”AT#F0*Q2S8=6\r”                   # Trellis modulation disabled
                                                # Retrain with adaptive rate
                                                # Set ,=6second
        expect ”0\r” or ”OK\r\n” timeout 2      # Confirm commands successful
        send ”ATV0X0S0=0\r”                     # Numeric response code
                                                # AT compatible messages
                                        #       Auto–Answer disabled
        expect ”0\r” or ”OK\r\n” timeout 2      # Confirm commands successful.
        done

connect:    send ”ATDT%N\r”                     # Tone dialing command.
                                                # %N from Call Home setup.
        expect ”1\r” busy ”7\r” timeout 60      # Expect a connection response.
        done

retry:      send ”A/”                   #       Repeat the previous command.
        expect ”1\r” busy ”7\r” timeout 60      # Expect a connection response.
        done

disconnect:
        delay 2                                 # Separate from previous data.
        send ”+++”                              # Assure command mode.
        delay 2                                 # Allow mode switching delay.
        send ”ATH0\r”                           # Set modem switch–hook down
                                                #  (i.e., hang up).
        ignore ”0\r” or ”OK\r” timeout 2        # Ignore modem response.
        send ”ATE0Q1\r”                         # Initialize modem: Echo OFF,
                                                #  Disable responses.
        ignore ”0\r” timeout 1
        done
```

```
condin:     send "AT&F*E0E0\r"                  # Reset to factory defaults.
                                                # *E0=data compression disabled
                                                # E0=echo disabled
            ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
            send "AT#F0*Q2\r"                   # Trellis modulation disabled
                                                # Retrain with adaptive rate
            expect "0\r" or "OK\r\n" timeout 2  # Confirm commands successful
            send "ATV0X0S0=2\r"                 # Numeric response code
                                                # AT compatible messages
                                                # Answer on 2nd ring
            expect "0\r" timeout 2              # Confirm commands successful.
            done

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

page:       send "ATD%N,%R\r"                   # %N = pager call center number
                                                # commas=6sec wait time to
                                                #   enter paging number.
                                                # %R = return number
            expect "0\r" or "3\r" timeout 30    # Confirm successful command.
            delay 2                             # Wait before hanging up.
            send "+++"                          # Assure command mode.
            delay 2                             # Allow mode switching delay.
            send "ATH0\r"                       # Hang up.
            expect "0\r" timeout 2              # Confirm successful command.
            done

ripo:       send "AT&F*E0E0\r"                  # Reset to factory defaults.
                                                # *E0=data compression disabled
                                                # E0=echo disabled
            ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
            send "AT#F0*Q2\r"                   # Trellis modulation disabled
                                                # Retrain with adaptive rate
            expect "0\r" or "OK\r\n" timeout 2  # Confirm successful command.
            send "ATV0X0S0=0\r"                 # Numeric response code
                                                # AT compatible messages
                                                # Auto–Answer disabled
            expect "0\r" timeout 2              # Confirm commands successful.
            done                                #

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

Sample File modem_z.cfg

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

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

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

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

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

```
        done

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

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

disconnect:
        delay 2                         # Separate from previous data.
        send "+++"                      # Assure command mode.
        delay 2                         # Allow mode switching delay.
        send "ATH0T\r"                  # Set modem switch–hook down
                                        #  (i.e., hang up).
        ignore "0\r" or "OK\r" timeout 2    # Ignore modem response.
        send "ATE0Q1\r"                 # Initialize modem: Echo OFF,
                                        #  Disable responses.
        ignore "0\r" timeout 1
        done

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

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

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

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

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

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

Sample File modem_z0.cfg

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

ICDelay 1
DefaultTO 10
CallDelay 120
#  AT  Attention Code          ,   Inserts delay in dialing commands
#  Z0  Reset. Restore Profile 0 Q0   Turn on responses
#  E0  Turn echo off           Q1   Turn off responses
#  V0  Use numeric responses    S0=0 Automatic answer inhibit
# +++  Escape to command mode   S0=2 Answer on second ring
#  H0  Hang–up                 X0=0 Limit modem response codes
#                         T =  Tone mode.  When used as T\r, it is a
#                            no op to maintain program synchronization
#                            when modem may/will echo the commands.
#
#  %N  Call–Out phone number    %P   Paging phone number
#  %S  Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses.  Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (”).

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

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

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

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

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

disconnect:
          delay 2                              # Separate from previous data.
          send ”+++”                           # Assure command mode.
          delay 2                              # Allow mode switching delay.
          send ”ATH0T\r”                       # Set modem switch–hook down
                                               #  (i.e., hang up).
          ignore ”0\r” or ”OK\r” timeout 2     # Ignore modem response.
          send ”ATE0Q1\r”                      # Initialize modem: Echo OFF,
                                               #  Disable responses.
          ignore ”0\r” timeout 1
          done

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

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

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

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

ripo:       send ”ATZ0Q0T\r”                   # Reset modem. Select profile 0
          ignore ”0\r” or ”OK\r\n” timeout 2    # Ignore modem response.
          send ”ATE0T\r”                       # Initialize modem: Echo OFF,
          expect ”0\r” or ”OK\r\n” timeout 2    #  Enable responses (Numeric),
```

```
        send "ATQ0V0X0T\r"              #  Limit response codes.
        expect "0\r" timeout 2          # Confirm commands successful.
        send "ATS0=0\r"                 # Set AutoAnswer OFF
        expect "0\r" timeout 2          # Confirm command successful.
        done                            # RI Power On enabled.

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

Sample File modem_f.cfg

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

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

condout:    send "AT&FQ0T\r"                    # Reset to factory defaults.
```

