RS/6000 7025 F50 Series



Service Guide

SA38-0541-01

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Contents

Communications Statements vii
Federal Communications Commission (FCC) Statement vii
International Electrotechnical Commission (IEC) Statement vii
United Kingdom Telecommunications Safety Requirements vii
European Union (EU) Statement viii
Avis de conformité aux normes du ministère des Communications du Canada . viii
Canadian Department of Communications Compliance Statement viii
VCCI Statement viii
Radio Protection for Germany ix
European Union (EU) Statement x
VCCI Statement x

Safety Notices xi
Electrical Safety xi
Laser Safety Information xiii

About This Book xv
ISO 9000 xv
Related Publications xv

Chapter 1. Reference Information 1-1
System Unit Locations 1-1
System Data Flow 1-8
Typical Boot Sequence for RS/6000 7025 F50 Series 1-9
Specifications 1-10
Power Cables 1-12
Service Inspection Guide 1-13

Chapter 2. Maintenance Analysis Procedures (MAPs) 2-1
Entry MAP 2-1
MAP 1020: Problem Determination 2-6
MAP 1520: Power 2-12
MAP 1540: Minimum Configuration 2-17
SSA Maintenance Analysis Procedures (MAPs) 2-35
MAP 2010: SSA Hot-Swap Disk Drive–Start 2-37

Chapter 3. Error Code to FRU Index 3-1
Firmware/POST Error Codes 3-2
Bus SRN to FRU Reference Table 3-27
Checkpoints 3-29
Location Codes 3-46

Physical Location Codes 3-46
AIX and Physical Location Code Reference Table 3-48
AIX Location Codes 3-54
SSA Location Code Format 3-58
SSA Loops and Links 3-59
SSA Service Aids 3-64
Service Aid Error Codes 3-83
Using the Service Aids for SSA-Link Problem Determination 3-84
Finding the Physical Location of a Device 3-90
Microcode Maintenance 3-92
Vital Product Data (VPD) 3-93

Chapter 4. Loading the System Diagnostics 4-1

Chapter 5. System Management Services 5-1
Graphical System Management Services 5-1
Config 5-5
MultiBoot: 5-7
Utilities 5-10
Password 5-12
Error Log 5-16
RIPL 5-17
SCSI ID 5-21
Update 5-22
Text-Based System Management Services 5-24

Chapter 6. Removal and Replacement Procedures 6-1
Handling Static–Sensitive Devices 6-2
Covers 6-3
Power Supply 6-15
CD-ROM Drive, Tape Drive, Diskette Drive 6-19
Backplane 6-20
Adapters 6-22
Memory Cards 6-26
Memory Module 6-29
I/O Planar 6-31
Processor Card 6-35
Service Processor 6-37
Battery 6-38
Fans 6-42
Operator Panel Display 6-44
Operator Panel Control Assembly 6-45
Serial/Parallel Card 6-46

Chapter 7. Parts Information 7-1
Power Cables 7-7

Appendix A. SSA Problem Determination Procedures A-1
Disk Drive Module Power-On Self-Tests (POSTs) A-1
Adapter Power-On Self-Tests (POSTs) A-2
Service Request Numbers (SRNs) A-3
SSA Loop Configurations That Are Not Valid A-15

Appendix B. Service Processor Menus B-1
Service Processor Menus B-3
General User Menus B-4
Privileged User Menus B-6
Service Processor Functions and Features B-24

Appendix C. Service Processor Setup and Test C-1
Testing the Setup C-2

Appendix D. Modem Configurations D-1
Sample Modem Configuration Files D-1
Configuration File Selection D-2
Seamless Transfer of a Modem Session D-6
Modem Configuration Samples D-9

Appendix E. Service Processor Operational Phases E-1

Index X-1

Reader's Comments — We'd Like to Hear From You X-3

Communications Statements

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

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

International Electrotechnical Commission (IEC) Statement

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

United Kingdom Telecommunications Safety Requirements

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

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

other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Neither the provider nor the manufacturer can accept responsibility for any failure to satisfy the protection requirements resulting from a non–recommended modification of the product, including the fitting of option cards not supplied by the manufacturer.

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

This Class A digital apparatus meets the requirements of the Canadian Interference–Causing Equipment Regulations.

VCCI Statement

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

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

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

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

Read the instructions for correct handling.

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

Note: If any of the following Feature Codes are installed:
3615, 4356, 4357, 4358, 4359, 6218, 8130, or 8134,
or if a configuration using more than one SysKonnect FDDI adapter (Feature Codes 2741, 2742, or 2743) where any one of them is Feature Code 2743 (SysKonnect SK-NET FDDI-UP SAS PCI), the following statement applies:

European Union (EU) Statement

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

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

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

VCCI Statement

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

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Safety Notices

A *danger* notice indicates the presence of a hazard that has the potential of causing death or serious personal injury.

A *caution* notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.

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.

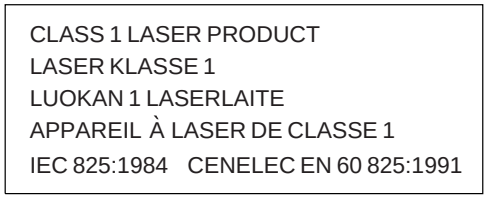
CAUTION:
This product is equipped with a three–wire power cable and plug for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.

DANGER

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

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.

About This Book

This book provides maintenance information that is specific to the system unit, adapters, and attached devices that do not have their own service information. It also contains Maintenance Analysis Procedures (MAPs) that are not common to other systems.

MAPs that are common to all systems are contained in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

This book is used by the service technician to repair system failures. This book assumes that the service technician has had training on the system unit.

ISO 9000

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

Related Publications

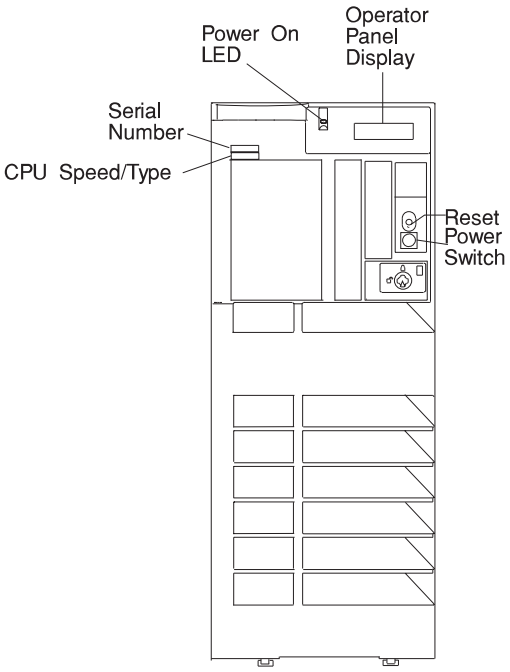
The following publications are available for purchase:

- The *IBM RS/6000 7025 F50 Series User's Guide* contains information to help users set up, install options, configure, modify, and solve minor problems.
- The *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* contains common diagnostic procedures, error codes, service request numbers, and failing function codes. This manual is intended for trained service technicians.
- The *IBM RS/6000 Adapter, Device, and Cable Information for Multiple Bus Systems* contains information about adapters, external devices, and cabling. This manual is intended to supplement information found in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.
- The *Site and Hardware Planning Information* contains information to help you plan your installation.

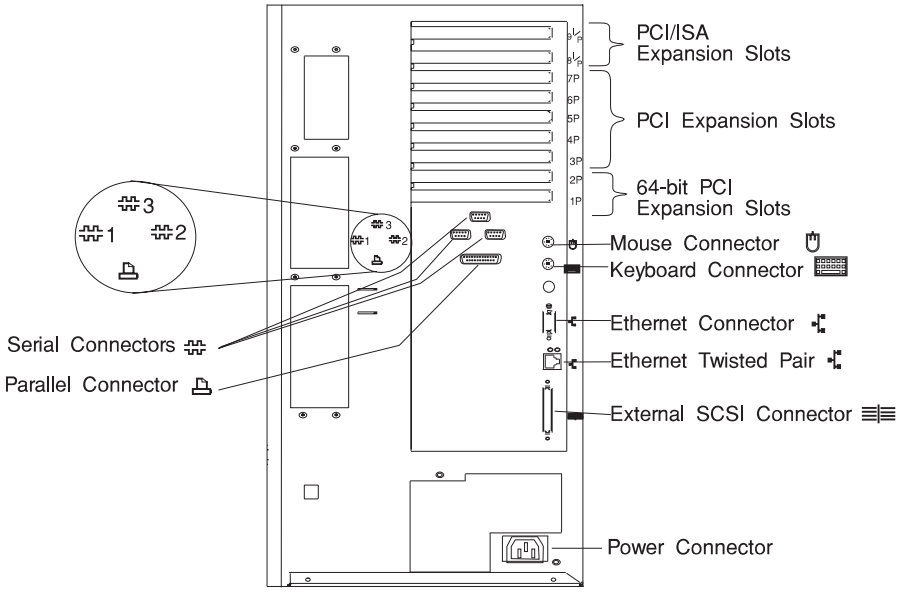
Chapter 1. Reference Information

System Unit Locations

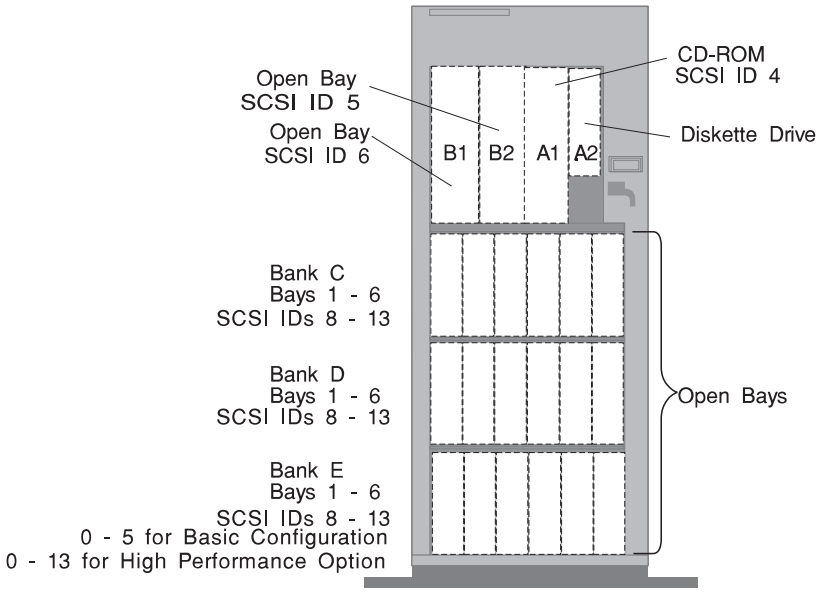
Front View with Media Door Off



Rear View

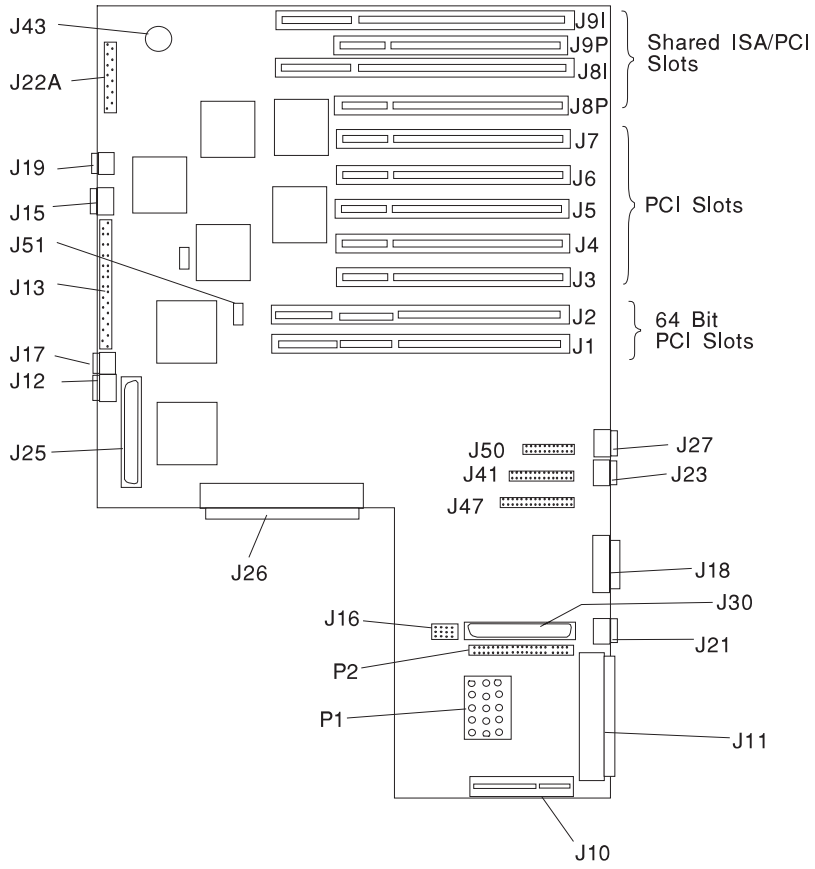

PCI/ISA
Expansion Slots
PCI Expansion Slots
64-bit PCI
Expansion Slots
7P
6P
5P
4P
3P
2P
1P
Mouse Connector
Keyboard Connector
Ethernet Connector
Ethernet Twisted Pair
External SCSI Connector
Power Connector
Serial Connectors
Parallel Connector
3
1
2

SCSI IDs and Bay Locations



Note: The SCSI bus ID's in Bays A1, B1 and B2 are the recommended values. Features installed at the manufacturing site correspond to these IDs. Field installations may not comply with these recommendations.

I/O Planar Locations



J1, J2 64-bit PCI connectors

J3, J4, J5, J6, J7, J8P, J9P 32-bit PCI connectors

J8I, J9I ISA connectors

J10 Service Processor

J11 External SCSI connector

J12 Fan #1 (Bottom Fan)

J13 Diskette Drive connector

J15 Fan #3

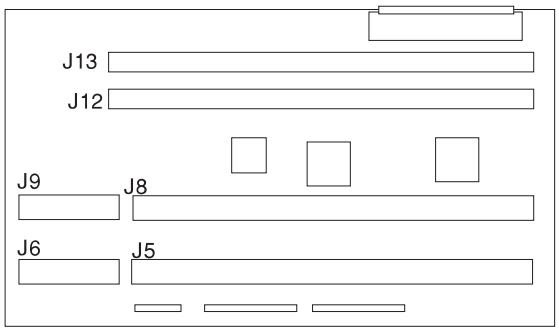
J16 SCSI Security Jumper

J17 Fan #2

J18 Ethernet connector (thick)

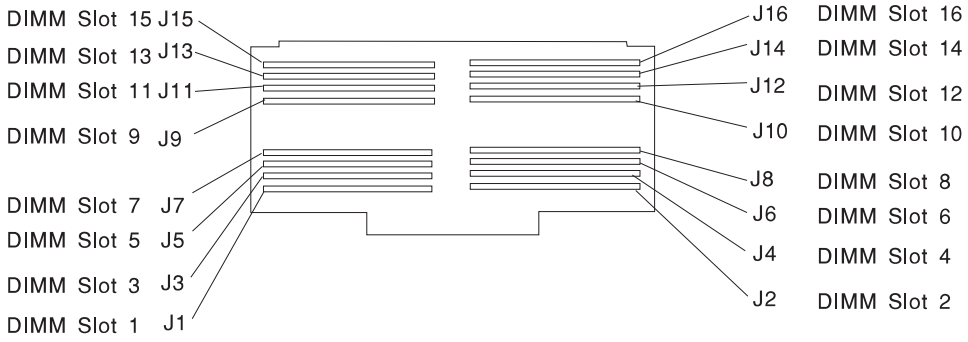
J19	Fan #4 (Top Fan)
J21	Ethernet connector (twisted pair)
J22A	Operator Panel
J23	Keyboard connector
J25	Internal SCSI connector (port 1)
J26	System Card connector
J27	Mouse connector
J30	Internal SCSI connector (port 2)
J41	Serial connector (serial port 1 and 2)
J43	Battery Socket
J47	Parallel connector
J50	Serial connector (serial port 3)
P1, P2	Power Supply

System Card Locations

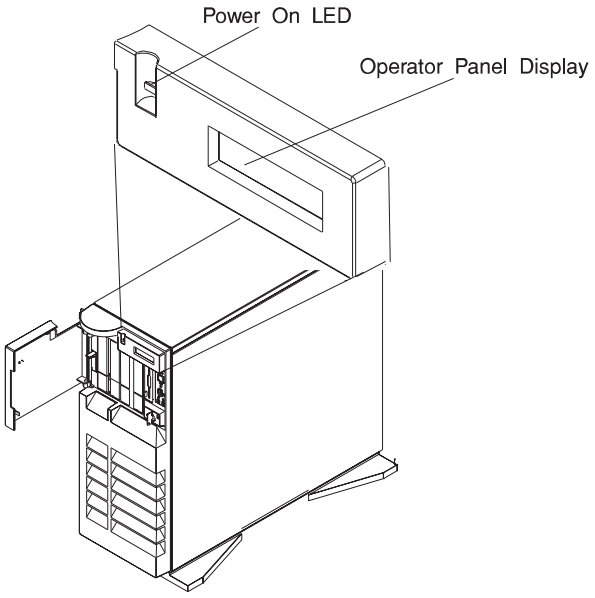


J5, J6	Processor card connector #2
J8, J9	Processor card connector #1
J12	Memory card connector #1
J13	Memory card connector #2

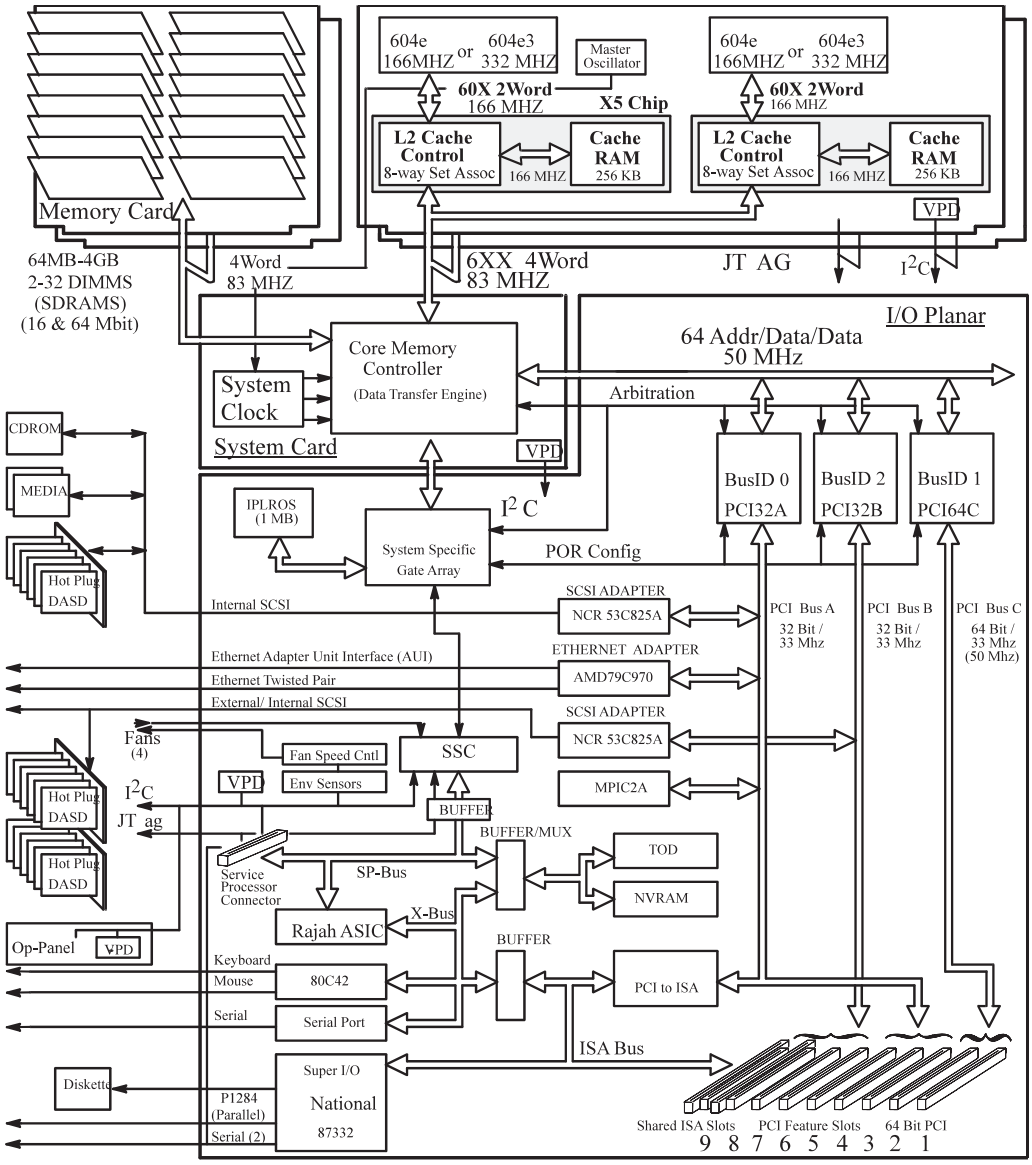
Memory Card Locations



Operator Panel



System Data Flow



Typical Boot Sequence for RS/6000 7025 F50 Series

After the A/C power is turned on, the System Support Controller (SSC) startup begins, and releases reset to the Service Processor. If the SSC cannot communicate with the Service Processor, the LCD displays 4BA00000. If the Service Processor is not present, the LCD displays 4BA00001.

1. Service Processor Self Test
   - Service Processor card performs self test and NVRAM initialization.
   - LCD Code range is E000 - E07F.
   - LCD code is "OK" when complete.
2. Service Processor in Standby Mode
   - You can enter the Service Processor menus whenever the LCD code is "OK", "STBY", or has an eight digit error code on the LCD display by pressing the enter key on an ASCII terminal connected to serial port 1.
3. Built-In-Self-Test (BIST)
   - The Service Processor initiates Built-In-Self-Test (BIST) on the Central Electronics Complex (CEC) chips when the POWER Button is pressed.
   - The VPD data is read and the CRC is checked.
   - The CPU compatibility test is run.
   - LCD Code range is E0A0 - E0E1.
4. System Initialization
   - System firmware begins to execute and initializes system registers after LCD code E0E1.
   - LCD Code range is E1XX - E2XX.
5. Memory Test
   - The system firmware tests the system memory and identifies failing memory cards and memory module locations.
   - LCD Code range is E3XX.
6. Device Configuration and Test
   - System firmware checks to see what devices are in the system and performs a simple test on them.
   - The system firmware displays the device name or device icon being tested. After the keyboard name or icon appears, the user can enter the Systems Management Services menu by hitting the "1" key (if ASCII terminal) or the "F1" key (if Graphics terminal).
   - The user can also enter one of the following:
     – "5" or "F5" to start the Stand-alone Diagnostics (CD or Tape).
     – "6" or "F6" to start the On-line Diagnostics (Hard Disk)

7. IPL Boot Code
    - The system firmware attempts to boot from the devices listed in the Boot List.
    - LCD Code range is E1XX.
8. Boot Image Execution
    - Once a boot image is located on a device in the Boot List, the system firmware code hands off control to the AIX Boot code.
        - LCD Code E105 for Normal Boot or
        - E15B for Service Mode Boot.
    - The AIX Boot code indicates LCD progress codes in the range from 05XX to 09XX.
9. AIX Boot Complete
    - The AIX login prompt appears on the main console.

Specifications

The mechanical packaging, cooling, power supply, and environmental requirements for the server is shown in the following:

Dimensions

Height - 620 mm (24.3 inches)

Depth - 695 mm (27.3 inches)

Width - 245 mm (9.6 inches)

Weight

Configuration dependent

Operating Environment - Class B

Temperature - 16° to 32°C (60° to 90°F)

Humidity - 8% to 80% noncondensing

Maximum Altitude - 2135 m (7000 feet)

Power Source Loading

Typical EMC Configuration - 0.28 kVA

Maximum - 0.65 kVA

Power Requirements

Typical - 154 watts

Maximum - 450 watts

Power Factor

0.8 - 0.98

Operating Voltage

100 to 127V ac; 50 to 60 Hz

200 to 240V ac; 50 to 60 Hz

Heat Output (Maximum)

Typical - 800 BTU/hr

Maximum - 2300 BTU/hr

Acoustics

6.0 Bels operating

5.5 Bels idle

Power Cables

To avoid electrical shock, a power cable with a grounded attachment plug is provided. Use only properly grounded outlets.

Power cables used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). These power cords consist of:

- Electrical cables, Type SVT or SJT.
- Attachment plugs complying with National Electrical Manufacturers Association (NEMA) 5-15P. That is:

"For 115 V operation, use a UL listed cable set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cord a maximum of 15 feet in length and a parallel blade, grounding type attachment plug rated at 15 A, 125 V."

"For 230 V operation in the United States use a UL listed cable set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cable a maximum of 15 feet in length, and a tandem blade, grounding type attachment plug rated at 15 A, 250 V."

- Appliance couplers complying with International Electrotechnical Commission (IEC) Standard 320, Sheet C13.

Power cables used in other countries consist of the following:

- Electrical cables, Type HD21.
- Attachment plugs approved by the appropriate testing organization for the specific countries where they are used.

"For units set at 230 V (outside of U.S.): use a cable set consisting of a minimum 18 AWG cable and grounding type attachment plug rated 15 A, 250 V. The cable set should have the appropriate safety approvals for the country in which the equipment will be installed and should be marked HAR'."

Refer to Chapter 7, “ Parts Information” on page 7-1 to find the power cables that are available.

Service Inspection Guide

Perform a service inspection on the system when:

- The system is inspected for a maintenance agreement.
- Service is requested and service has not recently been performed.
- An alterations and attachments review is performed.
- Changes have been made to the equipment that may affect the safe operation of the equipment.
- External devices with their own power cables have those cables attached.

If the inspection indicates an unacceptable safety condition, the condition must be corrected before anyone can service the machine.

Note: The correction of any unsafe condition is the responsibility of the owner of the system.

Perform the following checks:

1. Check the covers for sharp edges and for damage or alterations that expose the internal parts of the system unit.
2. Check the covers for proper fit to the system unit. They should be in place and secure.
3. Gently rock the system unit from side to side to determine if it is steady.
4. Set the power switch of the system unit to Off.
5. Remove the covers.
6. Check for alterations or attachments. If there are any, check for obvious safety hazards such as broken wires, sharp edges, or broken insulation.
7. Check the internal cables for damage.
8. Check for dirt, water, and any other contamination within the system unit.
9. Check the voltage label on the back of the system unit to ensure that it matches the voltage at the outlet.
10. Check the external power cable for damage.
11. With the external power cable connected to the system unit, check for 0.1 ohm or less resistance between the ground lug on the external power cable plug and the metal frame.
12. Perform the following checks on each device that has its own power cables:
    a. Check for damage to the power cord.

b. Check for the correct grounded power cable.

c. With the external power cable connected to the device, check for 0.1 ohm or less resistance between the ground lug on the external power cable the metal frame of the device.

13. Install the covers.

Chapter 2. Maintenance Analysis Procedures (MAPs)

Entry MAP

Use the following table to determine your starting point.

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 SMIT are only available when diagnostics are run from the hard drive.

Notes:

1. If more than eight digits are displayed in the operator panel, use only the first eight digits to find the error in the tables. The digits that display beyond the first eight digits are location codes that can assist you in diagnosing the problem. See “Location Codes” on page 3-46.
2. Licensed programs frequently rely on network configuration, and system information stored on the VPD on the operator panel control assembly (connector U2). If the MAPs indicate that the Operator Panel Control Assembly should be replaced, swap the VPD from the old operator panel to the new one. If the old VPD module has to be replaced call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys for licensed programs may be required.
3. If a network adapter, or the I/O planar is replaced, the network administrator must be notified so that the client IP addresses used by the server can be changed. In addition, the operating system configuration of the network controller may need to be changed in order to enable system startup. Also check to ensure that any client or server that addresses this system is updated.

Symptom	Action
Service Actions	
You have parts to exchange or a corrective action to perform.	1. Go to the *Removal and Replacement Procedures*. 2. Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.
You need to verify that a part exchange or corrective action corrected the problem.	Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Symptom	Action
You need to verify correct system operation. Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.	
Symptom Analysis	
You have OK displayed	The Service Processor (SP) is ready. The system is waiting for power on.
You have STBY displayed	The Service Processor (SP) is ready. The system was shutdown by the operating system and is still powered on. This condition can be requested by a privileged system user with no faults. See SP error log for possible operating system fault indications.
You do not have a determined symptom.	Go to “MAP 1020: Problem Determination” on page 2-6.
You have an 8-digit error code displayed.	Record the error code. Go to Chapter 3, “Error Code to FRU Index” on page 3-1.
You have an SRN.	Go to the Fast Path MAP in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.
The system POST indicators are displayed on the system console, the system pauses and then restarts. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	Go to “E1xx Code Boot Problems” on page 3-44.
The system stops and POST indicators are displayed on the system console. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	1. Use MAP 1540 to isolate the problem.
The system stops and the message "STARTING SOFTWARE PLEASE WAIT..." is displayed on ASCII terminal, the boot indicator () is displayed on a graphics terminal.	Go to “Checkpoints” on page 3-29.

Symptom	Action
The system does not respond to the password being entered or the system login prompt is displayed when booting in service mode.	Verify that the password is being entered from the ASCII terminal or keyboard defined as the system console. If so, then the keyboard or its controller may be faulty. 1. If entering the password from the keyboard which is attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O planar. (See notes on 2-1.) 2. If entering the password from a keyboard which is attached to a ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O planar if these procedures do not reveal a problem.
Nothing is displayed on the system console, and the operator panel is blank.	1. If using a graphic display, go to the *Problem Determination Procedures* for the display. 2. If you do not find a problem then replace the display adapter. 3. Go to “MAP 1540: Minimum Configuration” on page 2-17.
All display problems.	1. If using a graphics display, go to the *Problem Determination Procedures* for the display. 2. If you do not find a problem then replace the display adapter. 3. If the problem is with the ASCII terminal: a. Make sure that the ASCII terminal is connected to S1. b. If problems persist, go to the *Problem Determination Procedures* for the terminal. 4. If you do not find a problem then suspect the I/O planar. Go to “MAP 1540: Minimum Configuration” on page 2-17.
888 is displayed in the control panel followed by additional error codes.	Go to the Fast Path MAP in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Symptom	Action
The system stops and a 4-digit number is displayed in the operator panel display.	If the number displayed begins with the character "E0xx" then go to “SP Checkpoints” on page 3-29. or "E1xx-EFFF" then go to “Checkpoints” on page 3-29. For all other numbers record SRN 101-xxx, where **xxx** is the last three digits of the four-digit number displayed in the operator panel, then go to the Fast Path MAP in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*. **Note:** If the operator panel displays 2 sets of numbers, use the bottom set of numbers as the error code.
The power light does not come on, or stay on.	Go to “MAP 1520: Power” on page 2-12.
The operator panel is blank before the system is powered on (operator panel should display OK). No codes are displayed on the operator panel within a few seconds of turning on the system.	Reseat the operator panel cable. If problem not resolved, replace in order: 1. Operator Panel Control Assembly. Remove the VPD module from the old Operator Panel Control Assembly (connector U2) and place in the new one. 2. I/O planar (See notes on 2-1.)
The SMS configuration list or Boot sequence selection menu shows more SCSI devices attached to a controller/adapter than are actually attached.	A device may be set to use the same SCSI bus ID as the control adapter. Note the ID being used by the controller/adapter (this can be checked and/or changed via an SMS utility), and verify that no device attached to the controller is set to use that ID. If settings do not appear to be in conflict: 1. Replace the SCSI cable. 2. Replace the device. 3. Replace the SCSI adapter (or I/O planar if connected to one of the two integrated SCSI controllers on the I/O planar). (See notes on 2-1 if the I/O planar is replaced.) **Note:** In a "Twin-tailed" configuration where there is more than one initiator device (normally another system) attached to the SCSI bus, it may be necessary to change the ID of the SCSI controller or adapter with the System Management Services.
You cannot load diagnostics.	Go to “MAP 1020: Problem Determination” on page 2-6.
You have a problem that does not prevent the system from booting.	Go to the Fast Path MAP in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Symptom	Action
You suspect a cable problem.	See the *IBM RS/6000 Adapter, Device, and Cable Information for Multiple Bus Systems*.
You Cannot Find the Symptom in this Table	
All other problems.	Go to “MAP 1020: Problem Determination” on page 2-6.

MAP 1020: Problem Determination

Purpose of This MAP

Use this MAP to get an error code if you were not provided one by the customer or you are unable to load diagnostics. If you are able to load the diagnostics, go to MAP 0020 in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

The Service Processor may have recorded one or more symptoms in its error log. It is a good idea to examine that error log before proceeding (see Service Processor System Information Menu).

The Service Processor may have been set by the user to monitor server operations and to attempt recoveries. You may wish to disable these actions while you diagnose and service the system. If you disable them, you should make notes of their current settings for restoration before you leave. Following are the settings of your interest.

Surveillance	From the Service Processor Setup Menu, go to the Surveillance Setup Menu and disable surveillance.
Unattended Start	From the Service Processor System Power Control Menu, disable unattended start mode.
Reboot Policy	From the System Power Control Menu, go to the Reboot/Restart Policy Setup Menu and set: 1. Number of reboot attempts to **0** (zero) 2. Use OS-Defined restart policy to **No** 3. Enable supplemental restart policy to **No**.
Call Out	From the Call-In/Call-Out Setup Menu, go to the Serial Port Selection Menu and disable call-out on both serial ports.

Be prepared to record code numbers and use those numbers in the course of analyzing a problem. Go to “Step 1020-1.”

Step 1020-1

The following steps analyze a failure to load the diagnostic programs.

Note: You are asked questions regarding the operator panel display. You are also asked to perform certain actions based on displayed POST indicators. Please be observant of these conditions.

1. Insert the diagnostic CD-ROM into the CD-ROM drive.
2. Turn the power off.
3. Turn the power on.
4. When the keyboard indicator is displayed (the word **keyboard** on an ASCII terminal or the keyboard icon on a graphical display), press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal.

5. Enter any requested passwords.
6. Wait until the diagnostics are loaded or the system appears to stop.
7. Find your symptom in the following table; then follow the instructions given in the Action column.

Symptom	Action
The diskette LED is blinking rapidly, or EIEA or EIEB is displayed on the operator panel.	The flash EPROM data is corrupted. The recovery procedure for the flash EPROM should be executed. See “Firmware Recovery” on page 5-23.
The system stops with a prompt to enter a password.	Enter the password. You are not allowed to continue until a correct password has been entered. When you have entered a valid password go to the beginning of this table and wait for one of the other conditions to occur.
The diagnostics loaded.	Go to MAP 0020 in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.
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 IPL of the diagnostic programs. If this was the case start over at the beginning of this Step. **Note:** Perform the systems shutdown procedure before turning off the system. If you are sure you pressed the correct key in a timely manner, go to “Step 1020-2” on page 2-10.
The system does not respond when the password is entered.	Go to “Step 1020-2” on page 2-10.
The system stopped and a POST indicator is displayed on the system console and an eight-digit error code is not displayed.	If the POST indicator represents: • memory, record error code M0MEM002. • keyboard, record error code M0KBD000. • SCSI, record error code M0CON000. • network, record error code M0NET000. • speaker (audio), record error code M0BT0000. Go to “Step 1020-3” on page 2-10.

Symptom	Action
The system stops and a 4-digit number is displayed in the operator panel display.	If the number displayed begins with the character "E0xx" then go to “SP Checkpoints” on page 3-29. or "E1xx-EFFF" then go to “Checkpoints” on page 3-29. For all other numbers record SRN 101-xxx, where **xxx** is the last three digits of the four-digit number displayed in the operator panel, then go to the Fast Path MAP in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*. **Note:** If the operator panel displays 2 sets of numbers, use the bottom set of numbers as the error code.
All other symptoms.	If you were directed here from the Entry MAP, go to “MAP 1540: Minimum Configuration” on page 2-17. Otherwise, find the symptom in the “Entry MAP” on page 2-1.

Step 1020-2

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
Type 101 keyboard (U.S.). Identify by the size of the Enter key. The Enter key is in only one horizontal row of keys.	Record error code M0KBD001; then go to "Step 1020-3."
Type 102 keyboard (W.T.). Identify by the size of the Enter key. The Enter key extends into two horizontal rows.	Record error code M0KBD002; then go to "Step 1020-3."
Type 106 keyboard. (Identify by the Japanese characters.)	Record error code M0KBD003; then go to "Step 1020-3."
ASCII terminal keyboard	Go to the documentation for this type of ASCII terminal and continue problem determination.

Step 1020-3

Take the following actions:

1. Find the eight-digit error code in Chapter 3, "Error Code to FRU Index" on page 3-1.

   Note: If the eight-digit error code is not listed in Chapter 3, "Error Code to FRU Index," look for it in the following:

   - Any supplemental service manual for the device
   - The diagnostic problem report screen for additional information
   - The Service Hints service aid
   - The CEREADME file (by using the Service Hints service aid).

2. Perform the action listed.

Step 1020-4

1. Turn off, then turn on the system unit.
2. When the keyboard indicator appears, press the F1 key on a directly attached keyboard or the 1 key on an ASCII terminal.
3. When the System Management Services appear, check the error log for any errors.
   - Choose Utilities
   - Choose Error Log
   - If an error is logged, check the time stamp.
   - If the error was logged during the current boot attempt, record it.
   - Look up the error in the Chapter 3, “Error Code to FRU Index” on page 3-1 and do the listed action.
   - If no recent error is logged in the error log, go to “MAP 1540: Minimum Configuration” on page 2-17.

MAP 1520: Power

Note: This is not a start of call MAP. Use this Power MAP only if you have been directed here from a MAP step in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

This procedure is used to locate power problems in system units. If a problem is detected, this procedure helps you isolate the problem to a failing unit.

Observe the following safety notice during service procedures.

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 and 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 on 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.

Step 1520-1

You may be directed to this MAP for several reasons:

1. There is no indication of activity when the start/stop switch is pressed. None of the LEDs light and none of the fans, including the fan in the power supply, start to turn.

   Go to “Step 1520-2.”

2. When the start/stop switch is pressed, the system begins to power on, but the power LED does not stay on.

   Go to “Step 1520-3” on page 2-14.

Step 1520-2

1. Turn the power off.
2. Check that the external power cable to the system unit has continuity.
3. Check that the power outlet has been wired correctly with the correct voltage.
4. Check that the external power cable is plugged into both the system unit and the power outlet.

Did you find a problem?

NO Go to “Step 1520-3” on page 2-14.

YES Correct the problem. Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1520-3

Note: Either the cooling fans, the power supply, the I/O planar, service processor, or the system card is defective.

To test each FRU, exchange the FRUs that have not already been exchanged in the following order.

- Verify that the fan jumper is connected to connector J55.
- Power supply
- I/O planar
- Service Processor
- System card
- Front cooling fans (one at a time)

1. Turn the power off.
2. Unplug the system unit power cable from the wall outlet.
3. Exchange one of the FRUs in the list.
4. Connect the system unit power cable to the wall outlet.
5. Turn the power on.

Does the fan in the power supply turn on and the power LED come on and stay on?

NO Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, go to “Step 1520-4” on page 2-15.

YES Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1520-4

1. Turn the power off.
2. Unplug the system unit power cable from the wall outlet.
3. Record the slot numbers of all the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters.
4. Remove all installed memory cards.
5. Remove the CPU card(s).
6. Unplug the power cables from all the SCSI devices.
7. Unplug all the fans, except the fan in the power supply.
8. Connect the system unit power cable to the wall outlet.
9. Turn the power on.

Does the fan in the power supply turn on and the power LED come on and stay on?

NO Replace the I/O planar. Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

YES Go to “Step 1520-5” on page 2-16.

Step 1520-5

One of the parts that was removed or unplugged is causing the problem. Install or connect the parts in the following order.

1. CPU card(s).
2. Memory cards. (One at a time)
3. SCSI devices, lowest bay to highest bay.
4. PCI cards, lowest slot to highest slot.
5. ISA cards, lowest slot to highest slot.
6. Fans.

Turn the power on after each part is installed or connected. If the system does not power on or the power LED does not stay on, the most recently installed or connected part is causing the failure.

1. Turn the power off.
2. Unplug the system unit power cable from the wall outlet.
3. Install or connect one of the parts in the list.
4. Connect the system unit power cable to the wall outlet.
5. Turn the power on.

Does the fan in the power supply turn on and the power LED come on and stay on?

NO Replace the last part installed.

If the memory card was just installed, remove all of the memory DIMMs. If the system does not come up, replace the memory card.

Re-install the memory DIMMs, one pair at a time, until the problem recurs. Replace the memory DIMM pair that was just installed.

Note: The memory DIMM pair must be installed in slots that are next to each other. For example, install the pair in J1 and J2, not J1 and J3.

Repeat these steps until all the parts have been installed.

If the symptom did not change and all the parts have been replaced, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to “Step 1520-1” on page 2-13 in this MAP and follow the instructions for the new symptom.

YES Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

MAP 1540: Minimum Configuration

Notes:

1. Be sure to unplug the power cable before removing or installing Service Processor, CPU, System Card or I/O planar to avoid damage to them.
2. This MAP assumes that a CD-ROM drive is installed and connected to the integrated SCSI adapter, and a Diagnostics CD-ROM is available.
3. If a power-on password or privileged-access password is installed, you are prompted to enter the password before the diagnostic CD-ROM can load.
4. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).
5. The Service Processor may have recorded one or more symptoms in its error log. It is a good idea to examine that error log before proceeding (see Service Processor System Information Menu).
6. The Service Processor may have been set by the user to monitor server operations and to attempt recoveries. You may wish to disable these actions while you diagnose and service the system. If you disable them, you should make notes of their current settings for restoration before you leave. Following are the settings of your interest.

Surveillance	From the Service Processor Setup Menu, go to the Surveillance Setup Menu and disable surveillance.
Unattended Start	From the Service Processor System Power Control Menu disable unattended start mode.
Reboot Policy	From the System Power Control Menu go to the Reboot/Restart Policy Setup Menu and set: 1. Number of reboot attempts to **0** (zero) 2. Use OS-Defined restart policy to **No** 3. Enable supplemental restart policy to **No**.
Call Out	From the Call-In/Call-Out Setup Menu, go to the Serial Port Selection Menu and disable call-out on both serial ports.

Purpose of this MAP

This MAP is used to locate defective FRUs not found by normal diagnostics. For this procedure, diagnostics are run on a minimally-configured system. If a failure is detected on the minimally-configured system, the remaining FRUs are exchanged one at a time until the failing FRU is identified. If a failure is not detected, FRUs are added back until the failure occurs. The failure is then isolated to the failing FRU.

Step 1540-1

1. Ensure that the diagnostics and the operating system are shut down.
2. Insert the diagnostic CD-ROM into the CD-ROM drive.
3. Turn the power off.
4. Turn the power on.
5. When the keyboard indicator is displayed (the word **keyboard** on an ASCII terminal or the keyboard and hand icon on a graphical display), press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal.
6. Enter the appropriate password when prompted to do so.

Is the "Please define the System Console" screen displayed?

NO Go to “Step 1540-2” on page 2-19.

YES Go to “Step 1540-12” on page 2-31.

Step 1540-2

1. Turn the power off.
2. If you have not already done so, configure the Service Processor with the instructions on step 6 on page 2-17 and then return here and continue.
3. Exit Service Processor Menus and remove the power cable.
4. Disconnect all external cables.
5. Remove the side cover
6. Record the slot numbers of the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters.
7. Remove the second processor card (if present). [If second processor removed, ensure first CPU cable is installed.]
8. Record the position of the memory DIMMs. Remove all installed memory DIMMs except for one pair from the first Memory card.

   Note: The memory DIMM pair must be installed in slots that are next to each other. For example, install the pair in J1 and J2, not J1 and J3.
9. Remove the second Memory card, if present.
10. Disconnect the SCSI cable from the SCSI connectors on the I/O planar.
11. Disconnect the diskette drive cable from the diskette drive connector on the I/O planar.
12. Disconnect the internal serial and parallel cables.
13. Plug in the power cable (and wait for OK on the operator panel display).
14. Turn the power on.
15. Wait for the operator panel to stabilize at a checkpoint.

    Note: Checkpoints E1F2, E1F3 and STBY are stable as soon as they appear. Other checkpoints may take up to 3 minutes to assure stability, depending on system configuration.

Does the operator panel stabilize with code E1F2, E1F3, E1F7, or STBY?

NO Go to “Step 1540-3” on page 2-20.

YES Go to “Step 1540-4” on page 2-21.

Step 1540-3

One of the FRUs remaining in the system unit is defective.

If the following steps call for a I/O planar to be replaced, see notes on page 2-1.

Turn the power off, remove the power cable, and exchange the following FRUs in order:

1. Processor cards
2. Memory DIMMs (pair)
3. Memory card
4. I/O planar (see notes on page 2-1.)
5. System Card
6. Service Processor

Wait for the operator panel to stabilize at a checkpoint.

Note: Checkpoints E1F2, E1F3 and STBY are stable as soon as they appear. Other checkpoints may take up to 3 minutes to assure stability, depending on system configuration.

Does the operator panel stabilize with code E1F2, E1F3, E1F7, or STBY?

NO Reinstall the original FRU.

Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to “Step 1540-1” on page 2-18 in this MAP and follow the instructions for the new symptom.

YES Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-4

No failure was detected with this configuration.

1. Turn the power off and remove the power cable.
2. Install a pair of memory DIMMs.
3. Reinstall the power cable.
4. Turn the power on.
5. Wait for the operator panel to stabilize at a checkpoint.

   Note: Checkpoints E1F2, E1F3 and STBY are stable as soon as they appear. Other checkpoints may take up to 3 minutes to assure stability, depending on system configuration.

Does the operator panel stabilize with code E1F2, E1F3, E1F7, or STBY?

NO Go to “Step 1540-5” on page 2-22.

YES Repeat this step until all the memory DIMMs are installed and tested.

After all the memory DIMMs are installed and tested, record the positions of the memory DIMMs in the second memory card. Remove all of the memory DIMMs from the second memory card except 1 pair. Repeat this step with the second memory card (if previously installed).

Go to “Step 1540-7” on page 2-24.

Step 1540-5

The failure may be caused by the last pair of memory DIMMs installed or the memory card. To isolate the failing FRU, do the following:

1. Turn the power off and remove the power cable.
2. Exchange the last memory DIMM pair installed.
3. Reinstall the power cable.
4. Turn the power on.
5. Wait for the operator panel to stabilize at a checkpoint.

   Note: Checkpoints E1F2, E1F3 and STBY are stable as soon as they appear. Other checkpoints may take up to 3 minutes to assure stability, depending on system configuration.

Does the operator panel stabilize with code E1F2, E1F3, E1F7, or STBY?

NO Go to “Step 1540-6” on page 2-23.

YES Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-6

One of the FRUs remaining in the system unit is defective.

1. Turn the power off and remove the power cable.
2. Exchange the following FRUs the order listed.
   a. Memory card
   b. System card
   c. I/O planar (See notes on 2-1.)
   d. Power supply.
3. Reinstall the power cable.
4. Turn the power on.
5. Wait for the operator panel to stabilize at a checkpoint.

   Note: Checkpoints E1F2, E1F3 and STBY are stable as soon as they appear. Other checkpoints may take up to 3 minutes to assure stability, depending on system configuration.

Does the operator panel stabilize with code E1F2, E1F3, E1F7, or STBY?

NO Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to “Step 1540-1” on page 2-18 in this MAP, and follow the instructions for the new symptom.

YES Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-7

1. Turn the power off.
2. Reconnect the system console.

   Notes:

   a. If an ASCII terminal has been defined as the system console, attach the ASCII terminal cable to the to the S1 connector on the rear of the system unit. Also connect the internal serial and Ethernet cables to the I/O planar.

   b. If a display attached to a display adapter has been defined as the system console, install the display adapter and connect the display to it. Plug the keyboard into the keyboard connector on the rear of the system unit.
3. Turn the power on.
4. If the ASCII terminal or graphics display (including display adapter) are connected differently than before, the Console Selection screen appears and requires that a new console be selected.
5. When the keyboard indicator is displayed, press the F1 key on the directly attached keyboard or the number 1 key on an ASCII terminal. This triggers the SMS.
6. Enter the appropriate password when prompted to do so.
7. Wait until the SMS screen is displayed or the system appears to stop.

Is the SMS screen displayed?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

1. Go to the Problem Determination Procedures (test procedures) for the device attached to the S1 serial port or the display attached to the graphics adapter, and test those devices. If a problem is found, follow the procedures for correcting the problem on that device.
2. Graphics adapter (if installed).
3. Cable (async or graphics, including internal async cable).
4. I/O planar. (see notes on page 2-1.)

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom changed, check for loose cards and obvious problems. If you do not find a problem, return to “Step 1540-1” on page 2-18 and follow the instructions for the new symptom.

YES Go to “Step 1540-8” on page 2-26.

Step 1540-8

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
2. Turn the power off and remove the power cable.
3. Plug the internal SCSI cable into the SCSI connector (J25) on the I/O planar.
4. Disconnect the signal and power connectors from all the SCSI devices except the CD-ROM drive.
5. Reinstall the power cable.
6. Turn the power on.
7. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
8. Enter the appropriate password when prompted to do so.

Is the "Please define the System Console" screen displayed?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

1. SCSI cable
2. Last SCSI device connected (CD-ROM drive, tape drive, etc.)
3. The graphics adapter, if the system console is defined as a graphical display.
4. I/O planar (see notes on page 2-1.)
5. Processor card
6. Power Supply.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to “Step 1540-1” on page 2-18 in this MAP and follow the instructions for the new symptom.

YES Repeat this step, adding one SCSI device at a time, until all the SCSI devices that were attached to the integrated SCSI adapter are connected and tested.

Go to “Step 1540-9” on page 2-28.

Step 1540-9

The system is working correctly with this configuration. One of the FRUs (adapters) that you removed is probably defective.

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
2. Turn the power off and remove the power cable.
3. Plug the diskette drive cable into the diskette drive connector on the I/O planar.
4. Reinstall the power cable.
5. Turn the power on.
6. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
7. Enter the appropriate password when prompted to do so.

Is the "Please define the System Console" screen displayed?

NO One of the FRUs remaining in the system is defective.

In the following order, exchange the FRUs that have not been exchanged.

1. Diskette drive
2. Diskette drive cable
3. I/O planar (see notes on page 2-1).
4. Power supply

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed check for loose cards, cables, and obvious problems. If you do not find a problem return to “Step 1540-1” on page 2-18 in this MAP and follow the instructions for the new symptom.

YES Go to “Step 1540-10” on page 2-29.

Step 1540-10

The system is working correctly with this configuration. One of the FRUs (adapters) that you removed is probably defective,

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
2. Turn the power off and remove the power cable.
3. Install the second CPU card if one was removed. If a second CPU card was not removed, or has already been reinstalled and verified, install an I/O Planar device (parallel port device, serial port device, keyboard or mouse) that had been removed and any cables that were attached. If all I/O Planar devices have been reinstalled and verified, install a FRU (adapter) and connect any cables and devices that were attached to it.

   Note: If the FRU you installed requires supplemental media use the Process Supplemental Media task to load the supplemental media first.
4. Reinstall the power cable.
5. Turn the power on.
6. If the Console Selection screen displays, choose the system console.
7. After the keyboard indicator displayeds, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
8. Enter the appropriate password when prompted to do so.

Is the "Please define the System Console" screen displayed?

NO Go to “Step 1540-11” on page 2-30.

YES Repeat this step until all of the FRUs (adapters) are installed, then go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-11

The last FRU installed or one of its attached devices is probably defective.

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
2. Turn the power off and remove the power cable.
3. Starting with the last installed adapter, disconnect one attached device and cable.
4. Reinstall the power cable.
5. Turn the power on.
6. If the Console Selection screen is displayed, choose the system console.
7. After the keyboard indicator appears, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
8. Enter the appropriate password when prompted to do so.

Is the "Please define the System Console" screen displayed?

NO Repeat this step until the defective device or cable is identified or all the devices and cables have been disconnected.

If all the devices and cables have been removed, then one of the FRUs remaining in the system unit is defective.

To test each FRU, exchange the FRUs in the following order:

1. Adapter (last one installed)
2. I/O planar

   If the I/O planar or a network adapter is replaced, see notes on page 2-1.

3. Power supply.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed check for loose cards, cables, and obvious problems. If you do not find a problem return to “Step 1540-1” on page 2-18 in this MAP and follow the instructions for the new symptom.

YES The last device or cable that you disconnected is defective or if the last device is the CPU card go to “Step 1540-3” on page 2-20.

Exchange the defective device or cable.

Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-12

1. Follow the instructions on the screen to select the system console.
2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.
3. If the terminal type has not been defined, you must use the Initial Terminal option on the FUNCTION SELECTION menu to initialize the AIX operating system environment before you can continue with the diagnostics. This is a separate and different operation than selecting the console.
4. Select Task Selection.
5. When the NEW RESOURCE screen displays select an option from the bottom of the screen.

   Note: Adapters or devices that require supplemental media are not shown in the new resource list. If the system has adapters or devices that require a supplemental media, select option 1.

   If the adapter or device requires supplemental media select Process Supplemental Media from the TASKS SELECTION LIST. Follow the instructions on the screen after testing the adapters and devices listed on the NEW RESOURCE screen.

   Supplemental media must be loaded and processed one at a time.
6. Select Run Diagnostics from the TASK SELECTION LIST.
7. Select All Resources or the Adapter/Device you loaded from the supplemental media.

Did you get an SRN?

NO Go to “Step 1540-14” on page 2-33.

YES Go to “Step 1540-13” on page 2-32.

Step 1540-13

Look at the FRU part numbers associated with the SRN.

Have you exchanged all the FRUs that correspond to the failing function codes?

NO Exchange the FRU with the highest failure percentage that has not been changed.

Repeat this step until all the FRUs associated with the SRN have been exchanged or diagnostics run with no trouble found. Run diagnostics after each FRU is exchanged.

If the I/O planar or a network adapter is replaced, see notes on page 2-1.

Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

YES If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

Step 1540-14

Does the system have adapters or devices that require supplemental media?

NO Go to “Step 1540-15.”

YES Go to “Step 1540-16.”

Step 1540-15

Consult the ISA and PCI adapter configuration documentation for your operating system to verify that all installed adapters are configured correctly.

Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

Step 1540-16

Press Enter to return to the TASKS SELECTION LIST.

Select Process Supplemental Media and follow the on screen instructions to process the media.

Did the system return to the TASKS SELECTION SCREEN after the supplemental media was processed?

NO Go to “Step 1540-17” on page 2-34.

YES Go to “Step 1540-12” on page 2-31 substep 6 on page 2-31.

Step 1540-17

The Adapter or device is probably defective.

If the supplemental media is for an adapter replace the FRUs in the following order:

1. Adapter.
2. The planar the adapter is plugged into.

If the supplemental media is for a device replace the FRUs in the following order:

1. Device and any associated cables.
2. The adapter the device is attached to.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to “Step 1540-1” on page 2-18 on this MAP and follow the instructions for the new symptom.

Go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*.

SSA Maintenance Analysis Procedures (MAPs)

These maintenance analysis procedures (MAPs) describe how to analyze a continuous failure that has occurred in a system that contains two or more disk drive modules. Failing field-replaceable units (FRUs) of the system unit can be isolated with these MAPs.

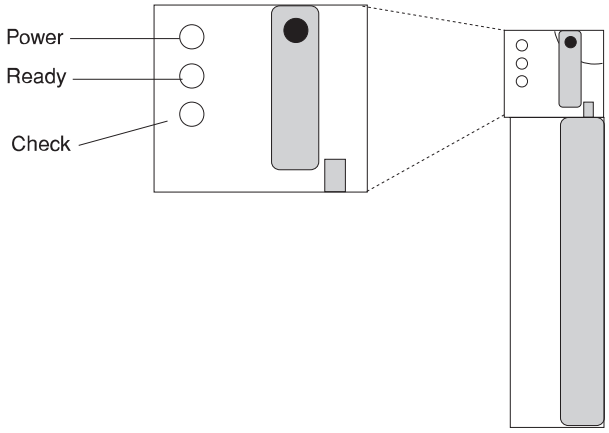
How to Use These MAPs

Attention: Switching off the power to an SSA Hot-Swap Disk Drive can cause a system fault unless you first make the SSA Hot-Swap Disk Drive modules unavailable to the system unit. To do this:

1. Use the system-management task menus to make the disk drive modules unavailable.
2. If the system unit has more than one SSA adapter, make the SSA Hot-Swap Disk Drive modules unavailable to the system for each of the paths to the SSA Hot-Swap Disk Drive.

Attention: Unless the system unit needs to be switched off for some other reason, do not switch off the power to the system unit when servicing an SSA Hot-Swap Disk Drive or the external SSA cable.

- To isolate the FRUs associated with in the failing SSA Hot-Swap Disk Drive, perform the actions and answer the questions given in this MAP.
- When instructed to exchange two or more FRUs in sequence:
    1. Exchange the first FRU in the list for a new one.
    2. Verify that the problem is solved. For some problems, verification means running the diagnostic programs (see the using-system service procedures).
    3. If the problem remains:
        a. Reinstall the original FRU.
        b. Exchange the next FRU in the list for a new one.
    4. Repeat steps 2 and 3 until either the problem is solved, or all the related FRUs have been exchanged.
    5. Perform the next action indicated by the MAP.
- The following table explains the meaning of the Power, Ready and Check status LEDs.



Status LEDs		
LED	**Status**	**Definition**
Power	On	Power On
	Off	Power Off
Ready	On	Both SSA connections good and drive is ready
	Blinking	Only one SSA connection good
	Flickering	Drive is executing a command
Check	On	Disk drive failure
		Self-test running
		Drive in service mode
	Blinking	Disk drive selected

MAP 2010: SSA Hot-Swap Disk Drive–Start

This MAP is the entry point to the MAPs for the SSA Hot-Swap Disk Drive. If you are not familiar with these MAPs, read “How to Use These MAPs” on page 2-35 first.

You might have been sent here because:

- The system problem determination procedures sent you here.
- Action from an SRN list sent you here.
- A problem occurred during the installation of an SSA Hot-Swap Disk Drive module.
- Another MAP sent you here.
- A customer observed a problem that was not detected by the system problem determination procedures.

Step 2010-1

Have you been sent to this MAP from the Configuration Verification service aid?

NO Go to “Step 2010-3” on page 2-39.

YES Go to “Step 2010-2” on page 2-38.

Step 2010-2

One of the following conditions exist. Take the action described.

1. You have an hdisk that has no associated pdisk.
   a. Issue the system **cfgmgr** command.
   b. Retry the Configuration Verification service aid.
   c. If the problem remains, a software error has probably occurred. Call your support center for assistance.
2. You have a pdisk that has no associated hdisk.
   a. Run diagnostics (using system verification mode) to the pdisk.
   b. If you get an SRN, go to Table A-1 on page A-6 and follow the actions described.

      If you do not get an SRN, the disk formatting may be incompatible with the system (the disk was formatted on a different type of using system).

      1) Format the pdisk.
      2) Issue the system **cfgmgr** command
      3) Retry the Configuration Verification service aid.
3. If the problem remains, a software error has probably occurred. Call your support center for assistance.

Step 2010-3

Have the system diagnostics or problem determination procedures given you an SRN for the SSA Hot-Swap Disk Drive?

NO Go to "Step 2010-4."

YES Go to "Service Request Numbers (SRNs)" on page A-3.

Step 2010-4

If the system diagnostics are available, go to "Step 2010-5."