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

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

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

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

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

disconnect:
        delay 2                                  # Separate from previous data.
        send "+++"                               # Assure command mode.
        delay 2                                  # Allow mode switching delay.
        send "ATH0T\r"                           # Set modem switch–hook down
                                                 #  (i.e., hang up).
        ignore "0\r" or "OK\r" timeout 2         # Ignore modem response.
        send "ATE0Q1\r"                          # Initialize modem: Echo OFF,
                                                 #  Disable responses.
        ignore "0\r" timeout 1
        done

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

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

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

```
                                        # %R = paging number

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



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

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

Sample File modem_f0.cfg

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

ICDelay 1
DefaultTO 10
CallDelay 120
#  AT  Attention Code           ,   Inserts delay in dialing commands
# &F0  Reset. Restore profile 0 Q0   Turn on responses
#  E0  Turn echo off           Q1   Turn off responses
#  V0  Use numeric responses   S0=0 Automatic answer inhibit
# +++  Escape to command mode   S0=2 Answer on second ring
```

```
#  H0  Hang–up                X0=0 Limit modem response codes
#                          T =  Tone mode.  When used as T\r, it is a
#                             no op to maintain program synchronization
#                             when modem may/will echo the commands.
#
# &C1  Detect CD              &D2  Respond to DTR (often the default)
# &R1  Ignore RTS (CTS)
#
#  %N  Call–Out phone number    %P   Paging phone number
#  %S  Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses.  Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (”).

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

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

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

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

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

disconnect:
        delay 2                                # Separate from previous data.
        send ”+++”                             # Assure command mode.
        delay 2                                # Allow mode switching delay.
        send ”ATH0T\r”                         # Set modem switch–hook down
                                               #  (i.e., hang up).
        ignore ”0\r” or ”OK\r” timeout 2       # Ignore modem response.
        send ”ATE0Q1\r”                        # Initialize modem: Echo OFF,
                                               #  Disable responses.
        ignore ”0\r” timeout 1
        done

condin:     send ”AT&F0Q0T\r”                  # Reset modem. Select profile 0
        ignore ”0\r” or ”OK\r\n” timeout 2     # Ignore modem response.
        send ”ATE0T\r”                         # Initialize modem: Echo OFF,
        expect ”0\r” or ”OK\r\n” timeout 2     #  Enable responses (Numeric),
```

```
        send ”ATQ0V0X0T\r”              #  Limit response codes.
        expect ”0\r” timeout 2          # Confirm commands successful.
        send ”ATS0=2\r”                 # Set AutoAnswer ON
        expect ”0\r” timeout 2          # Confirm command successful.
        send ”AT&C1&D2&R1\r”            # Detect carrier and DTR,
                                        #  Ignore RTS.
        expect ”0\r” timeout 2          # Confirm command successful.
        done

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

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

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

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

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

Sample File modem_f1.cfg

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

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

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

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

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

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

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

disconnect:
         delay 2                               # Separate from previous data.
         send ”+++”                            # Assure command mode.
         delay 2                               # Allow mode switching delay.
         send ”ATH0T\r”                        # Set modem switch–hook down
                                               #  (i.e., hang up).
         ignore ”0\r” or ”OK\r” timeout 2      # Ignore modem response.
         send ”ATE0Q1\r”                       # Initialize modem: Echo OFF,
                                               #  Disable responses.
         ignore ”0\r” timeout 1
         done

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

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

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

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

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

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

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