If the stand-alone diagnostics are available, but the system diagnostics are not available, run them, then go to "Step 2010-5."

If the system diagnostics and stand-alone diagnostics are not available, go to "Step 2010-1" on page 2-37.

Step 2010-5

Run the diagnostics in the problem determination mode.

Note: Do not run the advanced diagnostics, because errors are logged on other using systems that share the same loop.

Did the diagnostics give you an SRN for the SSA Hot-Swap Disk Drive?

NO Go to "Step 2010-6" on page 2-40.

YES Go to "Service Request Numbers (SRNs)" on page A-3.

Step 2010-6

Are all LED's on the drives in a 6 pack off?

NO Go to step “Step 2010-9.”

YES Go to “Step 2010-7.”

Step 2010-7

Are any power cables loose or in need of replacement?

NO Go to “Step 2010-8.”

YES Fix or replace the power cables as required. Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Step 2010-8

Replace the backplane. Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Step 2010-9

Is there only one drive with no LED's on?

NO Go to step “Step 2010-10” on page 2-41.

YES Replace the the following FRU's:

1. Backplane
2. Disk drive assembly

Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Step 2010-10

Is the middle LED on one or more disk drives on a backplane off?

NO Go to step “Step 2010-11.”

YES Replace the the following FRU's:

1. Backplane
2. EPOW cable

Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair..

Step 2010-11

Is middle LED in the drive at the end of the backplane flashing?

NO Go to step “Step 2010-8” on page 2-40.

YES Go to step “Step 2010-12” on page 2-42.

Step 2010-12

Replace the SSA link cable closest to the flashing LED. Did the LED stop flashing?

NO Go to step “Step 2010-13.”

YES Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Step 2010-13

Replace the following:

1. Backplane
2. Disk drive with the second LED flashing

Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Chapter 3. Error Code to FRU Index

The Error Code to FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Use this index to help you decide which FRUs to replace when servicing the system.

If the codes in the following tables indicate a device which is present more than once in the system unit, a location code is needed to specify which device generated the error. Go to “Step 1020-4” on page 2-11 to display the System Management Services error log and obtain a location code. Location code descriptions can be found under “Location Codes” on page 3-46.

Notes:

1. If more than eight digits are displayed in the operator panel, use only the first eight digits to find the error in the tables. The digits that display beyond the first eight digits are location codes that can assist you in diagnosing the problem. See “Location Codes” on page 3-46.
2. Licensed programs frequently rely on network configuration, and system information stored on the VPD on the operator panel. If the MAPs indicate that the Operator Panel should be replaced, swap the VPD from the old operator panel to the new one. If the old VPD module has to be replaced call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys for licensed programs may be required.
3. If a network adapter, or the I/O board is replaced, the network administrator must be notified so that the client IP addresses used by the server can be changed. In addition, the operating system configuration of the network controller may need to be changed in order to enable system startup. Also check to ensure that any client or server that addresses this system is updated.

If you replace FRUs and the problem is still not corrected, go to “MAP 1540: Minimum Configuration” on page 2-17 unless otherwise indicated in the tables.

If you replace FRUs and the problem is corrected, go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*

Firmware/POST Error Codes

If you replace FRUs and the problem is still not corrected, go to “MAP 1540: Minimum Configuration” on page 2-17

If you replace FRUs and the problem is corrected, go to "MAP 410: Repair Checkout" in the *IBM RS/6000 Diagnostic Information for Multiple Bus Systems*

Table 3-1 (Page 1 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
203w0xyz	• w=loop number • x=0 missing link • y=port number • z=c for interconnect z=b missing link back z=E RIO de-configured	Check Cables, then Remote I/O.
20A80xxx	Remote initial program load (RIPL) error.	
20A80000	Insufficient information to boot.	Verify the IP address.
20A80001	Client IP address is already in use by other network device.	Change IP address.
20A80002	Cannot get gateway IP address.	Refer to “Checkpoints” on page 3-29 table using code **E174**.
20A80003	Cannot get server hardware address.	Refer to “Checkpoints” on page 3-29 table using code **E174**.
20A80004	Bootp failed.	1. Refer to “E1xx Code Boot Problems” on page 3-44 for general considerations. 2. Turn off then on, and retry the boot operation. 3. Verify Boot List by using the Firmware SMS Multiboot menus. 4. Verify the network conection (network could be down). 5. Have network administrator verify the server configuration for this client.
20A80005	File transmission (TFTP) failed.	Check network connection, try again.
20D00xxx	Unknown/Unrecognized device	
20D0000F	Self-test failed on device, no error/location code information available.	Check the System Management Services error log entry (described in “Step 1020-4” on page 2-11) for this error code. The location code (if present) in the error log entry should identify the location of the failing device.

Table 3-1 (Page 2 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
20D00010	Self-test failed on device, can't locate package.	Contact you service support representative for assistance.
20D00011	Cannot determine Machine Model.	The Machine Model is part of the System Vital Product Data. Perform corrective actions listed for errors 2BA00050, 2BA00051.
20E00xxx	Security	
20E00000	Power on Password entry error.	The password has been entered incorrectly. Retry installing the password.
20E00001	Privileged-access password entry error.	The password has been entered incorrectly. Retry installing the password.
20E00002	Privileged-access password jumper not enabled.	The privileged-access password jumper is not in the correct position for password initial entry. Consult the system's User's Guide for jumper location and position.
20E00003	Power on Password must be set for Unattended mode.	Unattended mode requires the setting of the Power On password before it is enabled.
20E00004	Battery drained or needs replacement.	1. Replace battery. 2. Replace I/O board. (See notes on 3-1.)
20E00005	EEPROM locked.	1. Turn off, then turn on system unit. 2. Replace the I/O board. (See notes on 3-1.)
20E00008	CMOS corrupted or tampering evident, CMOS initialized.	Check your machine for evidence of tampering. If no tampering evident: 1. Replace battery, restore NVRAM data (passwords, startup data). 2. Replace I/O board. (See notes on 3-1.)
20E00009	Invalid password entered - system locked.	The password has been entered incorrectly 3 times. Turn off, then turn on the system unit, then enter the password correctly.

Table 3-1 (Page 3 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
20E0000A	EEPROM lock problem.	If for privileged-access password install, is jumper in correct position? Consult the system's User's Guide for jumper location and position. 1. Turn off, turn on system unit. 2. Replace I/O board. (See notes on 3-1.)
20E0000B	EEPROM write problem	1. Turn off, turn on system unit. 2. Replace I/O board. (See notes on 3-1.)
20E0000C	EEPROM read problem.	1. Turn off, turn on system unit. 2. Replace I/O board. (See notes on 3-1.)
20E00017	Cold boot needed for password entry.	Turn off, turn on system unit.
20EE0xxx	Informational	
20EE0003	IP parameter requires 3 dots "."	Enter valid IP parameter. Example: 000.000.000.000
20EE0004	Invalid IP parameter.	Enter valid (numeric) IP parameter. Example: 000.000.000.000
20EE0005	Invalid IP parameter (>255)	Enter valid (numeric) IP parameter in the range of 0 to 255. Example: 255.192.002.000
20EE0006	No SCSI controllers present	The I/O board should always have (at least) 2 integrated PCI SCSI controllers; replace the I/O board. (See notes on 3-1.)
20EE0007	Keyboard not found	1. Plug in keyboard. 2. Replace I/O board, (See notes on 3-1.)
20EE0008	No configurable adapters found in the system.	This warning occurs when the selected SMS function cannot locate any devices/adapters supported by the function. If a supported device is installed: 1. Replace the device or adapter. 2. Replace I/O board, (See notes on 3-1.)
20EE0009	Unable to communicate with the Service processor.	1. Replace the Service Processor. 2. Replace I/O board, (See notes on 3-1.) 3. Replace System Board.

Table 3-1 (Page 4 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
20EE000A	Pointer to the operating system found in non-volatile storage.	Values normally found in non-volatile storage that point to the location of an Operating System were not found. This can happen for two reasons, either your installed Operating System doesn't support storing the values or some event occurred that caused the system to lose non-volatile storage information (drainage or replacement of the battery). If you are running AIX, this information can be reconstructed by running the bootlist command specifying the device that the Operating System is installed on. Please refer to your AIX documentation for the exact syntax and usage of the bootlist command. In order to boot the Operating System so that the above mentioned values can be reconstructed,power the system down and power it back up again, this should cause the system to look for the Operating System in the devices contained in the custom boot list or in the default boot list, depending on the condition of the system. If this is not successful, modify the Boot Sequence (also known as boot list) to include devices that are known to contain a copy of the Operating System. This can be accomplished by using the System Management Services Menus. For example, select a hard disk known to have a copy of the Operating System as the first and only device in the boot sequence (boot list) and attempt to boot again.
20EE000B	The system was not able to find an operating system on the device list that was attempted.	Modify the Boot Sequence (also known as boot list) to include devices that are known to contain a copy of the Operating System. This can be accomplished by using the System Management Services Menus. For example, select a hard disk known to have a copy of the Operating System as the first and only device in the boot sequence (boot list) and attempt to boot again.

Table 3-1 (Page 5 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
21A000xxx	SCSI Device Errors	**Notes:** 1. Before replacing any system components: a. Ensure that the controller and each device on the SCSI bus is assigned a unique SCSI ID. b. Ensure SCSI bus is properly terminated. c. Ensure SCSI signal and power cables are securely connected and not damaged. 2. The location code information is required to identify the ID of SCSI device failures as well as to indicate the location of the controller to which the device is attached.
21A00001	Test Unit Ready Failed - hardware error.	Refer to the notes in error code 21A000xxx. 1. Replace the SCSI device. 2. Replace the SCSI cable. 3. Replace the SCSI controller.
21A00002	Test Unit Ready Failed - sense data available.	Refer to the notes in error code 21A000xxx. 1. Replace the Media (Removable media devices). 2. Replace the SCSI device.
21A00003	Send Diagnostic Failed.	Refer to the notes in error code 21A000xxx. Replace the SCSI device.
21A00004	Send Diagnostic Failed - DevOfl cmd.	Refer to the notes in error code 21A000xxx. Replace the SCSI device.
21E00xxx	SCSI Tape	Refer to 21A00xxx for a description and repair action for the xxx value.
21ED0xxx	SCSI Changer.	Refer to 21A00xxx for a description and repair action for the xxx value.
21EE0xxx	Other SCSI device type.	Refer to 21A00xxx for a description and repair action for the xxx value.
21F00xxx	SCSI CD-ROM.	Refer to 21A00xxx for a description and repair action for the xxx value.
21F20xxx	SCSI Read/Write Optical.	Refer to 21A00xxx for a description and repair action for the xxx value.
25000000	Memory Controller Failed.	Replace the System Board.

Table 3-1 (Page 6 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
25010xxx	Flash Update Problem	
25010000	No diskette in drive.	Insert diskette containing firmware image.
25010001	Diskette seek error.	1. Retry function. 2. Replace diskette drive. 3. Replace diskette cable. 4. Replace I/O board. (See notes on 3-1.)
25010002	Diskette in drive does not contain an *.IMG file.	Insert diskette with firmware update file.
25010003	Cannot open OPENPROM package.	Replace I/O board. (See notes on 3-1.)
25010004	Cannot find OPENPROM node.	Replace I/O board. (See notes on 3-1.)
25010006	System id does not match image system id.	Make sure correct firmware update diskette is being used with this system.
25010007	Image has bad CRC.	Replace firmware updated diskette.
25010008	Flash is write protected, update cancelled.	1. Turn off, turn on system unit and retry. 2. Replace I/O board. (See notes on 3-1.)
25010009	Flash module is unsupported or not recognized.	Make sure correct firmware update diskette is being used with this system.
2501000A	Flash write protected.	1. Turn off, turn on system unit, retry. 2. Replace I/O board. (See notes on 3-1.)
25A0xxx0	L2 Cache controller problem.	1. Replace the CPU card. 2. Replace the System board. See error code 2B2xxx22 for xxx definitions.
25A0xxx1	L2 Cache controller problem.	1. Replace the CPU card. 2. Replace the System board. See error code 2B2xxx22 for xxx definitions.
25A1xxx1	L2 SRAM failure	Replace the CPU card. See error code 2B2xxx22 for xxx definitions.

Table 3-1 (Page 7 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
25A80xxx	NVRAM problems	**NVRAM problem resolution:** 1. Errors reported against NVRAM can be caused by low Battery voltage and (more rarely) power outages that occur during normal system usage. With the exception of the 25A80000 error, these errors are warnings that the NVRAM data content had to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, any system customization (eg. boot device list) information has been lost, the system may need to be re-configured. 2. If the error is persistent, replace the battery. 3. If the error is persistent after battery replacement, or the error code is 25A80000, replace the I/O board. (See notes on 3-1.)
25A80000	Initialization failed, device test failed.	Refer to Action under error code 25A80xxx.
25A80001	Init-nvram invoked, ALL of NVRAM initialized.	Refer to Action under error code 25A80xxx.
25A80002	Init-nvram invoked, some data partitions may have been preserved.	Refer to Action under error code 25A80xxx.
25A80011	Data corruption detected, ALL of NVRAM initialized.	Refer to Action under error code 25A80xxx.
25A80012	Data corruption detected, some data partitions may have been preserved.	Refer to Action under error code 25A80xxx.
25A80100	NVRAM data validation check failed.	Turn off, turn on system unit and retry the operation before replacing any system component. Refer to Action under error code 25A80xxx.
25A80201	Unable to expand target partition while saving configuration variable.	Refer to Action under error code 25A80xxx.
25A80202	Unable to expand target partition while writing error log entry.	Refer to Action under error code 25A80xxx.
25A80203	Unable to expand target partition while writing VPD data.	Refer to Action under error code 25A80xxx.

Table 3-1 (Page 8 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
25A80210	Setenv/$Setenv parameter error - name contains a null character.	Refer to Action under error code 25A80xxx.
25A80211	Setenv/$Setenv parameter error - value contains a null character.	Refer to Action under error code 25A80xxx.
25AA0xxx	EEPROM problems.	**EEPROM problem resolution:** 1. Ensure that the EEPROM Security jumper is in the correct position if doing a privileged-access password install. 2. Retry the operation. 3. If retries do not solve the problem, replace the I/O board. (See notes on 3-1.)
25AA0000	Unable to unlock EEPROM.	Refer to Action under error code 25AA0xxx.
25AA0001	Read-Recv error.	Refer to Action under error code 25AA0xxx.
25AA0002	Read-Trans error.	Refer to Action under error code 25AA0xxx.
25AA0003	Write-enable error.	Refer to Action under error code 25AA0xxx.
25AA0004	Write-recv error.	Refer to Action under error code 25AA0xxx.
25AA0005	Write-disable error.	Refer to Action under error code 25AA0xxx.
25AA0006	Write-Trans error.	Refer to Action under error code 25AA0xxx.
25AA0007	Unable to lock EEPROM.	Refer to Action under error code 25AA0xxx.
25B00001	No memory modules detected in either memory card 1 or 2.	1. Reseat any installed memory card(s) and retry. 2. Reseat any installed memory modules on the installed memory cards. 3. Replace Memory Card(s).
25Cyyxxx	Memory Card problems.	See “Memory PD Bits” on page 3-26 for definition of "yy". Use the location code obtained from the SMS Error Log utility (described in MAP Step 1020-4) to identify which memory module (or memory module pair) the error is reported against.

Table 3-1 (Page 9 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
25Cyy001	Memory module is not supported.	Replace unsupported memory module. **Note:** Memory module must be replaced with a supported type memory module. If an unsupported memory module is replaced the same unsupported type, the error does not go away. There may be 2 memory module related memory errors reported to indicate a memory module pair. One of the 2 indicated memory modules may be good, when replacing memory replace 1 memory module at a time, not both. See “Memory PD Bits” on page 3-26 for definition of "yy".
25Cyy002	Memory module fails memory test.	1. Replace memory module. 2. Replace memory card. 3. Replace the System Board. See “Memory PD Bits” on page 3-26 for definition of "yy".
25Cyy003	PD bits are mis-matched or missing one memory module.	1. Make sure both memory modules in the pair are the same type. 2. Replace System Board. See “Memory PD Bits” on page 3-26 for definition of "yy".
25Cyy004	Memory modules are disabled.	Remove this unused memory module.
25Cyy005	Memory module failed address test.	1. Replace memory module. 2. Replace memory card. 3. Replace System Board. 4. Replace CPU Card. See “Memory PD Bits” on page 3-26 for definition of "yy".
25Cyy006	Memory module failed inter-extent test.	1. Replace system board. 2. Replace CPU card. See “Memory PD Bits” on page 3-26 for definition of "yy".
25Cyy007	Memory module failed extent access test.	1. Replace system board. 2. Replace CPU card. See “Memory PD Bits” on page 3-26 for definition of "yy".

Table 3-1 (Page 10 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
28030xxx	RTC errors	1. Errors reported against the Real Time Clock (RTC) can be caused by low battery voltage and (more rarely) power outages that occur during normal system usage. These errors are warnings that the RTC data content needs to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, the Power On Password and Time and Date information has been lost. • To set/restore a Power On Password, use the SMS utility. • To set/restore the Time and Date, use the Operating System facility. 2. If the error is persistent, replace the battery. 3. If the error is persistent after battery replacement, replace the I/O board. (See notes on 3-1.)
28030001	RTC initialization required- RTC not updating, corrected.	Refer to Action under error code 28030xxx.
28030002	Bad time/date values 1. Set the time and date. 2. Refer to Action under error code 28030xxx.	
29000002	Keyboard/Mouse controller failed self-test.	Replace the I/O board. (See notes on 3-1.)
29A00003	Keyboard not present/detected.	1. Keyboard 2. Replace the I/O board. (See notes on 3-1.)
29A00004	Keyboard stuck key test failed.	1. Keyboard 2. Replace the I/O board. (See notes on 3-1.)
29B00004	Mouse not present/detected.	1. Mouse 2. Replace the I/O board. (See notes on 3-1.)
2B200402	Unsupported Processor.	CPU Card.

Table 3-1 (Page 11 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2B2xxx22	Processor disabled.	CPU Card. Where xxx indicates the processor type as follows: **000** 166 Mhz 1 or 2 way Processor card **200** 166 Mhz 1 or 2 way Processor card **211** Down level VPD. Contact service person. **251** 166 Mhz 1 way Processor card **261** 166 Mhz 2 way Processor card **451** 332 Mhz 1 way Processor card **461** 332 Mhz 2 way Processor card
2B2xxx31	Processor failed.	CPU Card. See error code 2B2xxx22 for xxx definitions.
2B2xxx42	Unsupported processor type.	CPU Card. See error code 2B2xxx22 for xxx definitions.
2BA00xxx	Service Processor	
2BA00000	Service processor POST failure.	1. Unplug the system power cable and wait until the system power indicator remains off and the operator panel is blank. 2. Plug the system power cable back in and retry the operation. 3. Replace the service processor card. 4. Replace the I/O board. (See notes on 3-1.)
2BA00012	Service processor reports self-test failure.	1. Unplug the system power cable and wait until the system power indicator remains off and the operator panel is blank. 2. Plug the system power cable back in and retry the operation. 3. Replace the service processor card. 4. Replace the I/O board. (See notes on 3-1.)
2BA00013	Service processor reports bad NVRAM CRC.	1. If problem persists, replace battery. 2. Replace the I/O board. (See notes on 3-1.)

Table 3-1 (Page 12 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2BA00014	Service processor reports bad service processor firmware.	Use service processor firmware diskette to re-program firmware.
2BA00017	Service processor reports bad or low battery.	1. Replace the battery. 2. Replace the service processor card. 3. Replace the I/O board. (See notes on 3-1.)
2BA00018	EPOW test failure.	1. Replace the service processor. 2. Replace the I/O board. (See notes on 3-1.)
2BA00019	IRQ13 test failure.	1. Replace the I/O board. (See notes on 3-1.) 2. Replace the service processor card.
2BA00024	Service processor reports bad Power Controller firmware.	Use the System Firmware diskette to re-program the System firmware.
2BA00040	Service processor reports Service Processor VPD module not present.	1. Use the Service Processor Firmware diskette to re-program the Service Processor firmware. 2. Replace the Service Processor card.
2BA00041	Service processor VPD is corrupted.	1. Use the service processor firmware diskette to re-program the service processor firmware. 2. Replace the service processor card.
2BA00050	Service processor reports system operator panel VPD module not present or not recognizeable.	Replace the operator panel control assembly. (See notes on 3-1.) **Note:** Swap the old VPD module from the old operator panel control assembly to the new one.
2BA00051	System operator panel VPD data corrupted.	Replace the operator panel control assembly. (See notes on 3-1.) **Note:** Swap the old VPD module from the old operator panel control assembly to the new one.
2BA00060	Service processor reports I/O board VPD module not present.	Replace the I/O board. (See notes on 3-1.)
2BA00061	Service processor reports I/O board VPD data corrupted.	Replace the I/O board. (See notes on 3-1.)
2BA00062	Service processor reports system board VPD module not present.	Replace the system board.
2BA00063	Service processor reports system board VPD data corrupted.	Replace the system board.

Table 3-1 (Page 13 of 24). Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
2BA00064	Service processor reports PCI riser card VPD module not present.	Replace the PCI riser card.
2BA00065	Service processor reports PCI riser card VPD data corrupted.	Replace the PCI riser card.
2BA00066	Service processor reports PCI expansion card VPD module not present.	Replace the PCI expansion card.
2BA00067	Service processor reports PCI expansion card VPD data corrupted.	Replace the PCI expansion card.
2BA00070	Service processor reports CPU card VPD module not present.	Replace the CPU card(s).
2BA00071	VPD data corrupted for CPU in slot 0.	Replace the CPU card in slot 0.
2BA00073	VPD data corrupted for CPU in slot 1.	Replace the CPU card in slot 1.
2BA00100	Service processor firmware recovery information could not be written to diskette.	1. Check diskette media write protect tab. 2. Replace the diskette drive.
2BA00101	Service processor is not installed, update cancelled.	1. Install the service processor. 2. Retry operation.
2BA00102	No service processor update diskette in drive.	Insert the diskette.
2BA00103	Service processor firmware update file is corrupted, update cancelled.	1. Obtain new service processor firmware diskette. 2. Retry operation.
2BA00104	Service processor firmware update file is the same level as the service processor firmware, update cancelled.	1. Obtain new level of service processor firmware. 2. Retry operation.
2BA00200	Service processor firmware update error occurred, update not completed. Error occurred during service processor flash write operation.	Service processor firmware update error recovery procedure: 1. Turn the system Off. 2. Unplug power cable and then plug power cable back in. 3. Turn the system On. 4. Retry operation. If problem persists, replace service processor.
2BA00201	Service processor firmware update error occurred, update not completed. Error occurred while reading service processor CRC.	See error code 2BA00200 for recovery procedure.
2BA00202	Service processor firmware update error occurred, update not completed. Error occurred while verifying service processor CRC.	See error code 2BA00200 for recovery procedure.

Table 3-1 (Page 14 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2BA00203	Service processor firmware update error occurred, update not completed. Error occurred while reading new service processor CRC after updating service processor firmware.	See error code 2BA00200 for recovery procedure.
2BA00204	Service processor firmware update error occurred, update not completed. Error occurred while calculate CRC write.	See error code 2BA00200 for recovery procedure.
2BA00300	Service Processor reports Slow Fan number 1	1. Replace Fan 1. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00301	Service Processor reports Slow Fan number 2.	1. Replace Fan 2. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00302	Service Processor reports Slow Fan number 3.	1. Replace Fan 3. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00303	Service Processor reports Slow Fan number 4.	1. Replace Fan 4. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00309	Service Processor reports Generic Cooling Alert.	1. Check for cool air flow obstructions to the system. 2. Replace I/O Board. (See notes on 3-1.)
2BA00310	Service Processor reports CPU Over Temperature Alert.	1. Check for cool air flow obstructions to the system. 2. If the problem persists, replace CPU Card
2BA00311	Service Processor reports IO Over Temperature Alert.	1. Check for cool air flow obstructions to the system. 2. Replace I/O Board. (See notes on 3-1.)
2BA00312	Service Processor reports Memory Over Temperature Alert.	1. Check for cool air flow obstructions to the system. 2. Replace Memory Card.

Table 3-1 (Page 15 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2BA00313	Service Processor reports Generic Power Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00314	Service Processor reports 5V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00315	Service Processor reports 5V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00316	Service Processor reports 3.3V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00317	Service Processor reports 3.3V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00318	Service Processor reports 2.5V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00319	Service Processor reports 2.5V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00320	Service Processor reports +12V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00321	Service Processor reports +12V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00322	Service Processor reports -12V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00323	Service Processor reports -12V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00324	Service Processor reports 5V Standby Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00325	Service Processor reports 5V Standby Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00326	Service Processor reports PCI Expansion Card 5V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)

Table 3-1 (Page 16 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2BA00327	Service Processor reports PCI Expansion Card 5V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00328	Service Processor reports PCI Expansion Card 3.3V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00329	Service Processor reports PCI Expansion Card 3.3V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00330	Service Processor reports PCI Expansion Card +12V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00331	Service Processor reports PCI Expansion Card +12V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00332	Service Processor reports PCI Expansion Card -12V Over Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00333	Service Processor reports PCI Expansion Card -12V Under Voltage Alert.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00334	Service Processor reports Generic Slow Shutdown request.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00335	Service Processor reports CPU Critical Over Temperature Slow Shutdown request.	1. Check for cool air flow obstructions to the system. 2. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning). 3. If problem persists, replace CPU Card.
2BA00336	Service Processor reports IO Critical Over Temperature Slow Shutdown request.	1. Check for cool air flow obstructions to the system. 2. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning). 3. If problem persists, replace I/O Board. (See notes on 3-1.)

Table 3-1 (Page 17 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2BA00337	Service Processor reports Memory Critical Over Temperature Slow Shutdown request.	1. Check for cool air flow obstructions to the system. 2. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning) 3. If problem persists, replace Memory Card.
2BA00338	Service Processor reports Generic Fast Shutdown request.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00340	Service Processor reports Locked fan - Fast Shutdown request fan number 1.	1. Replace fan 1. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00341	Service Processor reports Locked fan - Fast Shutdown request fan number 2.	1. Replace fan 2. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00342	Service Processor reports Locked fan - Fast Shutdown request fan number 3.	1. Replace fan 3. 2. If problem persists, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00343	Service Processor reports Locked fan - Fast Shutdown request fan number 4.	1. Replace fan 4. 2. If problem persi.ts, replace Power Supply. 3. Replace I/O Board. (See notes on 3-1.)
2BA00350	Service Processor reports Generic Immediate Shutdown request.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00351	Service Processor reports Generic AC power loss EPOW.	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00352	Service Processor reports Loss of AC power (outlet).	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)
2BA00353	Service Processor reports Loss of AC power (power button).	1. Replace Power Supply. 2. Replace I/O Board. (See notes on 3-1.)

Table 3-1 (Page 18 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
2BA00399	Service Processor reports Unsupported value in EPOW.	1. Check EPOW cabling on SCSI or SSA Backplanes. 2. Replace I/O Board. (See notes on 3-1.)
40100005	A loss of system power detected.	Possible main power loss. If not, replace power supply.
40100007	Immediate shutdown.	Possible main power loss. If not, replace power supply.
40110001	Power Supply fail.	1. Check power cable to P2 connector on I/O Board. 2. Power supply. 3. I/O board. (See notes on 3-1.) 4. Service processor.
40110002	Voltage not detected on either processor card.	Replace power supply.
40110003	Voltage not detected on one processor card. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the Service Processor error log.)	Replace CPU card.
40111002	An unknown power problem detected.	1. Power supply. 2. I/O board. (See notes on 3-1.) 3. Service processor.
40111022	A high 5.0 voltage reading detected.	1. Power supply. 2. CPU card.
40111032	A high 3.3 voltage reading detected.	1. CPU card. 2. Power supply.
40111042	A high 2.5 voltage reading detected.	1. CPU card. 2. Power supply.
40111052	A high +12 voltage reading detected.	1. Power supply. 2. I/O board. (See notes on 3-1.)
40111062	A high –12 voltage reading detected.	1. Power supply. 2. I/O board. (See notes on 3-1.)
40111082	A low 5.0 voltage reading detected.	1. Power supply. 2. I/O board
40111092	A low 3.3 voltage reading detected.	1. CPU card. 2. Power supply.
401110A2	A low +5 standby voltage reading detected.	1. CPU card. 2. Power supply.
401110B2	A low +12 voltage reading detected.	1. Power supply. 2. I/O board. (See notes on 3-1.)

Table 3-1 (Page 19 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
401110C2	A low –12 voltage reading detected.	1. Power supply. 2. I/O board. (See notes on 3-1.)
40111101	Power good signal low on either processor card 1 or processor card 2. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the Service Processor error log.)	Replace failing processor card
40111102	Wrong processor cards plugged into the system.	1. Remove cards 2. Verify part numbers 3. Install valid cards
40200001	An unknown cooling problem detected.	Cooling problem; check system fans.
40200021	A CPU temperature warning detected.	Over temperature on CPU card.
40200023	A critical CPU temperature condition detected.	Critical temperature on CPU card.
40200031	An I/O board temperature warning detected.	Over temperature on I/O board.
40200033	A critical I/O board temperature condition detected.	Critical temperature on I/O board.
40200041	A memory temperature warning detected.	Over temperature on the Memory Card.
40200043	A critical memory temperature condition detected.	Critical temperature on the Memory Card.
40210011	A slow fan detected.	Check: 1. Room operating temperature. 2. System fans.
40A00000	System firmware IPL failure.	1. Surveillance mode control is from the Service Processor (SP) Menus. 2. Verify that the system firmware supports Service Processor surveillance. 3. CPU card. 4. I/O board. (See notes on 3-1.) 5. Service processor. 6. If the problem persists, call the support center for assistance.

Table 3-1 (Page 20 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
40B00000	The operating system surveillance interval exceeded.	1. Surveillance mode control is from the Service Processor(SP) Menus. 2. Verify that the Operating System (OS) Heartbeat Utility is installed and has been activated. 3. Check for errors or unusual conditions that might prevent the OS from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the error log. 4. I/O board. (See notes on 3-1.) 5. Service processor. 6. If the problem persists, call the support center for assistance.
40B00100	Surveillance timeout on CPU 1.	1. Check for errors or unusual conditions that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. 2. Replace the CPU card.
40B00101	Surveillance timeout on CPU 2.	1. Check for errors or unusual conditions that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. 2. Replace the CPU card.
40B00102	Surveillance timeout on CPU 3.	1. Check for errors or unusual conditions that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. 2. Replace the CPU card.
40B00103	Surveillance timeout on CPU 4.	1. Check for errors or unusual conditions that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. 2. Replace the CPU card.

Table 3-1 (Page 21 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
40D00003	An unknown slow shutdown commanded.	Critical cooling problem. Check to ensure the the temperature is in the ambient range
40D00004	An unknown fast shutdown commanded.	Locked fan failure detected. Make sure all fans are operating normally.
4B200054	The CPU cards are not compatible with each other (i.e. one is a 166MHz and the other is a 332MHz)	1. Remove cards 2. Verify part numbers 3. Install valid cards
4B200055	No CPU card in first slot.	1. If only one processor card is used, it must be in slot #1. 2. If two processor cards are being used, replace the card in slot #1.
4B201000	Checkstop	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. CPU Card. 3. System Board. 4. PCI Adapter. 5. I/O board. (See notes on 3-1.)
4B2xxx10	Machine Check	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. Refer to map 1540 in the system unit's Service Guide.
4B201020	TEA Error	Refer to map 1540 in the system unit's Service Guide.

Table 3-1 (Page 22 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
4B2xxx01	Checkstop - Slot 1 Fail	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. CPU Card in Slot 1 3. System Board
4B2xxx02	Checkstop - Slot 2 Fail	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. CPU Card in Slot 2 3. System Board
4B2xxx41	ABIST fail	1. CPU Card in Slot 1. 2. I/O board
4B2xxx42	ABIST fail	1. CPU Card in Slot 2. 2. I/O board

Table 3-1 (Page 23 of 24). Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
4B2xxx43	Service Processor reports JTAG fail	1. Service Processor is the least likely failure, but it is the tester in this case. Replace the Service Processor to assure true failure indication. If the failure disappears, the Service Processor was bad. Otherwise, reinstall the old Service Processor. 2. Remove the CPU(s) and the System Board. If the failure returns, replace the I/O planar. (See notes on 3-1.) Otherwise, continue. 3. Install the System Board WITHOUT the CPU(s). If the failure returns, replace the System Board. Otherwise, continue. 4. Install the CPU Card in slot 1. If the failure returns, replace that CPU Card. Otherwise, continue. 5. Install the CPU Card in slot 2 (if there was one). If the failure returns, replace that CPU Card. Otherwise, continue. 6. If the failure is still absent, the problem was a bad connection, and you have reseated the possible connections.
4BA00000	The system support controller detects the service processor, but cannot establish communication. The system halts.	1. Replace the service processor. 2. Replace the I/O board.
4BA00001	The system support controller cannot detect the service processor.	Replace the service processor.
4BA80013	NVRAM	Refer to map 1540 in the system unit's Service Guide.
4BA10001	SSC sram fail	Refer to map 1540 in the system unit's Service Guide.
4BA10002	SSC sram fail	Refer to map 1540 in the system unit's Service Guide.
4BA10003	Service Processor Fail.	Replace Service Processor.
4BA10004	Service Processor Firmware Fail.	Restore or update the Service Processor Flash EPROM.

Table 3-1 (Page 24 of 24). Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
4BA10005	I²C Path Fail.	1. I/O board. (See notes on 3-1.) 2. CPU Card. 3. System Board.

Memory PD Bits

The following table expands the firmware error code **25Cyyxxx** on page 3-9, where **yy** is the PD values in the table below. Use these values to identify the type of memory that generated the error.

If you replace FRUs and the problem is still not corrected, go to &hdref refid=1540. unless otherwise indicated in the tables.

Table 3-2. Memory Module PD bits

PD value	Size	Clock Cycle (nsecs)	Parity/ ECC
58	32MB	10	ECC
38	128MB	10	ECC

Note: Memory modules must be installed in pairs.

Bus SRN to FRU Reference Table

This table is used to locate defective FRUs within the I/O board PCI and ISA buses. The table indicates which devices should be tested for each SRN. For this procedure, if possible, diagnostics are run on the I/O board bus devices with all adapters removed from the failing bus. If a failure is detected on this system with all adapters removed from the failing bus, the I/O board is the isolated FRU. If a failure is not detected, the adapters are added back one at a time, to their original slot location, and the configuration is tested until a failure is detected. The failure is then isolated to the failing FRU.

If a failure has not been detected and all the FRUs have been tested call your technical service support person for assistance.

Table 3-3. Bus SRN to FRU Reference Table

SRN	Bus Identification	Possible Failing Device and AIX Location Code	Associated FRU
9CC-100	PCI Bus 00	Internal SCSI port 1 (10-60)	I/O board. (See notes on 3-1.)
		Internal Ethernet port (10-80)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 3P (10-68 to 10-6F)	Adapter
		Device installed in I/O Slot 4P (10-70 to 10-77)	Adapter
		Device installed in I/O Slot 5P (10-78 to 10-7F)	Adapter
9CC-101	PCI Bus 01	Device installed in I/O Slot 1P (20-58 to 20-5F)	Adapter
		Device installed in I/O Slot 2P (20-60 to 20-67)	Adapter
9CC-102	PCI Bus 02	Internal/External SCSI port 2 (30-58)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 6P (30-60 to 30-67)	Adapter
		Device installed in I/O Slot 7P (30-68 to 30-6F)	Adapter
		Device installed in I/O Slot 8P (30-70 to 30-77)	Adapter
		Device installed in I/O Slot 9P (30-78 to 30-7F)	Adapter
651-730	ISA Bus	Diskette Drive port/device (01-D1-00-00)	I/O board. (See notes on 3-1.)
		Parallel port/device (01-R1)	I/O board. (See notes on 3-1.)
		Serial ports (1-3)/device (01-S1 to 01-S3)	I/O board. (See notes on 3-1.)
		Mouse port/device (01-K1-01-00)	I/O board. (See notes on 3-1.)
		Keyboard port/device (01-K1-00-00)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 8I (01-01 or 01-02)	Adapter
		Device installed in I/O Slot 9I (01-01 or 01-02)	Adapter

Checkpoints

Checkpoints are intended to let users and service personal know what the server is doing, with some detail, as it initializes. These checkpoints are not intended to be error indicators, but in some cases a server could hang at one of the checkpoints without displaying an 8-character error code. It is for these hang conditions, only, that any action should be taken with respect to checkpoints. The most appropriate action is included with each checkpoint.

Before taking actions listed with a checkpoint, it is a good idea to look for better symptoms in the Service Processor error log. See Service Processor System Information Menu.

SP Checkpoints

Service Processor checkpoints are in the range E010 to E0FF. The message **OK** indicates successful service processor testing and initialization. Firmware checkpoints are listed in “Firmware Checkpoints” on page 3-32.

Note: Go to MAP 1540 for any of the following conditions:

- A four-digit code in the range of E001 through EFFF displays on the operator panal but is not listed in the checkpoint table.
- A four-digit code displays in the checkpoint table, but does not contain a repair action or FRU listing.
- All of the FRUs listed in the repair action have been replaced and the problem has not been corrected.

Table 3-4 (Page 1 of 3). SP Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E000	System Support Controller begins operation. This is an informational checkpoint.	See the note on 3-29.
E010	Starting SP. self-tests	1. Service Processor. 2. I/O board. (See notes on 3-1.)
E011	SP self-tests completed successfully	NA
E012	Begin to set up Service Processor heaps	Service Processor.
E020	Configuring CMOS	1. I/O board. (See notes on 3-1.) 2. Service Processor.

Table 3-4 (Page 2 of 3). SP Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E021	Configuring NVRAM	1. I/O board. (See notes on 3-1.) 2. Service Processor.
E030	Beginning to build I2C resources	1. Service Processor. 2. CPU Card. 3. I/O board. (See notes on 3-1.)
E031	Finished building I2C resources	1. Service Processor. 2. CPU Card. 3. I/O board. (See notes on 3-1.)
E040	Starting serial port tests	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E042	Configuring serial port 1	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E043	Configuring serial port 2	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E044	Preparing to set serial port line speed	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E045	Preparing to initialize serial port	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E060	Preparing to auto power-on (AC restored)	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E061	Preparing to auto power-on (Timer)	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E070	Configuring modem	1. Modem. 2. Service Processor. 3. I/O board. (See notes on 3-1.) 4. CPU Card.

Table 3-4 (Page 3 of 3). SP Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E072	Preparing to call home	1. Modem. 2. Service Processor. 3. I/O board. (See notes on 3-1.) 4. CPU Card.
E075	Entering SP menus	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E076	Leaving SP menus; attempting to disconnect modems	1. Service Processor. 2. I/O board. (See notes on 3-1.) 3. CPU Card.
E0A0	Beginning Bring-Up Phase	1. Service Processor. 2. CPU Card. 3. I/O board. (See notes on 3-1.)
E0B0	Starting CPU BIST	1. CPU Card. 2. I/O board. (See notes on 3-1.) 3. Service Processor.
E0C0	Starting X5 BIST	1. CPU Card. 2. I/O board. (See notes on 3-1.) 3. Service Processor.
E0E0	Pulling CPU out of reset	1. CPU Card. 2. I/O board. (See notes on 3-1.) 3. Service Processor.
E0E1	Pull CPU out of reset: okay	1. CPU Card. 2. I/O board. 3. System board. (See notes on 3-1.) 4. Service Processor.
OK	SP Ready Waiting for Power-On	None. Normal operation.
STBY	SP Ready. System was shutdown by the operating system and is still powered on.	This condition can be requested by a privileged system user with no faults. See Service Processor error log for possible operating system fault indications.

Firmware Checkpoints

Firmware uses progress codes (checkpoints) in the range of E1xx to EFFF. These checkpoints occur during system startup and maybe be useful in diagnosing certain problems. Service Processor checkpoints are listed in “SP Checkpoints” on page 3-29.

If you replace FRUs and the problem is still not corrected, go to “MAP 1540: Minimum Configuration” on page 2-17 unless otherwise indicated in the tables.

Table 3-5 (Page 1 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E100	Reserved	See the note on 3-29.
E101	Video enabled, extended memory test	See the note on 3-29.
E102	Firmware restart	See the note on 3-29.
E103	Set memory refresh (composite img)	See the note on 3-29.
E104	Set memory refresh (recovery block)	See the note on 3-29.
E105	Transfer control to Operating System (normal boot).	See “E1xx Code Boot Problems” on page 3-44.
E108	Run recovery block base memory (test 2K), set stack	See the note on 3-29.
E109	Copy CRC verification code to RAM	See the note on 3-29.
E10A	Turn on cache	See the note on 3-29.
E10B	Flush cache	See the note on 3-29.
E10C	Jump to CRC verification code in RAM	See the note on 3-29.
E10D	Compute composite image CRC	See the note on 3-29.
E10E	Jump back to ROM	See the note on 3-29.
E10F	Transfer control to Open Firmware	See the note on 3-29.
E110	Turn off cache, Check if composite image CRC is valid	See the note on 3-29.
E111	GOOD CRC - jump to composite image	See the note on 3-29.
E112	BAD CRC - initialize base memory, stack	See the note on 3-29.
E113	BAD CRC - copy uncompressed recovery block code to RAM	See the note on 3-29.
E114	BAD CRC - jump to code in RAM	See the note on 3-29.
E115	BAD CRC - turn on cache	See the note on 3-29.

Table 3-5 (Page 2 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E116	BAD CRC - copy recovery block data section to RAM	See the note on 3-29.
E117	BAD CRC - Invalidate and flush cache, set TOC	See the note on 3-29.
E118	BAD CRC - branch to high level recovery control routine.	See the note on 3-29.
E119	Initialize base memory, stack	See the note on 3-29.
E11A	Copy uncompressed recovery block code to RAM	See the note on 3-29.
E11B	Jump to code in RAM	See the note on 3-29.
E11C	Turn on cache	See the note on 3-29.
E11D	Copy recovery block data section to RAM	See the note on 3-29.
E11E	Invalidate and flush cache, set TOC	See the note on 3-29.
E11F	Branch to high level control routine.	See the note on 3-29.
E120	Initialize I/O and early memory block	See the note on 3-29.
E121	Initialize S.P.	See the note on 3-29.
E122	No memory detected (system lockup) Note: Disk drive light is on continuously.	1. Memory Modules 2. Memory Card 3. System Board 4. See the note on 3-29.
E123	No memory module found in socket.	See the note on 3-29.
E124	Disable defective memory bank	See the note on 3-29.
E125	Clear PCI devices command reg, go forth	See the note on 3-29.
E126	Check valid image - start	See the note on 3-29.
E127	Check valid image - successful	See the note on 3-29.
E128	Disable interrupts, set int vectors for O.F.	See the note on 3-29.
E129	Validate target RAM address	See the note on 3-29.
E12A	Copy ROM to RAM, flush cache	See the note on 3-29.
E12B	Set MP operational parameters	See the note on 3-29.
E12C	Set MP cpu node characteristics	See the note on 3-29.
E12D	Park secondary processors in parking lot	See the note on 3-29.
E12E	Primary processor sync	See the note on 3-29.
E12F	Unexpected return from Open Firmware (system lockup)	See the note on 3-29.

Table 3-5 (Page 3 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E130	Build device tree	See the note on 3-29.
E131	Create ROOT node	See the note on 3-29.
E132	Create cpus node	See the note on 3-29.
E133	Create L2 Cache node	See the note on 3-29.
E134	Create memory node	See the note on 3-29.
E135	Create memory module node	See the note on 3-29.
E136	Test memory	See the note on 3-29.
E137	Create openprom node	See the note on 3-29.
E138	Create options node	See the note on 3-29.
E139	Create aliases node and system aliases	See the note on 3-29.
E13A	Create packages node	See the note on 3-29.
E140	PReP style load	See the note on 3-29.
E149	Create boot mgr node	See the note on 3-29.
E14C	Create terminal-emulator node	See the note on 3-29.
E14D	Load boot image	See “E1xx Code Boot Problems” on page 3-44.
E14E	Create client interface node/directory	See the note on 3-29.
E14F	NVRAM validation, config variable token generation	See the note on 3-29.
E150	Create host (primary) PCI controller node	See the note on 3-29.
E151	Probing primary PCI bus	1. PCI Adapters 2. I/O board. If a network adapter or I\O board is replaced, see 3-1. See the note on 3-29.
E152	Probe for adapter FCODE, evaluate if present	1. PCI Adapters 2. I/O board. If a network adapter or I\O board is replaced, see 3-1. See the note on 3-29.
E153	End adapter FCODE, probe/evaluation	See the note on 3-29.
E154	Create PCI bridge node	See the note on 3-29.

Table 3-5 (Page 4 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E155	Probe PCI bridge secondary bus	1. PCI Adapters 2. I/O board. If a network adapter or I\O board is replaced, see 3-1. See the note on 3-29.
E156	Create PCI ethernet node	See the note on 3-29.
E15A	Create 64 bit host (primary) PCI controller node	See the note on 3-29.
E15B	Transferring control to Operating System (service mode boot)	See “E1xx Code Boot Problems” on page 3-44.
E15C	Probe primary 64 bit PCI bus	See the note on 3-29.
E15D	Create host PCI controller node	See the note on 3-29.
E15E	Create MPIC node	See the note on 3-29.
E15F	Adapter VPD probe	See the note on 3-29.
E160	CPU node VPD creation	See the note on 3-29.
E161	Root node VPD creation	See the note on 3-29.
E162	SP node VPD creation	See the note on 3-29.
E164	Create PCI graphics node (P9)	See the note on 3-29.
E168	Create PCI graphics node (S3)	See the note on 3-29.
E16C	GTX100P Subsystem Open request.	See the note on 3-29.
E16D	GTX100P Planar not detected or failed diagnostics.	See the note on 3-29.
E16E	GTX100P Subsystem Open successful.	See the note on 3-29.
E16F	GTX100P Close Subsystem.	See the note on 3-29.
E170	Start of PCI Bus Probe	See the note on 3-29.
E171	Executing PCI-Delay function	See the note on 3-29.
E174	Establish host connection	Refer to “E1xx Code Boot Problems” on page 3-44 for general considerations.

Table 3-5 (Page 5 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E175	BootP request	Refer to "E1xx Code Boot Problems" on page 3-44 for general considerations. 1. Turn off then on, and retry the boot operation. 2. Verify the network connection (network could be down). 3. Have network administrator verify the server configuration for this client.
E176	TFTP file transfer	See the note on 3-29.
E177	Transfer failure due to TFTP error condition	See the note on 3-29.
E178	Create PCI token ring node	See the note on 3-29.
E180	SP Command setup	See the note on 3-29.
E183	SP Post	See the note on 3-29.
E190	Create ISA node	See the note on 3-29.
E193	Initialize Super I/O.	See the note on 3-29.
E196	Probe ISA bus.	See the note on 3-29.
E19B	Create Service Processor node.	See the note on 3-29.
E19C	Create tablet node.	See the note on 3-29.
E19D	Create nvram node.	See the note on 3-29.
E19E	Real time clock (RTC) creation and initialization.	Refer to error code 28030xxx in "Firmware/POST Error Codes" on page 3-2.
E19F	Create eeprom node.	See the note on 3-29.
E1AD	See description of checkpoint E1DE.	See the note on 3-29.
E1B0	Create lpt node.	See the note on 3-29.
E1B1	Create serial node.	See the note on 3-29.
E1B2	Create audio node.	See the note on 3-29.
E1B3	Create 8042 node.	See the note on 3-29.
E1B6	Probe for (ISA) keyboard.	See the note on 3-29.
E1BA	Enable L2 cache.	See the note on 3-29.
E1BB	Set cache parms for burst.	See the note on 3-29.
E1BC	Set cache parms for 512KB.	See the note on 3-29.
E1BD	Probe for (ISA) mouse.	See the note on 3-29.
E1BE	Create op-panel node.	See the note on 3-29.

Table 3-5 (Page 6 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E1BF	Create pwr-mgmt node.	See the note on 3-29.
E1C0	Create ISA ethernet node.	See the note on 3-29.
E1C5	Create ISA interrupt controller (pic) node.	See the note on 3-29.
E1C6	Create dma node.	See the note on 3-29.
E1D0	Create PCI SCSI node.	See the note on 3-29.
E1D3	Create (* wildcard *) SCSI block device node (SD).	See the note on 3-29.
E1D4	Create (* wildcard *) SCSI byte device node (ST).	See the note on 3-29.
E1DB	Create floppy controller (FDC) node.	See the note on 3-29.
E1DC	Dynamic console selection.	If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the disired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: • 9600 Baud • No Parity • 8 Data bits • 1 Stop bit

Table 3-5 (Page 7 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E1DD	Early processor exception	I/O board (See notes on 3-1.) See the note on 3-29.
E1DE	Alternating pattern of E1DE and E1AD is used to indicate a Default Catch condition before the firmware "checkpoint" word is available.	1. I/O board (See notes on 3-1.) See the note on 3-29.
E1DF	Create diskette drive (disk) node	See the note on 3-29.
E1E0	Program flash	See the note on 3-29.
E1E1	Flash update complete	See the note on 3-29.
E1E2	Initialize System I/O	See the note on 3-29.
E1E3	PReP boot image initialization.	See the note on 3-29.
E1E4	Initialize Super I/O with default values.	See the note on 3-29.
E1E5	XCOFF boot image initialization.	See the note on 3-29.
E1E6	Set up early memory allocation heap.	See the note on 3-29.
E1E7	PE boot image initialization.	See the note on 3-29.
E1E8	Initialize primary diskette drive (polled mode).	See the note on 3-29.
E1E9	ELF boot image initialization.	See the note on 3-29.
E1EA	Firmware flash corrupted, load from diskette.	Ensure that the diskette installed contains recovery image appropriate for this system unit. The System Management Services recovery procedure for the flash EEPROM should be executed. See “Update” on page 5-22. If the diskette is installed with the correct recovery image, then suspect: 1. Diskette 2. Diskette drive 3. Diskette cable 4. I/O board (See notes on 3-1.) See the note on 3-29.

Table 3-5 (Page 8 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E1EB	Verify flash EPROM recovery image.	Ensure that the diskette installed contains recovery image appropriate for this system unit. The System Management Services recovery procedure for the flash EEPROM should be executed. See “Update” on page 5-22. If the diskette is installed with the correct recovery image, then suspect: 1. Diskette 2. Diskette drive 3. Diskette cable 4. I/O board (See notes on 3-1.) See the note on 3-29.
E1EC	Get recovery image entry point	See the note on 3-29.
E1ED	Invalidate instruction cache	See the note on 3-29.
E1EE	Jump to composite image	See the note on 3-29.
E1EF	Erase flash	See the note on 3-29.
E1F0	Start O.B.E.	See the note on 3-29.
E1F1	Begin self-test sequence on boot device(s)	See the note on 3-29.
E1F2	Power-On Password prompt.	Prompt should be visible on the system console. If a console is attached but nothing is displayed on it, go to the “Entry MAP” on page 2-1 with the symptom "All display problems."
E1F3	Privileged-Access Password prompt.	Prompt should be visible on the system console. If a console is attached but nothing is displayed on it, go to the “Entry MAP” on page 2-1 with the symptom "All display problems."
E1F5	Build boot device list.	See the note on 3-29.
E1F6	Determine boot device sequence.	See the note on 3-29.
E1F7	No boot image located.	See the note on 3-29.
E1FB	Scan SCSI bus for attached devices.	See the note on 3-29.

Table 3-5 (Page 9 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E1FD	Default Catch	The operator panel will alternate between the code E1FD and another Exxx code, where Exxx is the point at which the error occurred. If the Exxx is not listed in this table, go to "MAP 1540: Minimum Configuration" on page 2-17.
E201	Setup PHB BARC addresses.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E202	Initialize PHB registers and PHB's PCI configuration registers.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E203	Look for PCI to ISA bridge.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E204	Setup ISA bridge. PCI config. registers and initialize	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E206	Check for 50MHz device on PCI Bus in Slots 1P or 2P.	1. Replace the I/O board (See notes on 3-1.) 2. I/O Adapters in PCI slots 1P or 2P. 3. See the note on 3-29.
E207	Setup Data gather mode and 64/32-bit mode on PCG.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E208	Assign bus number on PCG.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E209	Assign PCI I/O addresses on PCI.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E20A	Assign PCI I/O addresses on PCG	Replace the I/O board. (See notes on 3-1.) See the note on 3-29.
E20B	Check MCERs stuck at fault.	1. Replace the System Board. See the note on 3-29. 2. If the problem persists, go to "MAP 1540: Minimum Configuration" on page 2-17.
E20C	Testing L2 cache.	Replace the CPU card (See notes on 3-1.) See the note on 3-29.
E211	IPL ROS CRC checking.	Replace the I/O board (See notes on 3-1.) See the note on 3-29.
E212	Processor POST.	Replace the CPU card (See notes on 3-1.) See the note on 3-29.

Table 3-5 (Page 10 of 10). Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E213	Initial memory configuration.	1. Replace the memory card (See notes on 3-1.) 2. Replace the System Board. See the note on 3-29.
E214	Memory test.	Replace the memory card (See notes on 3-1.) See the note on 3-29.
E216	Copy ROS into RAM. Setup Translation and C environment.	Replace the memory card (See notes on 3-1.) See the note on 3-29.
E220	Final memory configuration.	Go to “MAP 1540: Minimum Configuration” on page 2-17.
E299	Start C code execution.	See the note on 3-29.
E3xx	Memory test	See “Memory Test Hang Problem” on page 3-42.
E440	Validate NVRAM, initialize partitions as needed.	1. Verify that the system and Service Processor firmware levels are at the current release levels, update as necessary. 2. Replace the memory card (See notes on 3-1.) See the note on 3-29.
E441	Generate /options node NVRAM configuration variable properties.	1. Verify that the system and Service Processor firmware levels are at the current release levels, update as necessary. 2. Replace the memory card (See notes on 3-1.) See the note on 3-29.
E442	Validate NVRAM partitions.	1. Verify that the system and Service Processor firmware levels are at the current release levels, update as necessary. 2. Replace the memory card (See notes on 3-1.) See the note on 3-29.
E443	Generate NVRAM configuration variable dictionary words.	Suspect a system firmware problem if this problem persists. Verify that the system firmware is at the current release level, update as necessary. See the note on 3-29.

Memory Test Hang Problem

General Memory Information: Memory Card cards can be installed in either slot (or both) on the System Board, there is no requirement that one be installed before the other.

It is perfectly acceptable for there to be 2 partially populated Memory Cards, the first one does not have to be fully populated before memory on the 2nd Memory Card is usable.

Memory Card memory DIMMs, on the other hand, must be installed in matched (size and speed) pairs. Refer to the "Removal and Replacement Procedures" for "Memory Modules" on page 6-26 for labeling of the Memory Card and instructions on module removal and installation (do not, however, replace the covers as directed while troubleshooting this problem). A single memory DIMM pair may be installed in module slots 1 and 2 (not slots 1 and 3). A second memory DIMM pair could be installed in module slots 5 and 6 (slots 3 and 4 do not have to be populated first). Along these same lines, there is no requirement that memory DIMM slots 1 and 2 be populated before another slot pair.

Problem resolution steps: This section attempts to trouble shoot a problem during the memory testing where the system hangs before an error code can be displayed on the Operator Panel.

1. Power down the system
2. Remove and re-install any installed Memory Card(s), power the system up. If the system no longer stops at an E3xx code, re-seating the Memory Card(s) has corrected the problem.
3. Attempt to isolate the problem to a specific Memory Card.
   a. If there is only 1 Memory Card installed, tag the card as suspect bad and skip to step 4 on page 3-43.
   b. Remove one of the 2 Memory Cards, tag the card as suspect bad and Power the system up. If the system no longer stops at an E3xx code, skip to step 3d.
   c. Power down the system, remove the installed Memory Card and install the Memory Card removed in step 3b. Move the suspect bad tag from the installed Memory Card to the one just removed, and power the system up. If the system stops at an E3xx code, remove the suspect bad tag and skip to step 7 on page 3-44, if the system does not stop at an E3xx code, skip to step 4 on page 3-43.
   d. Power down the system, remove the installed Memory Card and install the Memory Card removed in step 3b (tagged as suspect bad). Power the system up. If the system stops at an E3xx code again, skip to step 4 on page 3-43.

e. Remove the suspect bad tag, re-install the 2nd Memory Card and power the system up. If the system no longer stops at an E3xx code, re-seating the Memory Cards (again) has corrected the problem. If the system stops at an E3xx code again, skip to step 7 on page 3-44.

4. Attempt to isolate the problem to a specific memory DIMM pair on the Memory Card tagged as suspect bad:
   a. Power the system down.
   b. Remove all installed memory DIMMs from the suspect bad Memory Card except one pair. Record the original positions of any memory DIMMs removed so that when instructed to re-install them they can be installed in their original position.
   c. Power the system up.
   d. If the system no longer stops at an E3xx code, skip to step 4g.
   e. Replace the memory DIMM pair left installed in step 4b, and tag the removed memory DIMM pair as suspect bad.
   f. Power the system up. If the system stops at an E3xx code, skip to step 6 on page 3-44.
   g. Power down the system
   h. If there are more memory DIMM pairs to be re-installed on the suspect bad Memory Card, install another memory DIMM pair in their original positions on the Memory Card, and continue with step 4i.

      If there are no more memory DIMM pairs to be re-installed, you either have a suspect bad memory DIMM pair or simply reseating the memory DIMMs on the Memory Card card has corrected the problem. If you have a suspect bad memory DIMM pair, continue with step 5.
   i. Power the system up.
   j. If the system does not stop at an E3xx code, continue at step 4g.
   k. If the system has stopped at an E3xx code again, replace the memory DIMM pair that was just re-installed and tag the removed memory DIMM pair as suspect bad.
   l. Power the system up. If the system again stops at an E3xx code, continue with step 6 on page 3-44. If the system does not stop at an E3xx code, continue with step 4g.
5. Determine which of the suspect bad memory DIMMs is defective (may be both).

   For each of the 2 memory DIMMs tagged as suspect bad:
   a. Power the system down. Removing the currently installed memory DIMM first, re-install one of the 2 suspect bad memory DIMMs in its original position.
   b. Power the system up. If the system again stops at an E3xx code, the memory DIMM tagged suspect bad just installed is defective, replace it with the memory DIMM removed in step 5a. If the system did not stop at an E3xx code, remove the suspect bad tag from the memory DIMM just installed - it is not defective.

6. Replace the Memory Card.
7. Replace the System Board.
8. Replace the CPU Card(s).

E1xx Code Boot Problems: Depending on the boot device, a checkpoint may be displayed on the operator panel for an extended period of time while the boot image is retrieved from the device. This is particularly true for Tape and Network boot attempts. If the checkpoint/code is displayed for an extended time there may be a problem loading the boot image from the device. If booting from CD-ROM or Tape, watch for “activity” on the drive's LED indicator. A blinking LED means that the loading of either the boot image or additional information required by the operating system being booted is still in progress.

For network boot attempts, if the system is not connected to an active network or if the target server is inaccessible (this can also result from incorrect IP parameters being supplied), the system still attempts to boot and because time-out durations are necessarily long to accommodate retries, the system may appear to be hung.

1. Restart the system and get to the Firmware SMS utilities. In the utilities check:
   - Is the intended boot device correctly specified in the boot sequence?
     - If the intended boot device is not correctly identified in the boot sequence, add it to the boot sequence using the SMS menus.
   - For network boot attempts:
     - Are the IP parameters correct?
     - Attempt to “Ping” the target server using the SMS “Ping” utility.
2. If the checkpoint E105 or E15B is displayed for an extended time, there may be a problem with the integrity of the boot image.
   - Try to boot and run standalone diagnostics against the system, particularly against the intended boot device. If the diagnostics are successful, it may be necessary to perform an operating system specific recovery process, or reinstall the operating system.
3. If attempting to boot from a Hard disk, CD-ROM, or Tape drive:
   a. Try a different CD/Tape (unless booting from Hard disk).
   b. Verify proper SCSI bus termination.
   c. Replace SCSI cable.
   d. It is possible that another attached SCSI device is causing the problem.

      Disconnect any other SCSI devices attached to the same controller as the one the boot device is attached to and retry the boot operation. If this is successful, one of the devices removed is causing the problem, re-attach devices one by one and retry the boot operation until the problem recurs and replace the device that caused the problem.
   e. Replace SCSI adapter (if drive is attached to a card rather than the I/O Board).
   f. Replace SCSI drive.

g. It is possible that another installed adapter is causing the problem.

   Remove all installed adapters except the one the boot device is attached to, try to boot the standalone diagnostics from a CD-ROM drive attached to the scsi controller on the I/O Board, and run the diagnostics against the system.

   If this is successful, re-install adapters (and attached devices as applicable) that were removed, one at a time, and run the standalone diagnostics against the system.

h. Replace backplane.
i. Replace I/O Board. (See notes on 3-1.)

4. If attempting to boot from a Network controller:
   a. Power Off then On and retry the boot operation
   b. Verify the network connection (network could be down)
   c. Verify that IP parameters are correct
   d. Try to “Ping” the target server
   e. Have network administrator verify the server configuration for this client
   f. Replace network cable
   g. Replace network adapter (unless trying to boot using the ethernet controller on the I/O Board)
   h. It is possible that another installed adapter is causing the problem.

      Remove all installed adapters except the one you are trying to boot, and try to boot the standalone diagnostics from a CD-ROM drive attached to the scsi controller on the I/O Board. If this is successful, run the diagnostics against the system, particularly against the target network boot controller/adapter.

      If this is successful, re-install adapters (and attached devices as applicable) that were removed, one at a time, and run the diagnostics against the system. If the diagnostics fails, replace the last installed FRU.

   i. Replace I/O Board (if not replaced in previous step). (See notes on 3-1.)
5. If you replaced the indicated FRUs and the problem is still not corrected, or the above descriptions did not address your particular situation, go to "MAP 1540: Minimum Configuration".

Location Codes

This system unit uses Physical Location Codes in conjunction with AIX Location Codes to provide mapping of the failing field replaceable units. The location codes are produced by the system unit's firmware and AIX.

Physical Location Codes

Physical location codes provide a mapping of logical functions in a platform (or expansion sites for logical functions, such as connectors or ports) to their specific locations within the physical structure of the platform.

Location Code Format

The format for the location code is an alphanumeric string of variable length, consisting of a series of location identifiers, separated by the standard dash (-) or slash (/) character. The series is hierarchical; that is, each location identifier in the string is a physical child of the one preceding it.

- The - (dash) separator character represents a normal structural relationship where the child is a separate physical package and it plugs into (or is connected to) the parent. For example, P1-C1 is a CPU card (C1) plugged into a planar (P1), or P1-M1 is a memory card (M1) plugged into a planar (P1).
- The / (slash) separator character separates the base location code of a function from any extended location information. A group of logical devices can have the same base location code because they are all on the same physical package, but may require extended location information to describe the connectors they support. For example, P2/S1 describes the location of the serial port 1 controller and its connector (S1), which is located on planar P2 (its base location code), but the / indicates that further devices can be connected to it at the external S1 serial connector. The keyboard controller and its connector likewise have location code P2/K1, which means they have the same base location code (P2) as serial port 1, but a different external connector. In contrast, the location code P2-K1 actually points to the device connected to connector K1; that is, the keyboard. The location code P2/Z1 indicates an integrated SCSI controller which drives connector Z1, while location codes of P2-Z1-... point to the actual SCSI bus and devices.

Each location identifier consists of one alpha prefix character that identifies a location type, and a decimal integer number (typically one or two digits) that identifies a specific instance of this location type. Certain location types may also support secondary sub-locations, which are indicated by appending a period (".") character and a sub-location instance number.

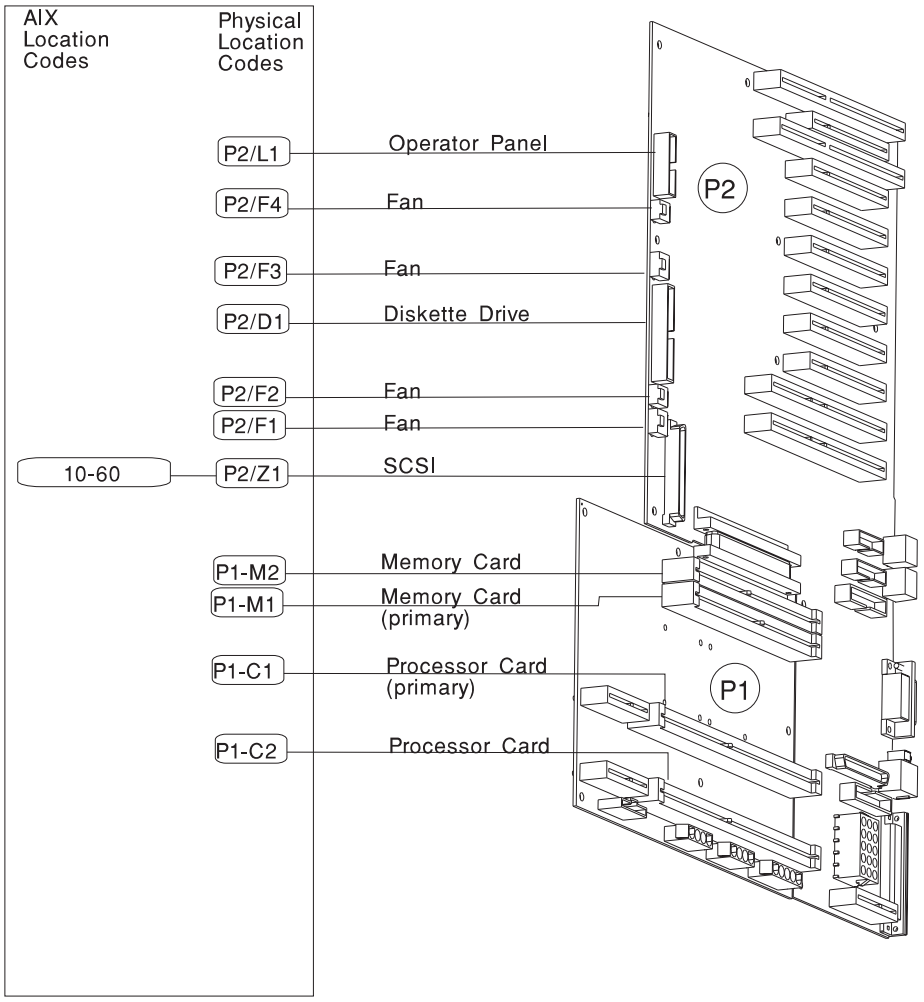
Specifically, the format of a location code is defined as follows:

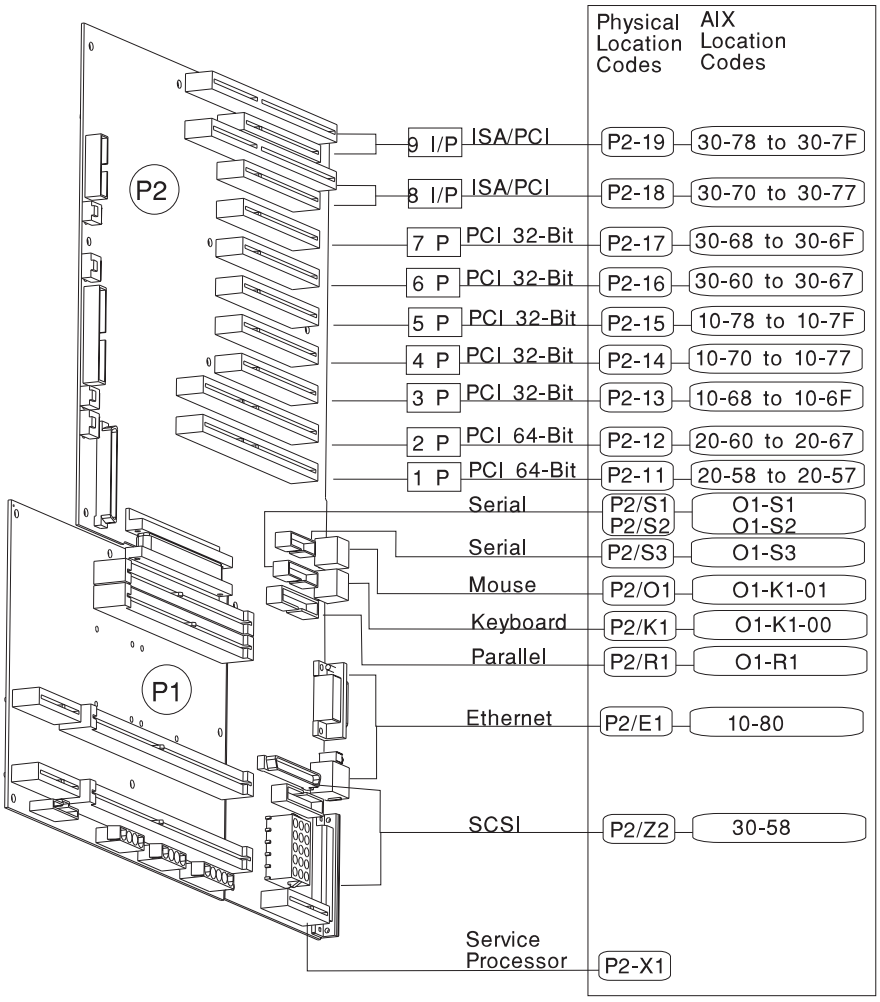
pn[.n][- or /]pn[.n][- or /]...

Where p is a defined alpha location type prefix, n is a location instance number, and [.n] is a sub-location instance number (where applicable). Sub-location notation is used only for location types which have clearly defined and limited expansion sites; for example, memory SIMMs slots on a memory card. Primarily, the [.n] sub-location notation is intended for use as an abbreviation of the location code in cases where:

1. Based on the device structure, the abbreviated sub-location code conveys the same information in a more concise form than an additional level of location identifier -- for example:
   - P1-M1.4 (pluggable module 4 on Memory Card 1 on Planar 1), rather than P1-M1-M4
   - P1-C1.1 (pluggable CPU 1 on CPU Card 1 on Planar 1), rather than P1-C1-C1
   - P2-Z1-A3.1 (LUN 1 at SCSI ID 3 on integrated SCSI bus 1 from Planar 2), rather than P2-Z1-A3-A1
2. The sub-location is either a basic physical extension or sub-enclosure of the base location, but does not represent additional function or connectivity; for example, a drawer in a rack (U1.2) or a riser card on an I/O board (P2.1).

AIX and Physical Location Code Reference Table




Physical Location Codes
AIX Location Codes
P2
P1
9 I/P
ISA/PCI
P2-19
30-78 to 30-7F
8 I/P
ISA/PCI
P2-18
30-70 to 30-77
7 P
PCI 32-Bit
P2-17
30-68 to 30-6F
6 P
PCI 32-Bit
P2-16
30-60 to 30-67
5 P
PCI 32-Bit
P2-15
10-78 to 10-7F
4 P
PCI 32-Bit
P2-14
10-70 to 10-77
3 P
PCI 32-Bit
P2-13
10-68 to 10-6F
2 P
PCI 64-Bit
P2-12
20-60 to 20-67
1 P
PCI 64-Bit
P2-11
20-58 to 20-57
Serial
P2/S1
P2/S2
O1-S1
O1-S2
Serial
P2/S3
O1-S3
Mouse
P2/O1
O1-K1-01
Keyboard
P2/K1
O1-K1-00
Parallel
P2/R1
O1-R1
Ethernet
P2/E1
10-80
SCSI
P2/Z2
30-58
Service Processor
P2-X1

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Central Electronics Complex (CEC)				
System Planar	00-00	P1		
Processor Card 1	00-00	P1-C1	Processor Connectors J8 and J5	CPU ID 0x00 and 0x01 (if 2-way card)
Processor Card 2	00-00	P1-C2	Processor Connector J9 and J6	CPU ID 0x04 and 0x05 (if 2-way card)
Memory Card 1	00-00	P1-M1	Processor Connector J12	
Memory Card 1 moduleS 1 thru 16	00-00	P1-M1.1 through P1-M1.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
Memory Card 2	00-00	P1-M2	Processor Connector J13	
Memory Card 2 moduleS 1 thru 16	00-00	P1-M2.1 through P1-M2.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
I/O board	00-00	P2		
FMC card	00-00	P2/X2	Connector J51	
Integrated Devices				
Diskette Drive	01-D1-00-00	P2-D1	I/O board Connector J13	Base Address 0x0310
Keyboard	01-K1-00-00	P2-K1	I/O board Connector J23	Base Address 0x0060
Mouse	01-K1-01-00	P2-O1	I/O board Connector J27	0x0060
Diskette Port	01-D1	P2/D1	I/O board Connector J13	0x03f0
Keyboard Port	01-K1-00	P2/K1	I/O board Connector J23	0x0060
Mouse Port	01-K1-01	P2/O1	I/O board Connector J27	0x0060
Serial Port 1	01-S1	P2/S1	I/O board Connector J41	0x0318

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Serial Port 2	01-S2	P2/S2	I/O board Connector J41	0x0218
Serial Port 3	01-S3	P2/S3	I/O board Connector J50	0x0898
Parallel Port	01-R1	P2/R1	I/O board Connector J47	0x0378
Ethernet Port	10-80	P2/E1	I/O board Connector J18(TH) or J21(TP)	Host Bridge ID00, Device 06
SCSI Port 1	10-60	P2/Z1	I/O board Connector J25	Host Bridge ID00, Device 04
SCSI Port 2	30-58	P2/Z2	I/O board Connector J11 and J30	Host Bridge ID02, Device 06
Pluggable Adapters				
Card in PCI Slot 1P	20-58 to 20-5F	P2-I1	I/O board Connector J1	Host Bridge ID01, Device 01
Card in PCI Slot 2P	20-60 to 20-67	P2-I2	I/O board Connector J2	Host Bridge ID01, Device 02
Card in PCI Slot 3P	10-68 to 10-6F	P2-I3	I/O board Connector J3	Host Bridge ID00, Device 03
Card in PCI Slot 4P	10-70 to 10-77	P2-I4	I/O board Connector J4	Host Bridge ID00, Device 04
Card in PCI Slot 5P	10-78 to 10-7F	P2-I5	I/O board Connector J5	Host Bridge ID00, Device 05
Card in PCI Slot 6P	30-60 to 30-67	P2-I6	I/O board Connector J6	Host Bridge ID02, Device 02
Card in PCI Slot 7P	30-68 to 30-6F	P2-I7	I/O board Connector J7	Host Bridge ID02, Device 03
Card in PCI Slot 8P	30-70 to 30-77	P2-I8	I/O board Connector J8P	Host Bridge ID02, Device 04
Card in PCI Slot 9P	30-78 to 30-7F	P2-I9	I/O board Connector J9P	Host Bridge ID02, Device 05
Card in ISA Slot 8I	01-01 or 01-02	P2-I8	I/O board Connector J81	
Card in ISA Slot 9I	01-01 or 01-02	P2-I9	I/O board Connector J91	
SCSI Devices				

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Base CD-ROM (Bay A1)	10-60-00-6, 0	P2-Z1-A6		Primary SCSI Bus ID 6 (refer to the note at the end of this table)
Media Device in Bay B1	10-60-00-4, 0	P2-Z1-A4		Primary SCSI Bus ID 4 (refer to the note at the end of this table)
Media Device in Bay B2	10-60-00-5, 0	P2-Z1-A5		Primary SCSI Bus ID 5 (refer to the note at the end of this table)
SCSI Backplane C When connected to SCSI Port 1 (P2/Z1)	10-60-00-15, 0	P2-Z1-B2		Primary SCSI Bus ID 15
SCSI Backplane C When connected to SCSI Port 2 (P2/Z2)	30-58-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15
DASD in Bays C1 through C6 When connected to SCSI Port 1 (P2/Z1)	10-60-00-G, 0 Where G identifies Primary SCSI Bus ID 8 through 13	P2-Z1-B2.1 through B2.6		Primary SCSI Bus ID 8 through 13
DASD in Bays C1 through C6 When connected to SCSI Port 2 (P2/Z2)	30-58-00-G, 0 Where G identifies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6		Secondary SCSI Bus ID 8 through 13
SCSI Backplane D When connected to SCSI Port 2 (P2/Z2)	30-58-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
SCSI Backplane D When connected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15
DASD in Bays D1 through D6 When connected to SCSI Port 2 (P2/Z2)	30-58-00-G, 0 Where G identifies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6	Backplane connector J6 through J11 Slots A through F	Secondary SCSI Bus ID 8 through 13
DASD in Bays D1 through D6 When connected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6	Backplane connector J6 through J11 Slots A through F	Bus ID 8 through 13
SCSI Backplane E When connected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15
DASD in Bays E1 through E6 When connected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6	Backplane connector J6 through J11 Slots A through F	Bus ID 8 through 13
Fans				
Fan 1		F1	Fan connector J12 at I/O Board	
Fan 2		F2	Fan connector J17 at I/O Board	
Fan 3		F3	Fan connector J15 at I/O Board	
Fan 4		F4	Fan connector J19 at I/O Board	
Fan 1 Connector		P2/F2	Fan connector J12 at I/O Board	
Fan 2 Connector		P2/F2	Fan connector J17 at I/O Board	

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Fan 3 Connector		P2/X3	Fan connector J15 at I/O Board	
Fan 4 Connector		P2/X4	Fan connector J19 at I/O Board	
Service Processor				
Service Processor		P2-X1	I/O board Connector J10	
Operator Panel				
Operator Panel		L1	I/O board Connector J22A	
Operator Panel Connector		P2/L1	I/O board Connector J22A	
Power Supply				
Power Supply		V1		I2C Ad 92, Ch2; RTAS=9002-0
Note: The SCSI bus ID's are the recommended values. Features installed at the manufacturing site will correspond to these IDs. Field installations may not comply with these recommendations.				

AIX Location Codes

The basic formats of the AIX location codes are:

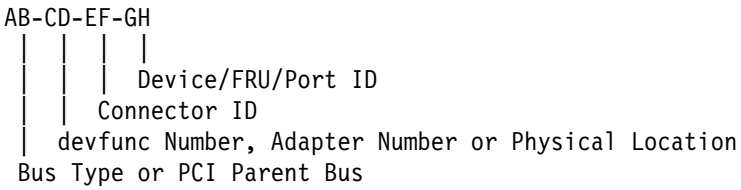
- For non-SCSI devices/drives

  AB-CD-EF-GH

- For SCSI devices/drives

  AB-CD-EF-G,H

For planars, cards, and non-SCSI devices the location code is defined as:



- The AB value identifies a bus type or PCI parent bus as assigned by the firmware.
- The CD value identifies adapter number, adapter's devfunc number, or physical location. The devfunc number is defined as the PCI device number times 8, plus the function number.
- The EF value identifies a connector.
- The GH value identifies a port, address, device, or FRU.

Adapters and cards are identified with just AB-CD.

The possible values for AB are:

00	Processor bus
01	ISA bus
02	EISA bus
03	MCA bus
04	PCI bus used in the case where the PCI bus cannot be identified
05	PCMCIA buses
xy	For PCI adapters where x is equal to or greater than 1. The x and y are characters in the range of 0-9, A-H, J-N, P-Z (O, I, and lower case are omitted) and are equal to the parent bus's ibm, aix-loc Open Firmware Property.

The possible values for CD depend on the adapter/card.

For pluggable PCI adapters/cards, CD is the device's devfunc number (PCI device number times 8, plus the function number). The C and D are characters in the range of 0-9, and A-F (hex numbers). This allows the location code to uniquely identify multiple adapters on individual PCI cards.

For pluggable ISA adapters, CD is equal to the order the ISA cards defined/configured either by SMIT or the ISA Adapter Configuration Service Aid.

For integrated ISA adapters, CD is equal to a unique code identifying the ISA adapter. In most cases this is equal to the adapter's physical location code. In cases where a physical location code is not available, CD will be FF.

EF is the connector ID. It is used to identify the adapter's connector that a resource is attached to.

GH is used to identify a port, device, or FRU. For example:

- For async devices GH defines the port on the fanout box. The values are 00 to 15.
- For a diskette drive H defines which diskette drive 1 or 2. G is always 0.
- For all other devices GH is equal to 00.

For integrated adapter, EF-GH is the same as the definition for a pluggable adapter. For example, the location code for a diskette drive is 01-D1-00-00. A second diskette drive is 01-D1-00-01.

For SCSI the location code is defined as:

```
AB-CD-EF-G,H
 |  |  | | |
 |  |  | | Logical Unit address of the SCSI Device
 |  |  | Control Unit Address of the SCSI Device
 |  |  Connector ID
 |  devfunc Number, Adapter Number or Physical Location
 Bus Type or PCI Parent Bus
```

Where AB-CD-EF are the same as non-SCSI devices.

G defines the control unit address of the device. Values of 0 to 15 are valid.

H defines the logical unit address of the device. Values of 0 to 255 are valid.

There is also a bus location code that is generated as '00-XXXXXXXX' where XXXXXXXX is equivalant to the node's unit address.

Examples of physical location codes displayed by AIX are:

Processor Card in slot 1 of planar 1

P1-C1

Memory module in system planar slot 2

P1-M2

Memory module 12 in card in slot 2 of system planar

U1-P1-M2.12

Examples of AIX location codes displayed are:

Integrated PCI adapter

10-80	Ethernet
10-60	Integrated SCSI Port 1
30-58	Integrated SCSI Port 2

Pluggable PCI adapters

20-58 to 20-5F	Any PCI card in slot 1
20-60 to 20-67	Any PCI card in slot 2
10-68 to 10-6F	Any PCI card in slot 3
10-70 to 10-77	Any PCI card in slot 4
10-78 to 10-7F	Any PCI card in slot 5
30-60 to 30-67	Any PCI card in slot 6
30-68 to 30-6F	Any PCI card in slot 7
30-70 to 30-77	Any PCI card in slot 8
30-78 to 30-7F	Any PCI card in slot 9

Integrated ISA adapters

01-D1	Diskette adapter
01-R1	Parallel port adapter
01-S1	Serial port 1 adapter
01-S2	Serial port 2 adapter
01-S3	Serial port 3 adapter
01-K1	Keyboard adapter

Non-integrated ISA adapters

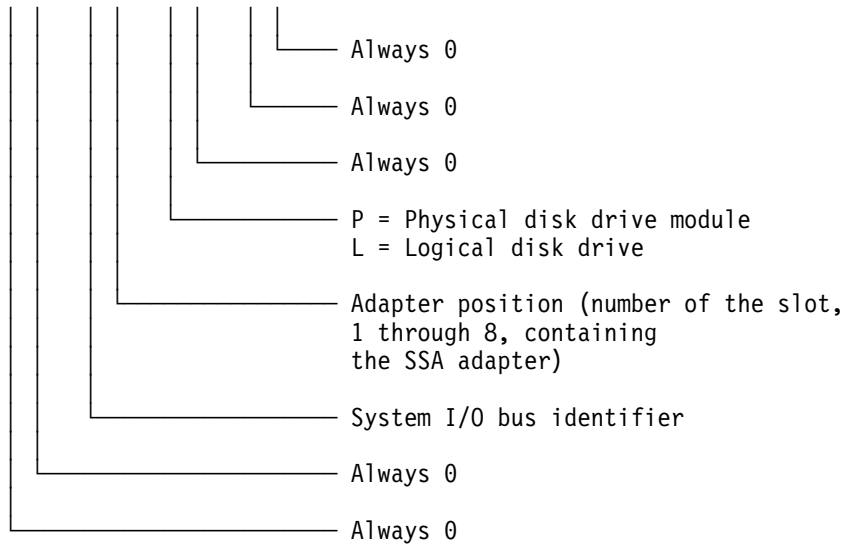
01-01	First ISA card defined/configured
01-02	Second ISA card defined/configured

Device attached to SCSI controller

10-60-00-4,0	Device attached to Integrated SCSI Port 1

SSA Location Code Format

Location codes identify the locations of adapters and devices in the using system and their attached subsystems and devices. These codes are displayed when the diagnostic programs isolate a problem. For information about the location codes that are used by the using system, see the operator guide for the using system.



The location code shows only the position of the SSA adapter in the using system and the type of device that is attached. Use a service aid to find the location of the device (disk drive module). For more information, see “SSA Service Aids” on page 3-64.

SSA Loops and Links

The disk drive modules of the system unit are connected through two SSA links to an SSA adapter that is located in the using system. The disk drive modules, SSA links, and SSA adapter are configured in loops. Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (SSA cable) to the disk drive modules. The path continues through the disk drive modules, then returns through another link to a second connector on the SSA adapter.

The SSA Adapter

The system unit can be attached to an SSA adapter. See Figure 3-1. The adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair. Connectors B1 and B2 are used on 7025 Model F50, since they support the internal and external SSA cable options.

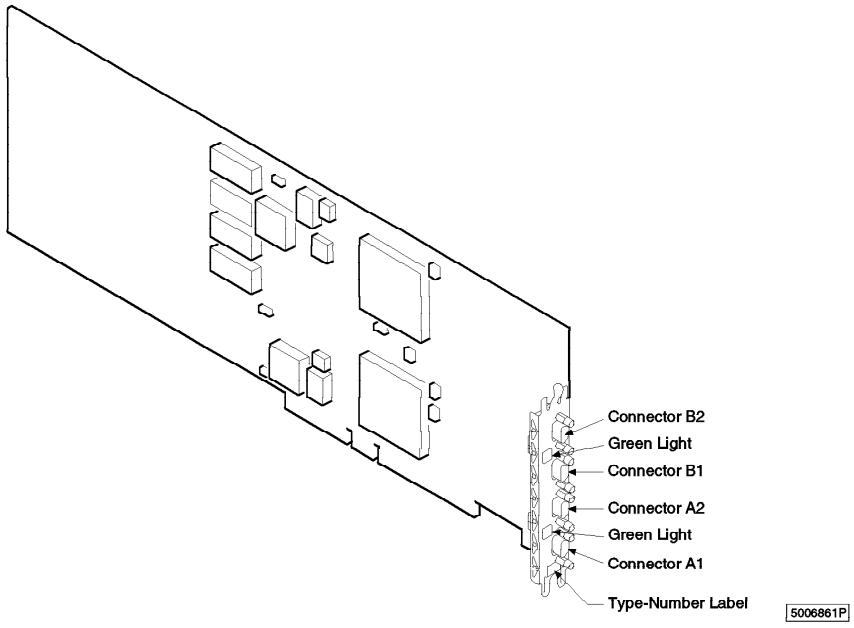


Figure 3-1. SSA Adapter Card

The SSA links must be configured as loops. The loop is connected to the internal connectors at the SSA adapter card. These connectors *must* be a valid pair (that is, A1 and A2, or B1 and B2); otherwise, the disk drive modules on the loop are not fully configured, and the diagnostics fail. Operations to all the disk drive modules on a particular loop can continue if that loop breaks at any one point.

Each pair of connectors has a green light that indicates the operational status of its related loop:

Status of Light	Meaning
Off	Both SSA connectors are inactive. If disk drive modules are connected to these connectors, either those modules are failing, or their SSA links have not been enabled.
Permanently on	Both SSA links are active (normal operating condition).
Slow Flash	Only one SSA link is active.

Disk Drive Module Strings

In the system unit, the disk drive modules are arranged in a string of 2 to 6 disk drive modules. This string has its own two SSA connectors. This string is connected through an internal SSA cable to a pair of connectors on the SSA adapter to make an SSA loop. (The SSA cables provide the SSA links.)

Figure 3-2 shows the relationships between the SSA connectors and the disk drive module string in a system unit.

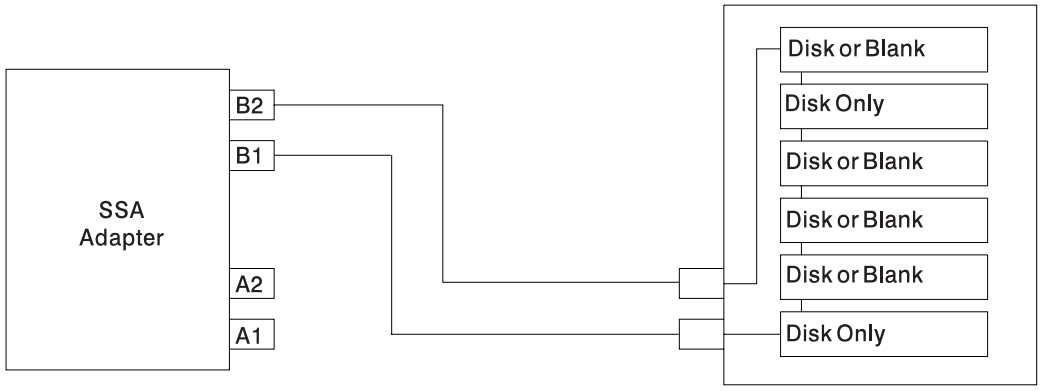


Figure 3-2. A String of Disk Drive Modules

Pdisks, Hdisks, and Disk Drive Module Identification

The *physical disk drives* (**pdisks**) in an SSA subsystem can be configured as logical units (LUNs). A LUN is also known as an **hdisk**, and can consist of one or more physical disk drives. An hdisk in an SSA subsystem might, therefore, consist of one pdisk or several pdisks.

The configuration software also allocates an identification (hdisk and pdisk number) to each disk drive module during the configuration of the SSA link. The disk drive modules do not have fixed physical addresses.

The configuration software first recognizes the disk drive module by the machine-readable serial number that is written on the disk. Then, it assigns an identification that is related to the position of the disk drive-module in the SSA string. After configuration, the disk drive module always has the same identification. It can be moved to any position on the SSA link, but can always be found by the software.

Service actions are always related to physical disk drives. For this reason, errors that occur on SSA disk drives are always logged against the physical disk drive (pdisk).

The numeric identifier of pdisks, hdisks, and disk drive module slots of the system unit are not related to each other. For example, pdisk1 is not necessarily installed in slot 1 of the 6-pack.

The disk drive module serial number, on the label on the front of the carrier, is also displayed by the service aids. It is the last eight digits of the drives IEEE SSA unique ID, which is stored on the drives electronics card.

Rules for SSA Loops

The following are rules for SSA loops.

- The SSA loop must be connected to the internal pair of connectors on the SSA adapter.
- Only one pair of adapter connectors can be connected to a particular SSA loop.
- A maximum of 18 disk drive modules can be connected in a particular SSA loop.
- A maximum of three dummy disk drive modules can be connected next to each other in a particular SSA loop.

Loops and Data Paths

All devices that are attached to an SSA adapter card are connected through SSA links. See Figure 3-2 on page 3-60. The SSA links are configured as loops. Data and commands to a particular device pass through all other devices on the link between the adapter and the target device.

Data can travel in either direction around a loop. The adapter can, therefore, access the disk drive modules through two data paths. The using system cannot detect which data path is being used.

If a disk drive module fails, or is turned off, the loop is broken, and one of the data paths to a particular module is no longer available. The disk drive modules on the loop continue to work, but an error is reported to the using system.

Figure 3-3 shows that disk drive module in slot 3 has failed. The disk drive modules in slots 1 and 2 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive modules in slots 4, 5, and 6 can communicate only through connector A2 of the SSA adapter.

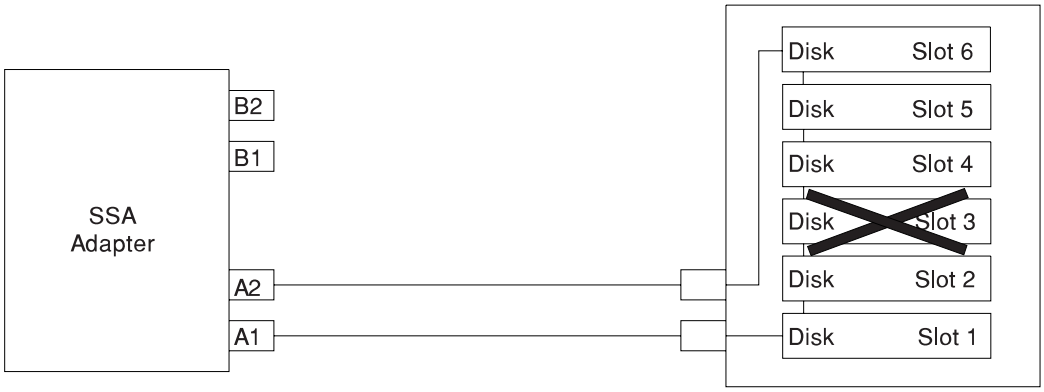


Figure 3-3. Disk Drive Module in Slot 3 Has Failed

If two or more disk drive modules are turned off, fail, or are removed from the loop, some modules might become isolated from the SSA adapter.

Figure 3-4 shows that disk drive modules in slots 2 and 4 have failed. The disk drive module in slot 1 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive module in slots 5 and 6 can communicate with the using system only through connector A2 of the SSA adapter. The disk drive module in slot 3 is isolated from the SSA adapter.

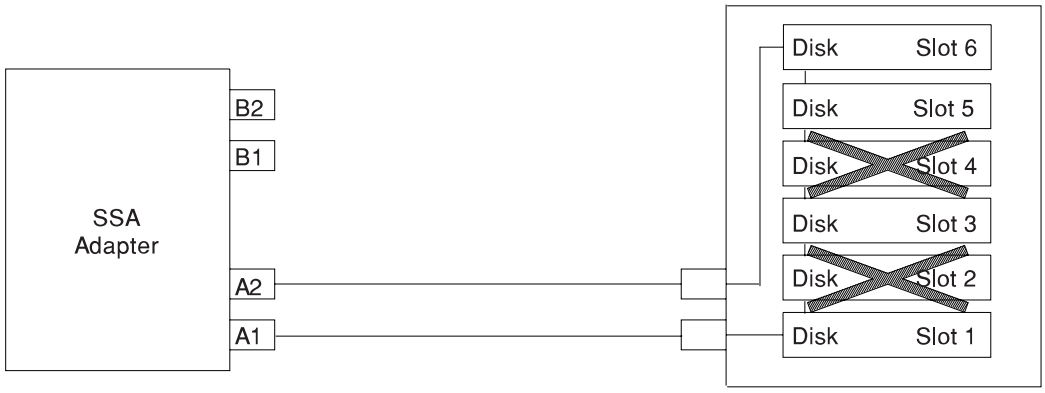


Figure 3-4. Disk Drive Modules in Slots 2 and 4 Have Failed

SSA Service Aids

SSA service aids help you service the SSA Hot-Swap Disk Drive. This section describes those service aids, and tells how to use them.

Attention: Do not run the service aids from more than one using system at a time; otherwise, unexpected results might occur.

The SSA service aids are:

Set Service Mode	This service aid enables you to determine the location of a particular disk drive module on the SSA link and to remove that module from the link.
Link Verification	This service aid tells you the operational status of an SSA link.
Configuration Verification	This service aid lets you determine the relationship between physical and logical disk drives.
Format Disk	This service aid formats an SSA disk drive module.
Certify Disk	This service aid verifies that all the data on a disk drive can be read correctly.

Before you use the service aids, ensure that you are familiar with the principles of SSA links and physical disk drives (pdisks). If you are not familiar with these principles, first read “SSA Loops and Links” on page 3-59.

The Identify Function

The identify function can be accessed from any of the service aids.

This function enables you to determine the location of a particular disk drive module that you want to identify but do not want to remove from the system unit. The identify function causes the check light of the disk drive module to flash for identification (1 second on, 1 second off), but has no effect on the normal operation of the disk drive module. You can use the identify function on any number of disk drive modules at the same time.

Instructions displayed by the service aids tell you when you can select the identify function.

Note: You cannot use the identify function on a device that is in reserved status.

Starting the SSA Service Aids

To start the SSA service aids:

1. Start the using-system diagnostics (see the *Common Diagnostics Information Manual*), and go to DIAGNOSTIC OPERATING INSTRUCTIONS.
2. Follow the instructions to select FUNCTION SELECTION.
3. Select SERVICE AIDS from the Function Select menu.
4. Select SSA SERVICE AIDS from the Service Aids menu.

   The SSA Service Aids menu is displayed.

```
SSA SERVICE AIDS                                                    802380

Move cursor onto selection, then press Enter.


           Set Service Mode
           Link Verification
           Configuration Verification
           Format Disk
           Certify Disk









 F3=Cancel        F10=Exit
```

Note: In some configurations of the using-system console:

Esc and **0** = Exit
Esc and **3** = Cancel

In such configurations, however, the displayed instructions for the function keys remain the same as those shown in the screen above.

5. Select the service aid that you require, then go to the relevant instructions in this chapter:

"Set Service Mode Service Aid" on page 3-67

"Link Verification Service Aid" on page 3-73

"Configuration Verification Service Aid" on page 3-77

"Format Disk Service Aid" on page 3-79

"Certify Disk Service Aid" on page 3-81

Set Service Mode Service Aid

The Set Service Mode service aid enables you to determine the location of a particular disk drive module and to remove that module from the system unit. It causes the check light of that disk drive module to come on for identification, and it stops all SSA link activity through the module. Only one disk drive module at a time can be in the service mode.

Before using this service aid, you must make the selected disk drive module unavailable to the using system; otherwise, an error occurs.

SSA disk drive modules can be maintained concurrently; that is, they can be removed, installed, and tested on an SSA link while the other modules on the link continue to work normally. If a disk drive module has its check light on, you can remove that module from the SSA link without taking any special actions.

If a disk drive module does *not* have its check light on, the SSA link that passes through it might still be active, even though the disk drive module itself might not be working. You must put that module into the service mode before you remove it from the SSA link.

If you leave the Set Service Mode service aid, the service mode is reset.

To use the Set Service Mode service aid:

1. Select SET SERVICE MODE from the SSA Service Aids menu (see “Starting the SSA Service Aids” on page 3-65). A list of physical disk drives (pdisks) is displayed:

```
SSA SERVICE AIDS                                                    802380


SET SERVICE MODE                                                    802381

Move cursor onto selection, then press Enter.

  {TOP}

  pdisk0    11111111    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk1    22222222    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk2    33333333    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk3    44444444    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk4    55555555    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk5    66666666    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk6    77777777    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk7    88888888    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk8    99999999    00-04-P        2 GB SSA F Physical Disk Drive


  {BOTTOM}

 F3=Cancel        F10=Exit
```

The columns of information displayed on the screen have the following meanings:

pdisk0 through pdisk8	Physical disk drive resource identifiers.
11111111 through 99999999	Serial numbers of the physical disk drive modules. The actual serial number of a disk drive module is shown on the front of the disk drive module.
00-04-P	See “SSA Location Code Format” on page 3-58.
2 GB SSA F Physical Disk Drive	Descriptions of the disk drive modules.

2. Select the pdisk that you want to identify or put into Service Mode (for example, pdisk3). The following display appears with details of the disk drive module that you have just selected.

```
SSA SERVICE AIDS                                                    802380

SET SERVICE MODE                                                    802381

SET SERVICE MODE                                                    802382

pdisk3    44444444    00-04-P        2 GB SSA F Physical Disk Drive

Move cursor onto selection, then press Enter.

+ Set or Reset Identify.
    Select this option to set or reset the Identify indicator
    on the disk drive.
> Set or Reset Service Mode.
    Select this option to set or reset Service Mode
    on the disk drive.




 F3=Cancel        F10=Exit
```

3. Select either the service mode or the identify function. (For this example, assume that you have selected the service mode function.) The list of pdisks is displayed again, and the disk drive module that you selected is marked by a >, which shows that the module is in the service mode.

```
SSA SERVICE AIDS                                                    802380

SET SERVICE MODE                                                    802381

SET SERVICE MODE                                                    802382

SET SERVICE MODE                                                    802381

Move cursor onto selection, then press Enter.

  {TOP}

  pdisk0    11111111    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk1    22222222    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk2    33333333    00-04-P        2 GB SSA F Physical Disk Drive
> pdisk3    44444444    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk4    55555555    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk5    66666666    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk6    77777777    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk7    88888888    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk8    99999999    00-04-P        2 GB SSA F Physical Disk Drive



  {BOTTOM}

 F3=Cancel        F10=Exit
```

Notes:

a. You can select only one disk drive module at a time.

b. If you select the service mode function, and the selected disk drive module is not in a closed loop (see “SSA Loops and Links” on page 3-59), your selection fails and an error message is displayed. Use the Link Verification service aid to identify any open-link problems before trying to reselect the service mode function.

c. If you select the service mode function, and a file system is mounted on the selected disk drive module, your selection fails. Use the Configuration Verification service aid to determine which hdisk must have its file system unmounted before you can select the service mode function.

d. If the check light of the disk drive module that you have put into the service mode does not come on, and if you are not sure of the location of that module, use the identify function to help you find the disk drive module (see “The Identify Function” on page 3-65).

4. Select a second disk drive module, if required (for example, pdisk5). The following display appears:

```
SSA SERVICE AIDS                                                    802380

SET SERVICE MODE                                                    802381

SET SERVICE MODE                                                    802382

SET SERVICE MODE                                                    802381

SET SERVICE MODE                                                    802382

> pdisk5    66666666    00-04-P    2 GB SSA F Physical Disk Drive


Move cursor onto selection, then press Enter.

+ Set or Reset Identify.
    Select this option to set or reset the Identify indicator
    on the disk drive.
> Set or Reset Service Mode.
    Select this option to set or reset Service Mode
    on the disk drive.


 F3=Cancel        F10=Exit
```

5. Select either the service mode or the identify function. If the original disk drive module is to remain in service mode, you can select only the identify function now. (Only one disk drive module at a time can be in the service mode.) The list of pdisks appears again. The pdisk that is in identify mode is identified by a +.

```
SSA SERVICE AIDS                                                    802380

SET SERVICE MODE                                                    802381

SET SERVICE MODE                                                    802382

SET SERVICE MODE                                                    802381

SET SERVICE MODE                                                    802382

SET SERVICE MODE                                                    802381

Move cursor onto selection, then press Enter.

  {TOP}

  pdisk0    11111111    00-04-P    2 GB SSA F Physical Disk Drive
  pdisk1    22222222    00-04-P    2 GB SSA F Physical Disk Drive
  pdisk2    33333333    00-04-P    2 GB SSA F Physical Disk Drive
> pdisk3    44444444    00-04-P    2 GB SSA F Physical Disk Drive
  pdisk4    55555555    00-04-P    2 GB SSA F Physical Disk Drive
+ pdisk5    66666666    00-04-P    2 GB SSA F Physical Disk Drive
  pdisk6    77777777    00-04-P    2 GB SSA F Physical Disk Drive
  pdisk7    88888888    00-04-P    2 GB SSA F Physical Disk Drive
  pdisk8    99999999    00-04-P    2 GB SSA F Physical Disk Drive









  {BOTTOM}

 F3=Cancel        F10=Exit
```

6. Identify other disk drive modules in the same way, if required.

Link Verification Service Aid

The Link Verification service aid helps you determine:

- Where an SSA link has been broken
- The status of the disk drive modules on that SSA link
- The location of a power fault that has been detected by the disk drive modules on that SSA link

To use the Link Verification service aid:

1. Select Link Verification from the SSA Service Aids menu (see “Starting the SSA Service Aids” on page 3-65). The Link Verification adapter menu is displayed:

```
SSA SERVICE AIDS                                                  802380

LINK VERIFICATION                                                 802385

Move cursor onto selection, then press Enter.

  ssa0    00-03    SSA Adapter
  ssa1    00-05    SSA Adapter
  ssa2    00-06    SSA Adapter
  ssa3    00-07    SSA Adapter

F3=Cancel        F10=Exit
```

2. Select the adapter that you want to test.

   The columns of information displayed on the screen have the following meanings:

ssa0 through ssa3	Adapter resource identifiers.
00-03 through 00-07	Adapter location codes. These codes specify the location of the SSA adapter in the using system.
SSA Adapter	Descriptions of the adapters.

3. When you have selected an adapter, a list is displayed showing the status of all the disk drive modules that are attached to the adapter:

```
SSA SERVICE AIDS                                                    802380

LINK VERIFICATION                                                   802385

LINK VERIFICATION                                                   802386

SSA Link Verification for:
  ssa1    00-05    SSA Adapter

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#       Adapter Port

                           A1  A2  B1  B2                  Status
  {TOP}
  pdisk0     11111111      0   7                           Good
  pdisk1     22222222      1   6                           Good
  pdisk2     33333333      2   5                           Good
  pdisk3     44444444      3   4                           Good
  pdisk4     55555555      4   3                           Good
  pdisk5     66666666      5   2                           Good
  pdisk6     77777777      6   1                           Good
  pdisk7     88888888      7   0                           Good
  pdisk8     99999999              0  10                   Good
  pdisk9     nnnnnnnn              1   9                   Good
  {MORE}

 F3=Cancel        F10=Exit
```

The columns of information displayed on the screen have the following meanings:

pdisk0 through pdisk9 — Physical disk drive resource identifiers.

11111111 through 99999999 — Serial numbers of the physical disk drive modules. The actual serial number of a disk drive module is shown on the front of the disk drive module.

A1 A2 B1 B2 — Adapter connector number (see “The SSA Adapter” on page 3-59).

Status — Statuses are:

- **Good** — The disk drive module is working correctly.
- **Failed** — The disk drive module has failed.
- **Power** — The disk drive module has detected a loss of power.
- **Reserved** — The disk drive module is used by another using system.

An SSA link must be configured in a loop around which data can travel in either direction. The loop is broken if a cable fails or is removed, or if a disk drive module fails. Because each disk drive module on the loop can be accessed

from either direction, the broken loop does not prevent access to any data, unless that data is on the failed disk drive module. If the loop is broken between two disk drive modules, the ready lights on those modules flash to show that only one SSA path is active. Also, the Link Verification service aid shows that only one path is available to each disk drive module on the broken loop.

You can find the physical location of any disk drive module on the link by using the identify function (see “The Identify Function” on page 3-65).

Notes:

a. In the lists of physical disk drives (pdisks) that are displayed by the service aids, you might see:

????? Question marks show where an SSA loop is broken. No information is available about any devices that are beyond this point.

Asterisks indicate an unconfigured device. That device might be:

- Another SSA adapter that is in the same using system or in a different using system.
- An SSA device that is in the SSA network, but whose type is not known. Such a condition can occur if, for example, devices are added to the network, but the **cfgmgr** command is not run to configure those devices into the using system.

For example:

```
LINK VERIFICATION                                                    802386

SSA Link Verification for:
  ssa1    00-05    SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#       Adapter Port

                          A1  A2  B1  B2                 Status
  {TOP}
  pdisk0    11111111       0                              Good
  pdisk1    22222222       1                              Good
  ?????
  pdisk3    44444444           4                          Good
  pdisk4    55555555           3                          Good
  pdisk5    66666666           2                          Good
  pdisk6    77777777           1                          Good
  pdisk7    88888888           0                          Good
  pdisk8    99999999               0   3                  Good
  pdisk9    10000000               1   2                  Good
  {MORE}

 F3=Cancel        F10=Exit
```

Note that the missing disk drive module (pdisk2) is represented by a line of question marks.

b. If you have just made changes to or have just turned on the system unit, you might need to wait up to 30 seconds before detailed information about the SSA network becomes available to the service aids.

4. When you have solved a problem, press **F3** (**Esc** and **3** on some consoles) to leave the display; then press Enter to reselect it. The display shows the new status of the SSA links.

Configuration Verification Service Aid

The Configuration Verification service aid enables you to determine the relationship between SSA logical units (hdisks) and SSA physical disk drives (pdisks). It also displays the connection information and operational status of the disk drives.

Note: User applications communicate with the hdisks; error data is logged against the pdisks.

To use the Configuration Verification service aid:

1. Select Configuration Verification from the SSA Service Aids menu to display a list of pdisks and hdisks (see “Starting the SSA Service Aids” on page 3-65).

```
SSA SERVICE AIDS                                                    802380

CONFIGURATION VERIFICATION                                          802390

Move cursor onto selection, then press Enter.

  {TOP}
  pdisk0    22222222    00-03-P      2 GB SSA F Physical Disk Drive
  pdisk1    33333333    00-05-P      2 GB SSA F Physical Disk Drive
  pdisk2    44444444    00-07-P      2 GB SSA F Physical Disk Drive
  hdisk3    22222222    00-03-L      SSA Logical Disk Drive
  hdisk4    33333333    00-05-L      SSA Logical Disk Drive
  hdisk5    44444444    00-07-L      SSA Logical Disk Drive









  {BOTTOM}

 F3=Cancel        F10=Exit
```

2. Select the hdisk or pdisk that you want to test.
3. If you select an hdisk, a list of pdisks is displayed:

```
SSA SERVICE AIDS                                                    802380

CONFIGURATION VERIFICATION                                          802390

CONFIGURATION VERIFICATION                                          802391

  hdisk3    22222222   00-03-L    SSA Logical Disk Drive

To set or reset Identify, move cursor onto selection, then press enter.

  Physical     Serial#    Adapter    Port    SSA_Addr    Status

  {TOP}
  pdisk0      22222222     00-02      A1         5      Good
                           00-02      A2         5      Good
                           00-03      A1        10      Good
                           00-03      A2         0      Good

  {BOTTOM}

 F3=Cancel        F10=Exit
```

If you select a pdisk, a list of hdisks is displayed:

```
SSA SERVICE AIDS                                                    802380

CONFIGURATION VERIFICATION                                          802390

CONFIGURATION VERIFICATION                                          802392

  pdisk0    22222222   00-03-P    2 GB SSA F Physical Disk Drive

Move cursor onto selection, then press Enter.

  hdisk3    22222222   00-03-L    SSA Logical Disk Drive


  {BOTTOM}

 F3=Cancel        F10=Exit
```

Note: If you select the hdisk from this screen, the hdisk configuration is displayed.

Format Disk Service Aid

The Format Disk service aid formats SSA disk drive modules.

Attention: Formatting a disk drive module destroys all the data on that module. Use this procedure only when instructed to do so by the service procedures.

To use the Format Disk service aid:

1. Select Format Disk from the SSA Service Aids menu (see “Starting the SSA Service Aids” on page 3-65). A list of pdisks is displayed:

```
SSA SERVICE AIDS                                                    802380

FORMAT DISK                                                         802395

Move cursor onto selection, then press Enter.

  {TOP}
  pdisk0    11111111    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk1    22222222    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk2    33333333    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk3    44444444    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk4    55555555    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk5    66666666    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk6    77777777    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk7    88888888    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk8    99999999    00-04-P        2 GB SSA F Physical Disk Drive





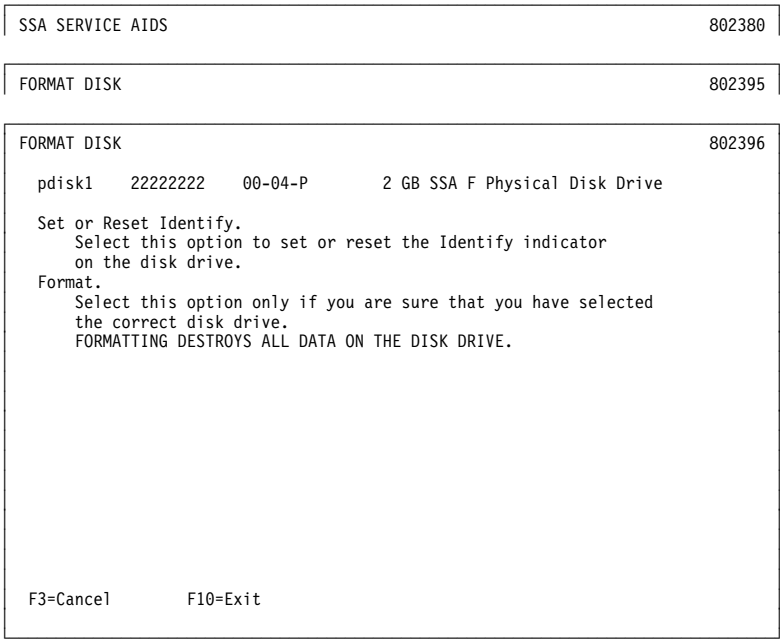




 {BOTTOM}

 F3=Cancel        F10=Exit
```

2. Select the pdisk that you want to format. The following instructions are displayed:



3. If you are not sure of the identification (pdisk number) of the disk drive module that you want to format, use the identify function to get a positive physical identification of the module (see “The Identify Function” on page 3-65). You can further ensure that you have selected the correct disk drive module by verifying that the serial number on the front of the disk drive module is the same as the serial number that is displayed on the screen.
4. When you are sure that you have selected the correct disk drive module, select Format.

Certify Disk Service Aid

The Certify Disk service aid verifies that all the data on a disk drive module can be read correctly. Instruction given elsewhere in this book tell you when you need to run this service aid.

To use the Certify Disk service aid:

1. Select Certify Disk from the SSA Service Aids menu (see “Starting the SSA Service Aids” on page 3-65). A list of pdisks is displayed:

```
SSA SERVICE AIDS                                                    802380

CERTIFY DISK                                                        802404

Move cursor onto selection, then press Enter.

  {TOP}
  pdisk0    11111111    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk1    22222222    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk2    33333333    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk3    44444444    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk4    55555555    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk5    66666666    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk6    77777777    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk7    88888888    00-04-P        2 GB SSA F Physical Disk Drive
  pdisk8    99999999    00-04-P        2 GB SSA F Physical Disk Drive









  {BOTTOM}

 F3=Cancel        F10=Exit
```

2. Select the pdisk that you want to certify. The following instructions are displayed:

```
SSA SERVICE AIDS                                                    802380

CERTIFY DISK                                                        802404

CERTIFY DISK                                                        802405

  pdisk1    22222222    00-04-P        2 GB SSA F Physical Disk Drive

Move cursor onto selection, then press Enter.

 Set or Reset Identify.
     Select this option to set or reset the Identify indicator
     on the disk drive.
 Certify.
     Select this option to start the Certify operation.

 F3=Cancel        F10=Exit
```

3. If you are not sure of the identification (pdisk number) of the disk drive module that you want to format, use the identify function to get a positive physical identification of the module (see “The Identify Function” on page 3-65). You can further ensure that you have selected the correct disk drive module by verifying that the serial number on the front of the disk drive module is the same as the serial number that is displayed on the screen.
4. When you are sure that you have selected the correct disk drive module, select Certify

Service Aid Error Codes

If the SSA service aids detect an unrecoverable error and are unable to continue, one of the following error codes might occur.

SSA01 Not enough using-system memory is available for this service aid to continue. Take one of the actions described here:

- This problem might be caused by a failed application program. Ask the user to end any failed application program, then try to run the service aid again.
- Run diagnostics in the problem determination mode on the system unit. If you find any problems, solve them; then try to run the service aid again.
- Close down and reboot the using system; then try to run the service aid again.
- Run diagnostics from diskette or CD-ROM to isolate the problem. If you do not find a problem, the operating system might have failed.

SSA02 An unknown error has occurred. Take one of the actions described here:

- Run diagnostics in the problem determination mode to the system unit. If you find any problems, solve them; then try to run the service aid again.
- If diagnostics fail or if the same problem occurs when you try the service aid again, run the diagnostics from diskette or CD-ROM to isolate the problem. If you do not find a problem, the operating system might have failed.

SSA03 The service aid was unable to open an hdisk. This problem might have occurred because a disk drive module has failed or has been removed from the system. Take the actions described here:

1. Use the Configuration Verification service aid (see “Configuration Verification Service Aid” on page 3-77) to determine the location code of the SSA adapter to which the hdisk is attached. (For example, if the location code of the hdisk is 00-03-L, the location code of the SSA adapter is 00-03.)
2. Run the Link Verification service aid (see “Link Verification Service Aid” on page 3-73) to the SSA adapter.
3. If a link failure is indicated by the service aid, go to “SSA Maintenance Analysis Procedures (MAPs)” on page 2-35.
4. If no link failures are indicated, run the diagnostics in the system verification mode to each pdisk that is attached to the SSA adapter.

Using the Service Aids for SSA-Link Problem Determination

If you have a problem with an SSA link, use the Link Verification service aid (see “Link Verification Service Aid” on page 3-73). The following examples show various loops and the associated information that is displayed by the Link Verification service aid.

Example 1. Normal Loops In Figure 3-5, eight disk drive modules are connected to connectors A1 and A2 of the SSA adapter. Five disk drive modules are connected to connectors B1 and B2 of the same SSA adapter.

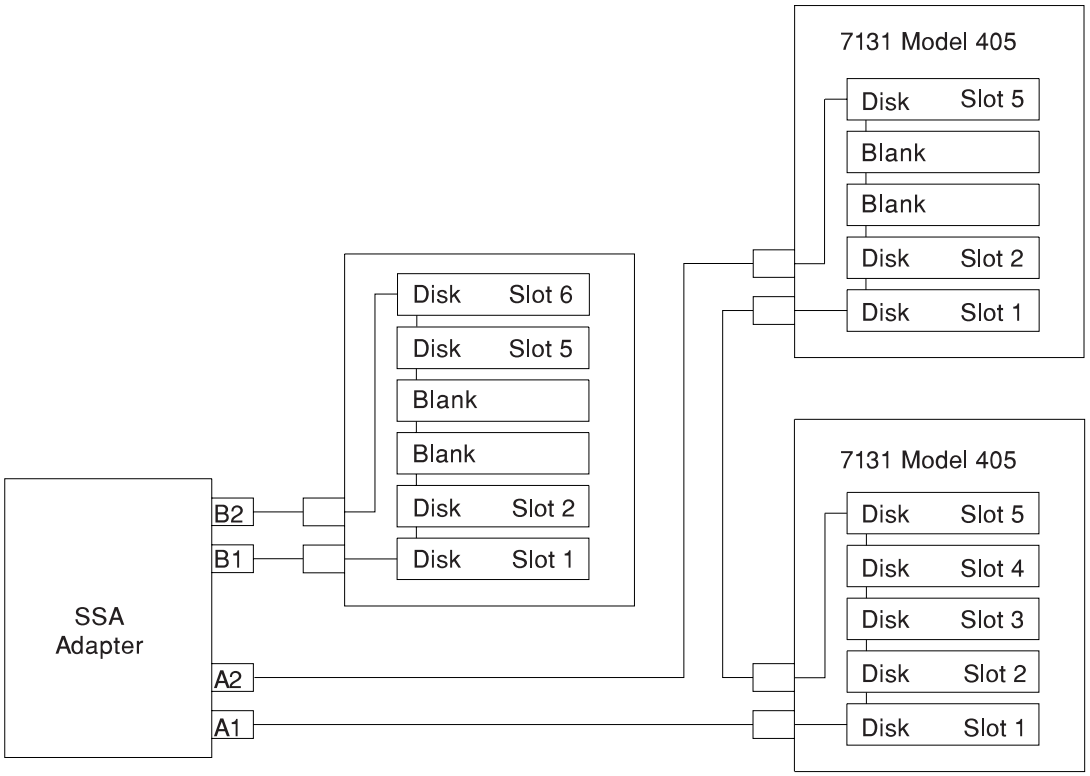


Figure 3-5. Normal Loops

For this example, the Link Verification service aid displays the following information:

```
LINK VERIFICATION                                                    802386

SSA Link Verification for:
  ssa1    00-05    SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#       Adapter Port

                           A1  A2  B1  B2                  Status
  {TOP}
  pdisk0    nnnnnnnn       0   7                           Good
  pdisk1    nnnnnnnn       1   6                           Good
  pdisk2    nnnnnnnn       2   5                           Good
  pdisk3    nnnnnnnn       3   4                           Good
  pdisk4    nnnnnnnn       4   3                           Good
  pdisk5    nnnnnnnn       5   2                           Good
  pdisk6    nnnnnnnn       6   1                           Good
  pdisk7    nnnnnnnn       7   0                           Good
  pdisk8    nnnnnnnn               0   3                   Good
  pdisk9    nnnnnnnn               1   2                   Good
  {MORE}

 F3=Cancel        F10=Exit
```

Note: Scroll the display to see all the connected disk drive modules.

Example 2. Broken Loop (Cable Removed): Each disk drive module normally communicates with the adapter through one data path. Because data can pass around the loop in either direction, however, the adapter automatically reconfigures the loop to enable communication to continue to each disk drive if the loop becomes broken.

In Figure 3-6, eight disk drive modules should be connected to connectors A1 and A2 of the SSA adapter. However, the loop is broken because the SSA cable has been disconnected from connector A2. Four disk drive modules are connected to connectors B1 and B2 of the same SSA adapter.

Although the broken loop is reported as an error, all the disk drive modules can still communicate with the using system. The eight disk drive modules can communicate through connector A1 of the SSA adapter . The five disk drive modules can communicate through connectors B1 and B2 of the same SSA adapter (normal loop).

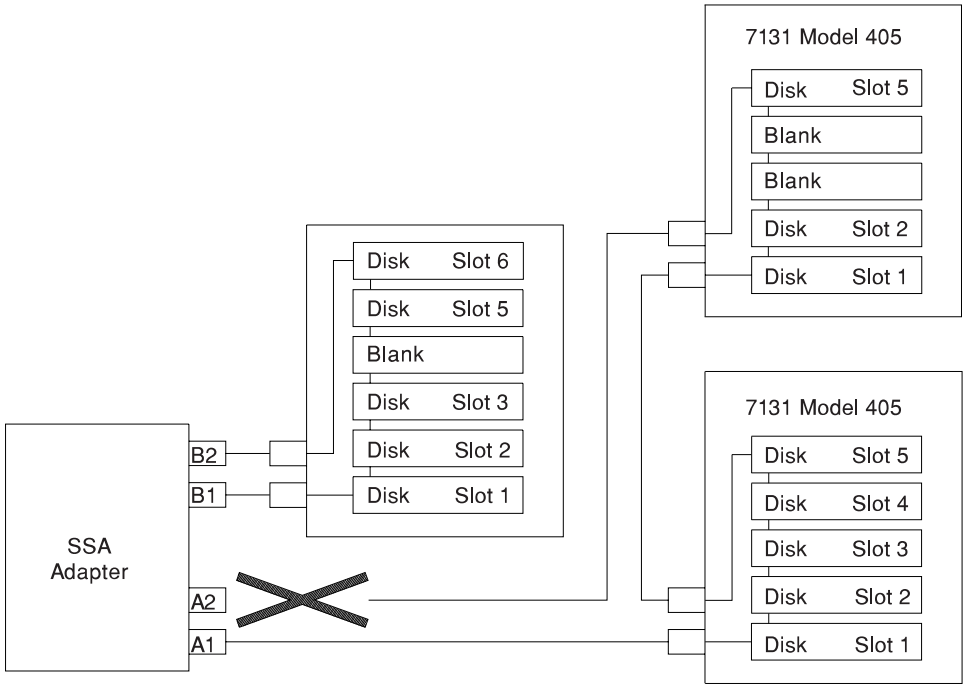


Figure 3-6. Broken Loop

For this example, the Link Verification service aid displays the following information:

```
LINK VERIFICATION                                                    802386

SSA Link Verification for:
  ssa1    00-05    SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#       Adapter Port

                          A1  A2  B1  B2                  Status
  {TOP}
  pdisk0    nnnnnnnn       0                               Good
  pdisk1    nnnnnnnn       1                               Good
  pdisk2    nnnnnnnn       2                               Good
  pdisk3    nnnnnnnn       3                               Good
  pdisk4    nnnnnnnn       4                               Good
  pdisk5    nnnnnnnn       5                               Good
  pdisk6    nnnnnnnn       6                               Good
  pdisk7    nnnnnnnn       7                               Good
  pdisk8    nnnnnnnn               0   3                   Good
  pdisk9    nnnnnnnn               1   2                   Good
  {MORE}

 F3=Cancel        F10=Exit
```

Note that the column for adapter connector A2 shows no connections.

Example 3. Broken Loop (Disk Drive Module Removed): Figure 3-7 shows eight disk drive modules connected to connectors A1 and A2 of the SSA adapter, but the loop is broken because disk drive module in slot 3 has been removed. Four disk drive modules are connected to connectors B1 and B2 of the same SSA adapter.

Although the missing disk drive module is reported as an error, all the remaining disk drive modules can still communicate with the using system. Two disk drive modules can communicate through connector A1 of the SSA adapter. Five disk drive modules can communicate through connector A2 of the SSA adapter. Five disk drive modules can communicate through connectors B1 and B2 of the same SSA adapter (normal loop).

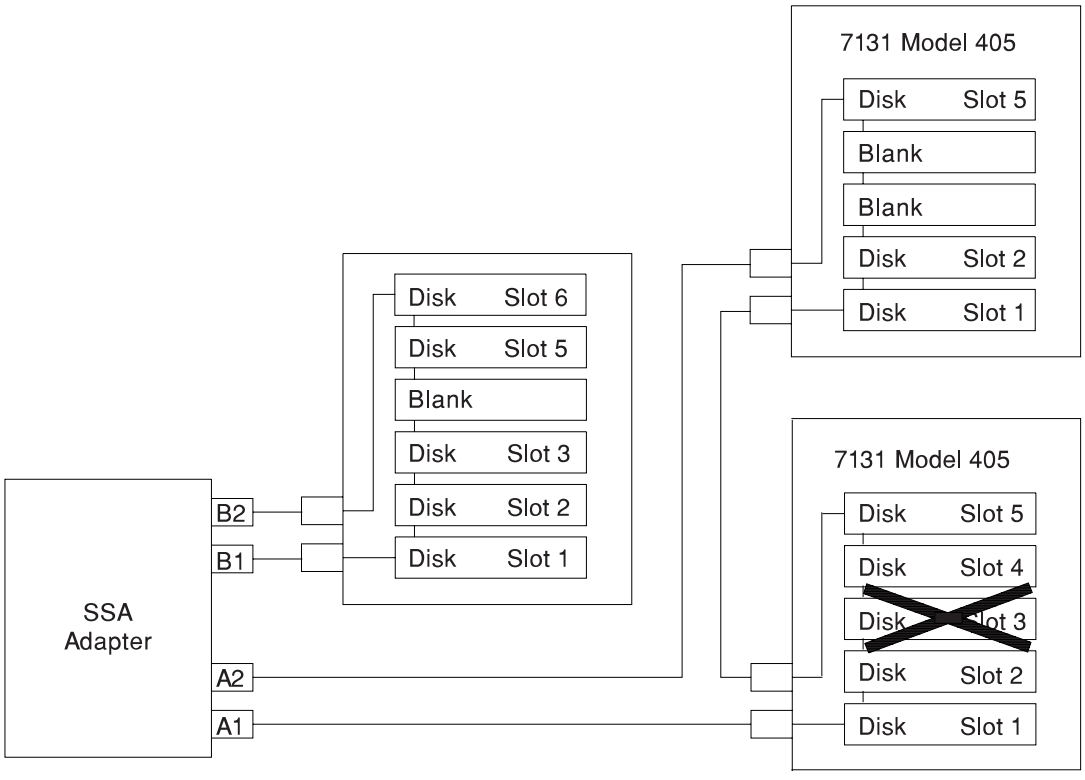


Figure 3-7. Broken Loop (Disk Drive Module Removed)

For this example, the Link Verification service aid displays the following information:

```
LINK VERIFICATION                                                    802386

SSA Link Verification for:
  ssa1    00-05    SSA ADAPTER

To set or reset Identify, move cursor onto selection, then press Enter.

  Physical   Serial#       Adapter Port

                          A1  A2  B1  B2                  Status
  {TOP}
  pdisk0    nnnnnnnn       0                               Good
  pdisk1    nnnnnnnn       1                               Good
  ?????
  pdisk3    nnnnnnnn           4                           Good
  pdisk4    nnnnnnnn           3                           Good
  pdisk5    nnnnnnnn           2                           Good
  pdisk6    nnnnnnnn           1                           Good
  pdisk7    nnnnnnnn           0                           Good
  pdisk8    nnnnnnnn               0   3                   Good
  pdisk9    nnnnnnnn               1   2                   Good
  {MORE}

 F3=Cancel        F10=Exit
```

Note that the missing disk drive module (pdisk2) is represented by a line of question marks.

Finding the Physical Location of a Device

The physical location of a device (for example, a disk drive module or an SSA adapter) cannot be reported directly by the using system because of the way in which the SSA interface works. The address of an SSA device is related to the position of that device on the SSA loop. The address can, therefore, change if the configuration is changed.

Finding the Device When Service Aids Are Available

To help you to find the correct physical disk drive, the SSA service aids include an identify function. This function, when selected, causes the check light of the selected disk drive module to flash. For more details, see "SSA Service Aids" on page 3-64.

Some devices (for example, adapters) do not have check lights. To find such a device, you can either use the identify function to identify devices that are next to the SSA adapter on the SSA link, or use the procedure described in "Finding the Device When No Service Aids Are Available."

Finding the Device When No Service Aids Are Available

When no service aids are available, you must find the device by using the port (P) and SSA-address (AA) values that are provided by some service request numbers (SRNs). Examples of these SRNs are 43nnn, 44nnn, and 45nnn, where nnn represents the PAA values.

The port (P) value can be a number from 0 to 3, which indicates the port connector on the SSA adapter:

0 = Connector A1
1 = Connector A2
2 = Connector B1
3 = Connector B2

The AA value is the decimal SSA-address value. It indicates the position of the device that you are trying to find (counted *along* the SSA link).

Use the port value to locate the relevant connector on the SSA adapter, then follow the SSA cable to the first disk drive module or adapter in the same SSA loop. Do not include dummy disk drive modules.

The first disk drive module or adapter that you reach represents SSA-address count 0. Continue to follow the SSA link from disk drive module or adapter, increasing the SSA-address count by 1 for each device, until you reach the disk drive module or adapter that is indicated in the SRN.

Microcode Maintenance

Updates to the microcode are loaded into the using system from diskettes. If the level of the microcode that is stored in the using system is higher than the level of the microcode that is installed on the SSA adapter or the disk drive modules, the higher-level microcode is automatically downloaded to the adapter and disk drive modules when the using system runs the device configuration method.

For some problems, the service request number (SRN) might ask you to check the microcode package ID before you exchange any field-replaceable units (FRUs). You can determine the package ID for the adapter in either of the following two ways:

- On the command line, type the following command and press Enter:

  lsattr -E -l <adapter> **-a ucode**

  where *adapter* is the ID of the adapter that you want to check; for example, ssa0.

  The response to this command is:

  ucode 8F97.00.nn **Name of adapter download False**

  where *nn* is the adapter code package ID.

- Use the Display or Change Configuration or Vital Product Data (VPD) service aid to display the VPD for the adapter. The first two characters of the ROS Level field contain the adapter code package ID.

To determine the ID of the microcode package that is being used on a disk drive module, use the Display or Change Configuration or Vital Product Data (VPD) service aid to display the VPD for the disk drive module. The first two characters of the ROS Level field contain the ID of the microcode package for the disk drive module.

Note: During the configuration of the complete system, all the VPD files in the system are updated *before* any microcode is downloaded from the using system to the 6-pack. If the using system later downloads a new level of microcode to the subsystem, the VPD for the adapter or disk drive module do not show the ID of the new microcode package until the next time the configuration manager command (**cfgmgr**) is run.

Vital Product Data (VPD)

The vital product data (VPD) for the system unit and for the SSA adapter can be displayed by using the using-system service aids. This section shows the types of information that are contained in the VPD.

Abbreviations used in this section are:

DRAM Dynamic random-access memory

FRU Field-replaceable unit

RAM Random-access memory

ROM Read-only memory

ROS Read-only storage

SSA Serial storage architecture

4.5 GB, and 9.1 GB SSA Disk Drives

Part number	Disk drive module part number
EC level	Disk enclosure engineering change level
Serial number	Disk enclosure serial number
Machine type and model	Type and model
Manufacturer	Manufacturer and plant code
ROS level and ID	ROM and RAM code revision levels
Device specific Z2	RAM code load part number
Device specific Z3	Electronics card assembly part number
Device specific Z4	Disk enclosure date of manufacture

SSA Adapter

Part number	Adapter card FRU part number
Serial number	Adapter card serial number
Engineering change level	Adapter card engineering change level
Manufacturing location	Manufacturer and plant code
ROS level and ID	Version of ROS code loaded on the adapter
Loadable microcode level	Version of loadable code needed for the satisfactory operation of this card

Device driver level	Minimum level of device driver needed for this level of card
Description of function	SSA adapter
Device specific (Z0)	If the adapter contains additional DRAM modules, Z0 indicates the total DRAM size in megabytes
Device specific (Z1)	If the adapter contains a pluggable fast-write cache module, Z1 indicates the cache size in megabytes

Chapter 4. Loading the System Diagnostics

The system diagnostics can be booted either from the default boot list or from the service mode boot list. (The service mode boot list can be modified using the system diagnostics "Display or Change Bootlist" service aid. The service mode boot list cannot be modified under the System Management Services.)

To load **Standalone Diagnostics** from the default boot list, perform the following procedure:

1. Verify with the system administrator and users that all programs may be stopped, then do so.
2. Turn off the system.
3. Wait 30 seconds, and turn on the system.
4. Immediately insert the diagnostic CD-ROM into the CD-ROM drive.
5. When or after the keyboard indicator appears during startup, press the F5 key on a directly-attached keyboard (or the number 5 key on an ASCII terminal).
6. Enter any requested passwords.

Online Diagnostics can be loaded by booting from the service mode boot list by pressing the F6 key (on a directly-attached keyboard) or the number 6 key on an ASCII terminal.

The procedure for booting from the devices listed in the service mode boot list (**Online Diagnostics**) is the following:

1. Verify with the system administrator and users that all programs may be stopped, then do so.
2. Turn off the system.
3. Wait 30 seconds, and turn on the system.
4. When or after the keyboard indicator appears during startup, press the F6 key on a directly-attached keyboard (or the number 6 key on an ASCII terminal).
5. Enter any requested passwords.

After any requested passwords have been entered, the system attempts to boot from the first device of each type found on the list. If no bootable image is found on the first device of each type on the list, the system does not search through the other devices of that type for a bootable image; instead, it polls the first device of the next type.

If all types of devices in the boot list have been polled without finding a bootable image, the system restarts, this gives the user the opportunity to start the System Management Services (by pressing the F1 key on a directly attached keyboard or the number 1 on an ASCII terminal) before the system attempts to boot again.

Default Boot List and Service Mode Boot List

The default boot list is:

1. Diskette
2. CD-ROM
3. Tape
4. Hard File
5. Network
    - Token-Ring
    - Ethernet

Pressing the F5 key on a directly-attached keyboard (or the number 5 key on an ASCII terminal) causes the system to load **Standalone Diagnostics** given that a Diagnostic CD is present in the CD-ROM drive.

Pressing the F6 key on a directly-attached keyboard (or number 6 key on an ASCII terminal) loads **Online Diagnostics** from the service mode boot list, no Diagnostic CD should be in the CD-ROM drive since **Online Diagnostics** is typically run from a hard disk, which is in the service mode boot list defined using the system diagnostics "Display or Change Bootlist" service aid. Like the default boot list, the service mode boot list can contain five entries. The F6 or 6 keys work like the F5 or 5 keys, with the following exceptions:

- The system searchs for a boot record according to the service mode boot list.
- If the service mode boot list is discovered by a cyclical redundancy check to be corrupted, the system rebuilds the service mode boot list according to the default boot list. (The default boot list contains five entries, and for each matching device type found in the system unit, the system makes an entry in the service mode boot list.)
- If no service mode boot list is present, the system uses the default boot list.

Chapter 5. System Management Services

The System Management Services make it possible for you to view information about your computer and to perform such tasks as setting passwords and changing device configurations.

If you have chosen a graphical display as your system console, you can use the graphical System Management Services described below. If you are using an ASCII display as your system console, see “Text-Based System Management Services” on page 5-24.

Graphical System Management Services

To start the Open Firmware command line or graphical System Management Services, turn on or restart the computer.

After the logo is displayed, initialization icons appear across the bottom of the screen.

To enter the Open Firmware command line, you must press the **F8** key *after the keyboard icon appears* during startup.

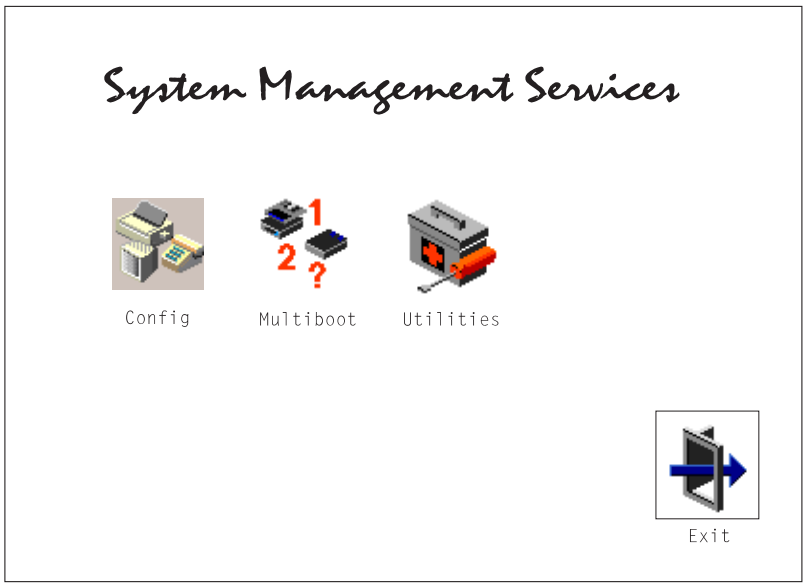
If you have pressed the **F8** key, the Open Firmware command line (an "OK" prompt) appears after the initialization and power-on self test (POST) are complete.

The Open Firmware command line is used 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 enter `reset-all` or power the system down and reboot.

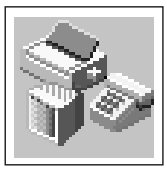
To enter the graphical System Management Services instead of the Open Firmware command line, you must press the **F1** key *after the keyboard icon appears* during startup.

After the System Management Services starts, the following screen appears.



You may also press F8 here to enter the 0K> prompt.

The System Management Services screen contains the following choices.



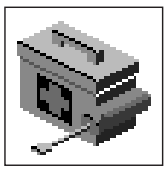
Config: Enables you to view your system configuration.



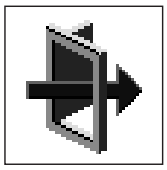
MultiBoot: Invokes the Mulitboot menu which provides several functions:

- To Select a particular operating system to boot.

  In the case of AIX this is a supported option, if you receive a an informational icon after making this selection this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value, issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. Please see the explanation of the bootlist command in your AIX documentation.
- To select a particular operating system as the default operating system
- To install from the list of possible devices
- To set the sequence in which devices are searched for operating system startup code
- To go to the Open Firmware command prompt
- To set the Multiboot menu so that it comes up immediately as the system powers up



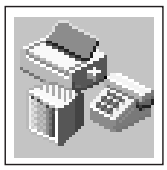
Utilities: Enables you to set and remove passwords, enable the unattended start mode, set and view the addresses of your system's SCSI controllers, select the active console, view or clear the error log, and update your system firmware.



Exit: Returns you to the previous screen.

To select an icon, move the cursor with the arrow keys to choose which icon is highlighted, then press the **Enter** key. You can also select an icon by clicking on it with your left mouse button. To leave the current screen, either press the **Esc** key or select the **Exit** icon.

Config



Selecting this icon makes it possible for you to view information about the setup of your system unit. A list similar to the following appears when you select the **Config** icon.

<Device Name>
PowerPC, 604
L2-Cache, 0256K
Memory
slot A=8 MB
slot B=8 MB
LPT
addr=3BC
IDE
addr=1F0
COM
addr=3F8
COM
addr=2F8
Audio
Keyboard
Mouse
Diskette
addr=3F0
Integrated Ethernet
addr=9999FF111B
Video
enhanced graphics

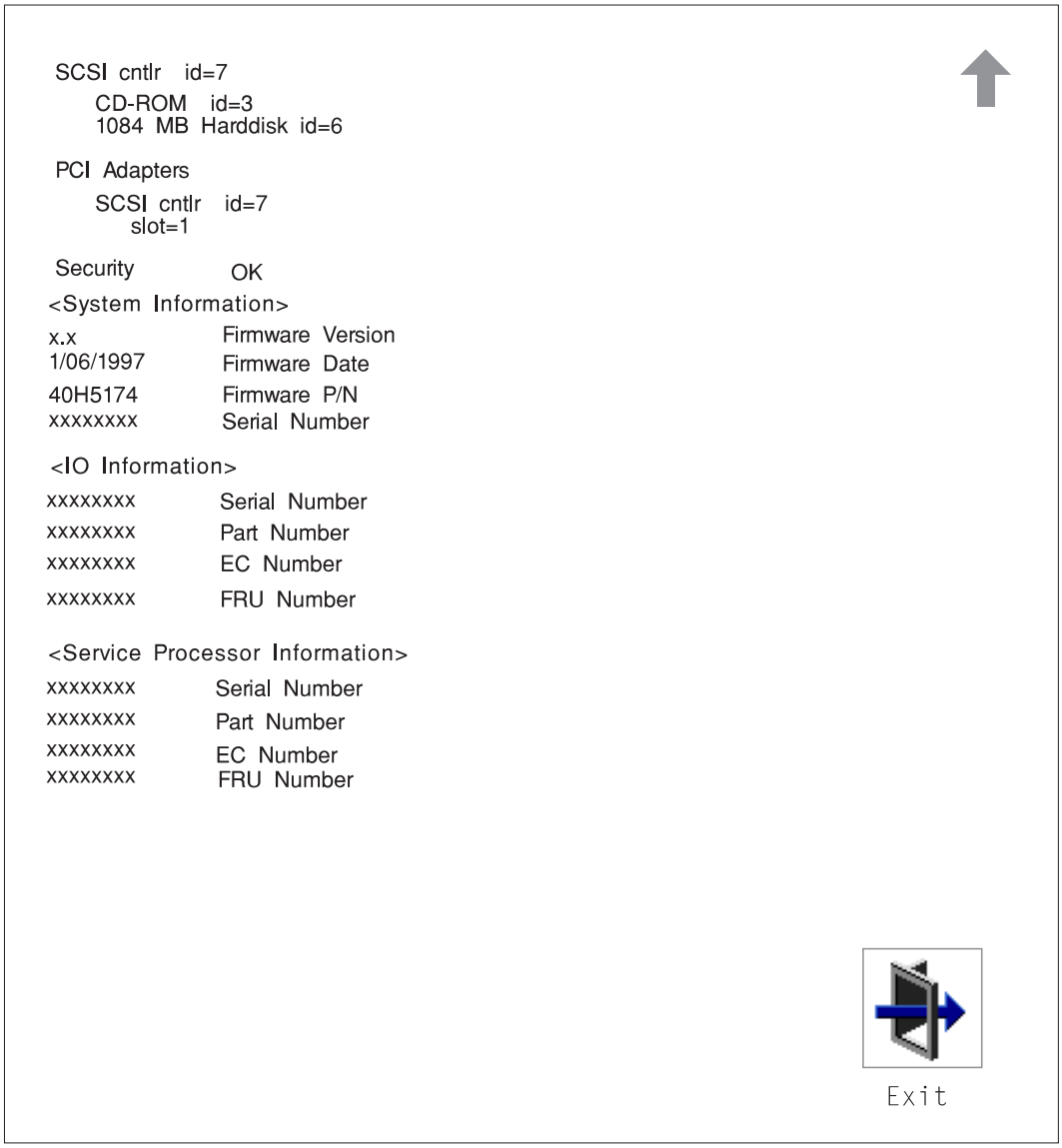




Exit

Selecting the down arrow key or Page Down key displays the next configuration screen, which lists your computer's firmware version, the date of its development, and the firmware part number.

The following screen is provided by the service processor.



MultiBoot:

This selection invokes the Mulitboot menu which provides several functions:

- To Select a particular operating system to boot.

  In the case of AIX this is a supported option, if you receive a an informational icon after making this selection this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value, issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. Please see the explanation of the bootlist command in your AIX documentation.
- To select a particular operating system as the default operating system
- To install from the list of possible devices
- To set the sequence in which devices are searched for operating system startup code
- To go to the Open Firmware command prompt
- To set the Multiboot menu so that it comes up immediately as the system powers up



The Select Software option, if supported by the operating system, shows the names of the operating system installed. This option may not be supported by all operating systems.

In the case of AIX this is a supported option, if you receive a message saying that:

```
No Operating System Installed
```

this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular Hard disk. Please see the explanation of the bootlist command in your AIX documentation.

The Software Default option, if supported by the operating system, lets you select the default operating system to start the system. This option may not be supported by all operating systems.

The Install From option produces a list of devices, for example the CD-ROM, where the operating system is installed from. You select one of the devices and the system searches the device for an operating system to install and if supported by the operating system in that device, the name of the operating system displays.

The Select Boot Device option provides a list of devices that can be selected to be stored on the boot list. Up to 5 devices are supported.

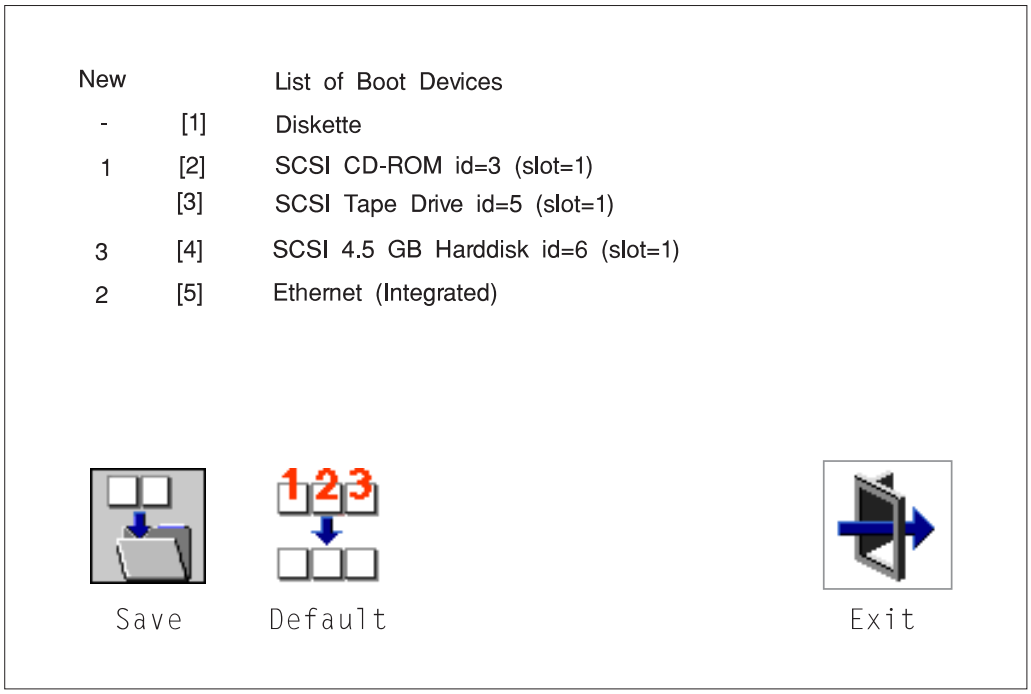
The OK Prompt procvides access to the Open Firmware command prompt. The Open Firmware command prompt is used for debug purposes, and device driver development. Information about the commands that are available in the IEEE Standard 1275.

The Multiboot Start option toggles between OFF and ON and selects if the Multiboot menu invokes automatically on startup or not.

Boot



This selection enables you to view and change the custom boot list (the sequence in which devices are searched for operating system startup code).



Attention: If you change your startup sequence, you must be extremely careful when performing *write* operations (for example, copying, saving, or formatting). You can accidentally overwrite data or programs if you select the wrong drive.

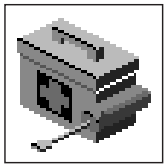
The default boot sequence is:

- The primary diskette drive
- CD-ROM drive
- Tape id=5 (slot=1)
- Hard disk drive id=6 (Slot=1)
- Network device.

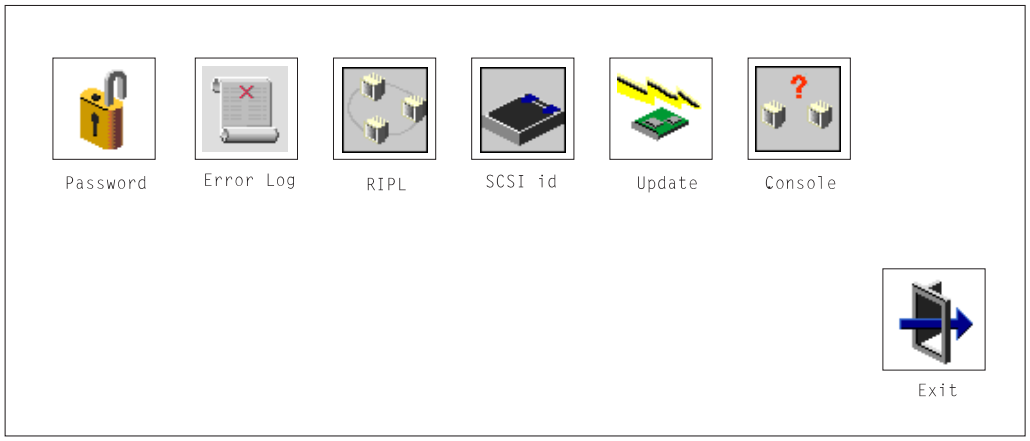
To change the custom boot list, enter a new order in the **New** column, then select **Save**. The List of Boot Devices is updated to reflect the order you have chosen.

You can choose 1 to 5 devices for the custom boot list. To change the boot sequence back to the default values, select **Default**. (The default sequence is automatically saved.)

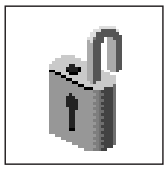
Utilities



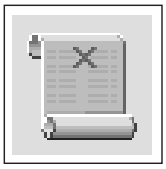
Selecting this icon enables you to perform various tasks and view additional information about your computer.



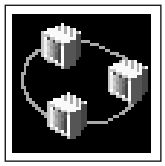
The following describes the choices available on this screen.



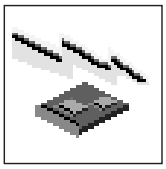
Password: Enables you to set password protection for turning on the computer and for using system administration tools.



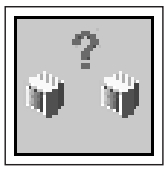
Error Log: Enables you to view and clear error log information for your computer.



RIPL (Remote Initial Program Load): Allows you to select a remote system from which to load programs via a network adapter when your system unit is first turned on. This option also allows you to configure network adapters which require setup.

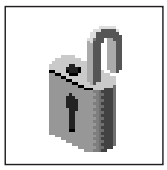


Update: Allows you to update the firmware programs on your computer.

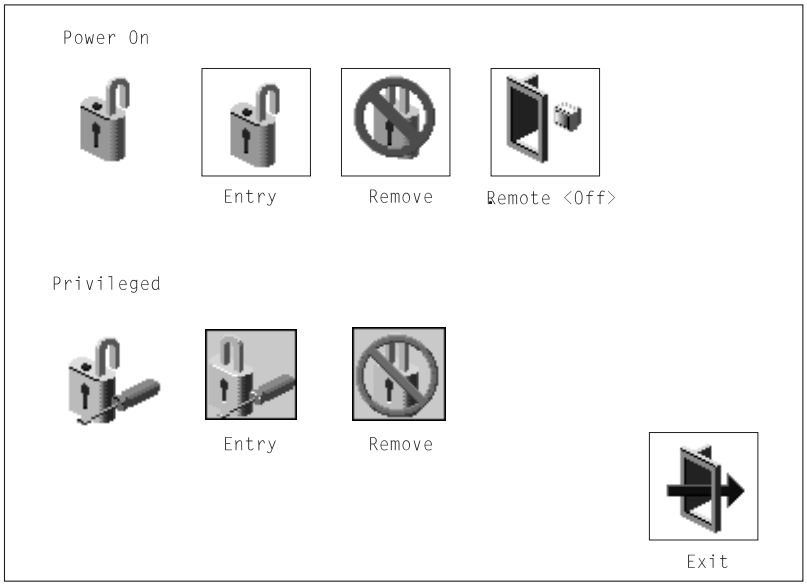


Console: If you have more than one display attached to your system unit, or if you have an ASCII terminal attached to your system unit in addition to a keyboard and display, this tool allows you to define which one is active.

Password

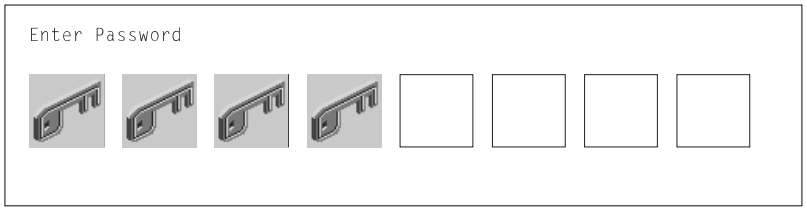


When you select this icon, the following screen is displayed.

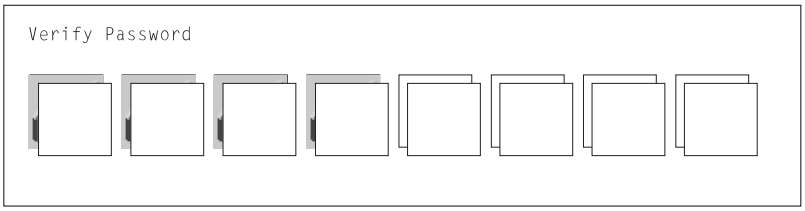


Power-On Password: Setting a power-on password helps protect information stored in your computer. If a power-on password is set for your computer, the Power On icon is shown in the locked position; if a power-on password is not set, then the Power On icon is shown in the unlocked position (as in the screen above).

When you select the Entry icon, a screen with 8 empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. As you type a character, a key appears in the box.



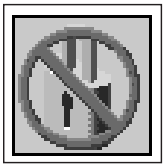
Press **Enter** when you are finished; you are required to type the password again for verification.



If you make a mistake, press the **Esc** key and start again.

After you have entered and verified the password, the power-on password icon flashes and changes to the locked position to indicate that the power-on password is set.

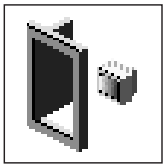
If you previously had set a power-on password and want to remove it, select the Remove icon.



Note: If you *forget* the power-on password, you have to remove the battery for at least 30 seconds to disable this password. See “Battery” on page 6-38 for details.

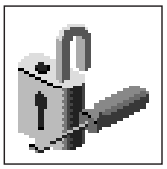
Attention: After you remove the battery, you must reconfigure your system (bootlist, IP parameters, console information, support processor, etc).

A password can be set only after the system is turned off and on again.



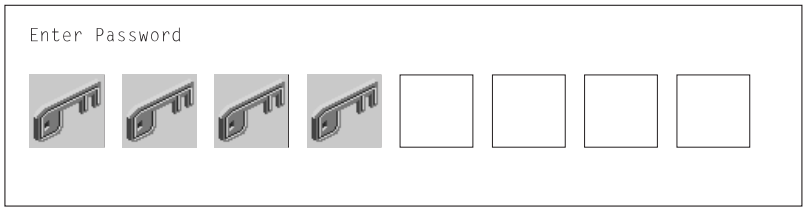
Remote Mode: The remote mode, when enabled, allows the system to start from the defined boot device. This mode is ideal for network servers and other computers that operate unattended. You *must* set a power-on password before you can enable the remote mode. When the remote mode is set, the icon changes to **Remote <On>**.

If you remove the power-on password, the remote mode is automatically reset, and the icon returns to **Remote <Off>**.

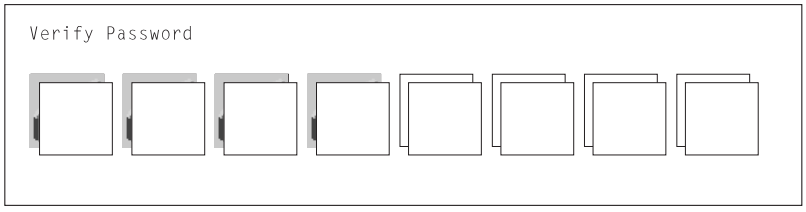


Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

When you select the Entry icon, a screen with 8 empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. As you type a character, a key appears in the box.



Press **Enter** when you are finished; you are required to type the password again for verification.

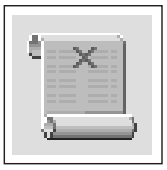


If you make a mistake, press the **Esc** key and start again.

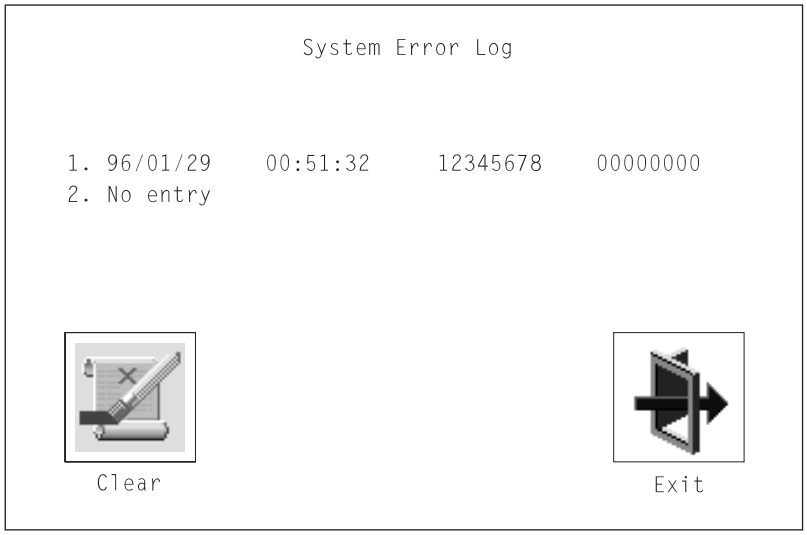
After you have entered and verified the password, the privileged-access password icon flashes and changes to the locked position to indicate that your computer now requires the password you just entered before running system programs.

Note: If you *forget* the power-on password, you have to remove the battery for at least 30 seconds to disable this password. See “Battery” on page 6-38 for details.

Error Log

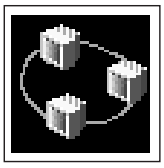


Selecting this icon displays the log of errors your computer has encountered during operations.

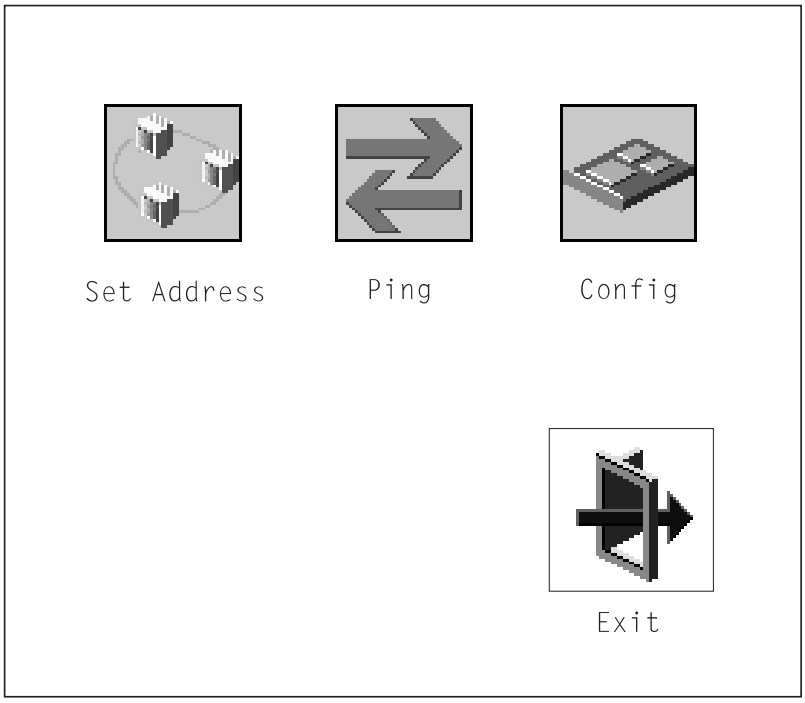


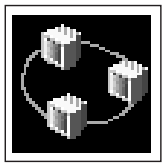
Selecting the Clear icon erases the entries in this log.

RIPL

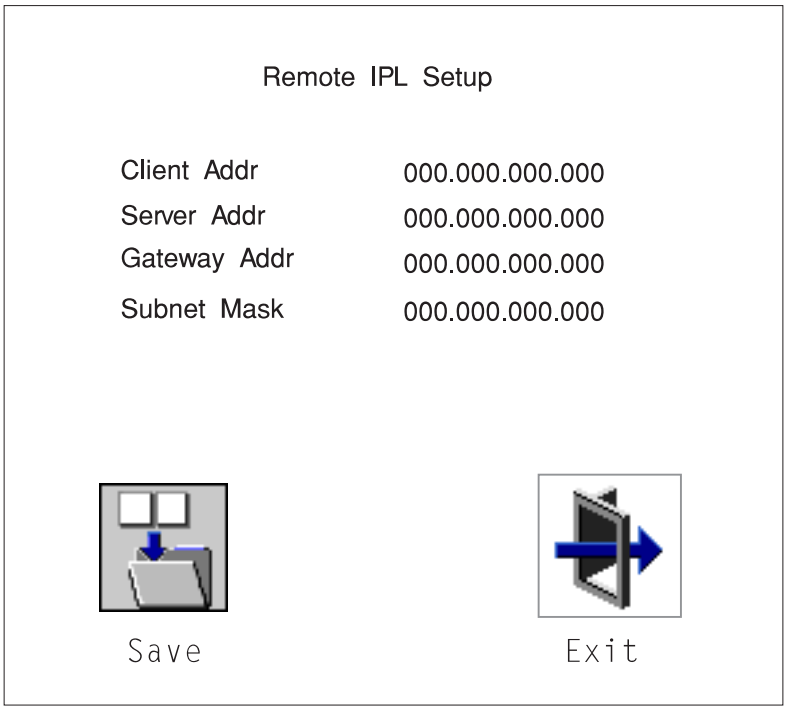


Selecting the Remote Initial Program Load (RIPL) icon above gives you access to the following selections.





The Set Address icon allows you to define addresses from which your computer can receive RIPL code.

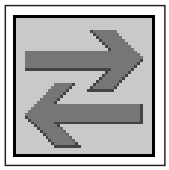


Notes:

1. 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 123.132.004.020.

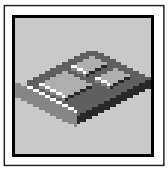
If any of the addresses is incomplete or contains a number other than 0 to 255, an error message is displayed when you select the Save icon. To clear this error, change the improper address and select Save again.

Note: You should save a copy of your changes in case you need to replace your battery.

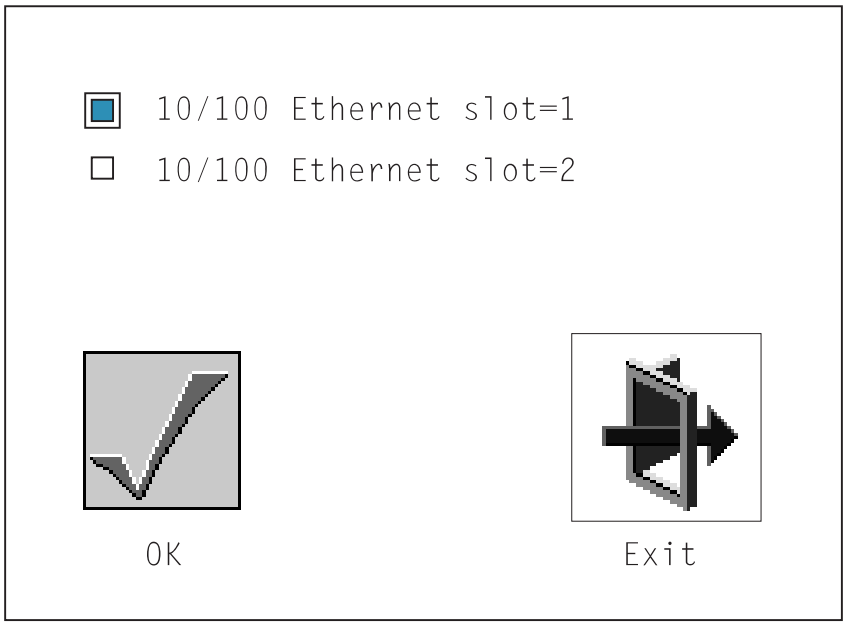


The Ping icon allows you to confirm that a specified address is valid by sending a test transmission to that address.

After choosing the Ping option, you may be asked to indicate which communications adapter (Token Ring or Ethernet) should be used to send the test transmission.

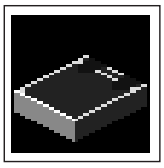


The Config icon allows you to configure network adapters which require setup. Selecting the Config icon presents a list of the adapters requiring configuration. Use the arrow keys to highlight an adapter, press the spacebar to select the adapter, then highlight the OK icon and press the Enter key.



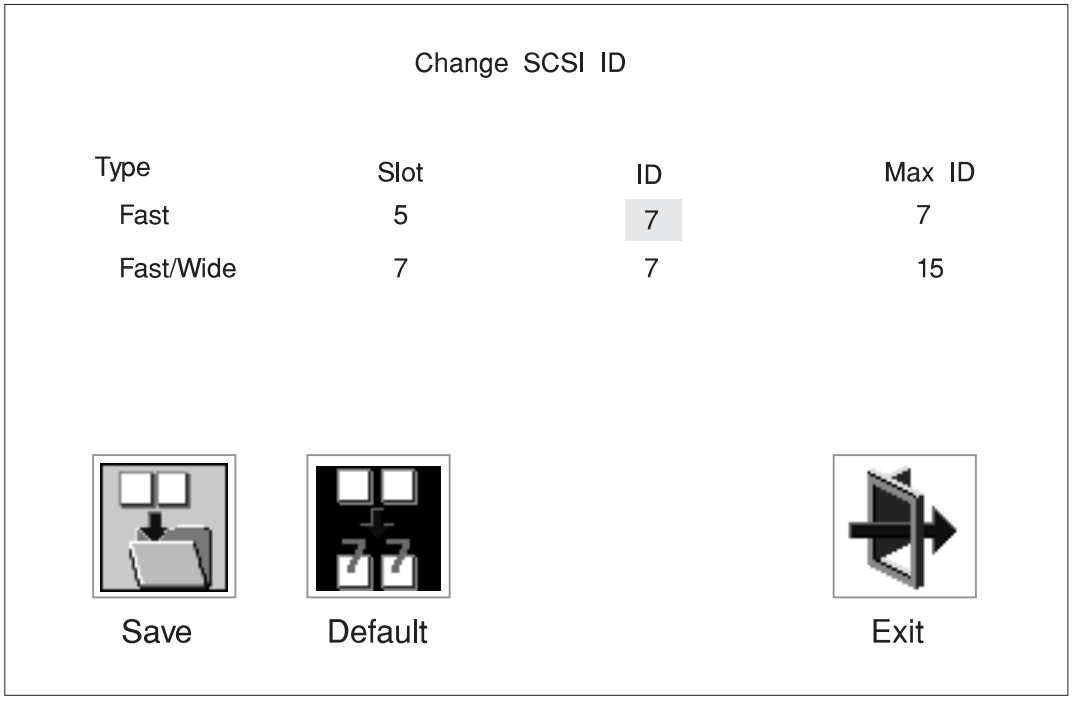
The next screen allows you to select the configuration of the adapter you have just chosen (or allow the system to select the configuration automatically). As on the previous screen, use the arrow keys to highlight, press the space bar to select, then highlight the OK icon and press enter.

SCSI ID

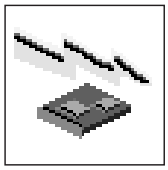


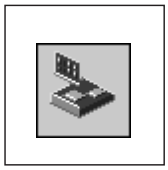
This selection allows you to view and change the addresses (IDs) of the SCSI controllers attached to your system unit. To change an ID, highlight the entry by moving the arrow keys, then use the space bar to scroll through the available ID's. After you have entered the new address, use the arrow keys to highlight the Save icon and press the Enter key.

At any time in this process, you can select the Default icon to change the SCSI IDs to the default values.



Update





This selection allows you to update the service processor and system firmware in your system unit from an image on a 3.5 inch diskette. After choosing to update the firmware and confirming this choice, you must insert the diskette containing the firmware image.

ATTENTION: While the new firmware image is being copied into your system unit, **you must not turn off the system unit**. Turning off the system unit during the update process may render your system unit inoperable.

After the flash update is complete, the system unit restarts.

If the flash update does not complete successfully or the system unit does not restart after the flash update, contact your authorized reseller or marketing representative.

Firmware Recovery

If a troubleshooting procedure has indicated that the firmware information in your system unit has been corrupted, then you must perform a firmware recovery.

To perform a firmware recovery, do the following:

1. Locate your firmware update diskette.
2. Using another system unit, rename the ***.img** ,br file on the firmware update diskette to **precover.img**
3. Make sure your system unit is turned off.
4. Insert the firmware recovery diskette into your system unit.
5. Turn on your system unit.
6. When the keyboard indicator appears, press the **1** key if the system console is an ASCII terminal, or the **F1** key if the system console is a directly-attached keyboard.
7. When the System Management Services appear, choose Utilities and perform a Firmware Update as described above.

Text-Based System Management Services

The text-based Open Firmware command line and System Management Services are available if an ASCII terminal is attached to your system unit. The text-based Open Firmware command line allows you to configure some adapters, and the System Management Services makes it possible for you to view information about your system unit and to perform such tasks as setting passwords and changing device configurations.

To enter the Open Firmware command line, you must press the **8** key *after the keyboard text symbol appears* during startup.

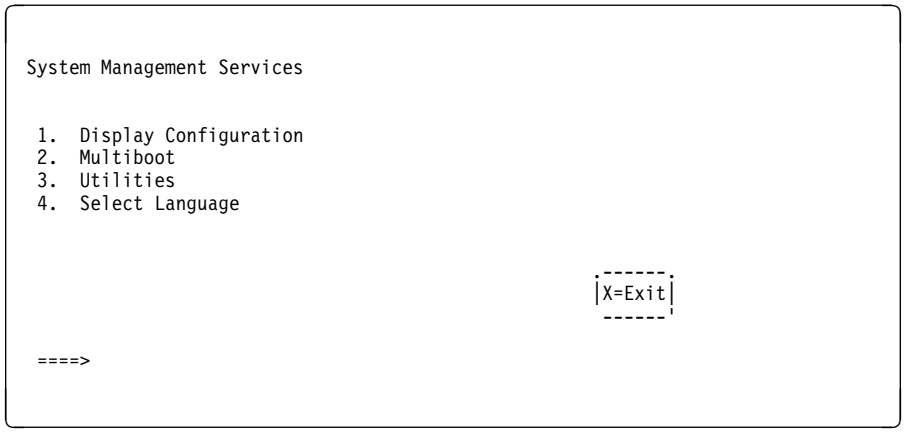
If you have pressed the **8** key, the Open Firmware command line (an "OK" prompt) appears after the initialization and power-on self tests (POST) are complete.

The Open Firmware command line can be used 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 enter `reset-all` or power the system down and reboot.

To start the text-based System Management Services instead of the Open Firmware command line, **press 1** on the ASCII terminal keyboard when the keyboard text symbol appears during startup.

After the text-based System Management Services starts, the following screen appears.

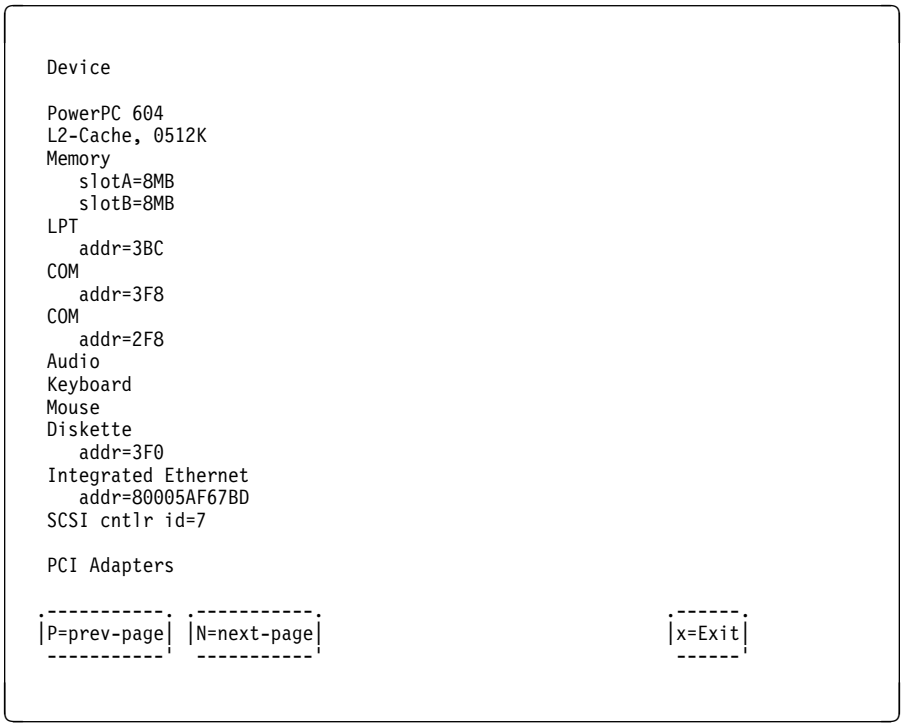


Selecting the numbered options provide capabilities described on the following pages.

After you have finished using the text-based System Management Services, entering **x** (for exit) boots your computer.

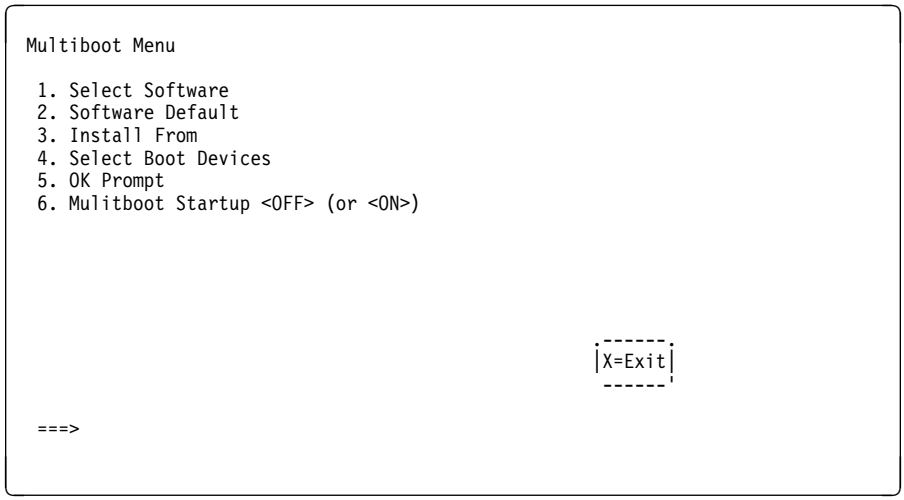
Display Configuration

This option provides information about the setup of your computer. A screen similar to the following is displayed.



Note that this configuration information does not include ISA adapters installed in the system unit.

MultiBoot Menu



The Select Software option, if supported by the operating system, shows the names of the operating system installed. This option may not be supported by all operating systems.

In the case of AIX this is a supported option, if you receive a message saying that:

```
No Operating System Installed
```

this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular Hard disk. Please see the explanation of the bootlist command in your AIX documentation.

The Software Default option, if supported by the operating system, lets you select the default operating system to start the system. This option may not be supported by all operating systems.

The Install From option produces a list of devices, for example the CD-ROM, where the operating system is installed from. You select one of the devices and the system searches the device for an operating system to install and if supported by the operating system in that device, the name of the operating system displays.

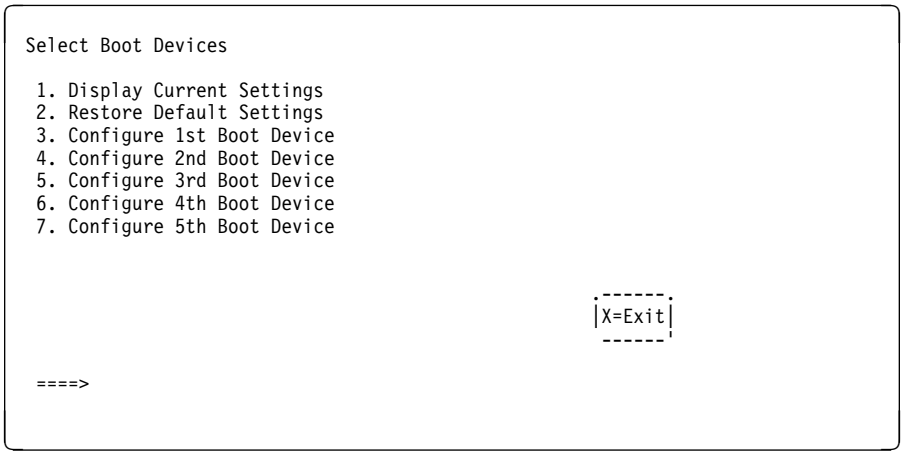
The Select Boot Device option provides a list of devices that can be selected to be stored on the boot list. Up to 5 devices are supported.

The OK Prompt procvides access to the Open Firmware command prompt. The Open Firmware command prompt is used for debug purposes, and device driver development. Information about the commands that are available in the IEEE Standard 1275.

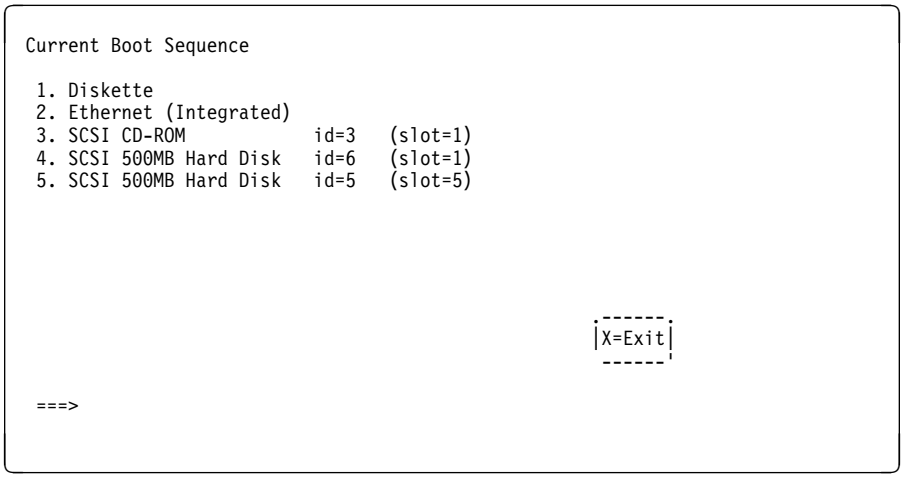
The Multiboot Start option toggles between OFF and ON and selects if the Multiboot menu invokes automatically on startup or not.

Select Boot Devices

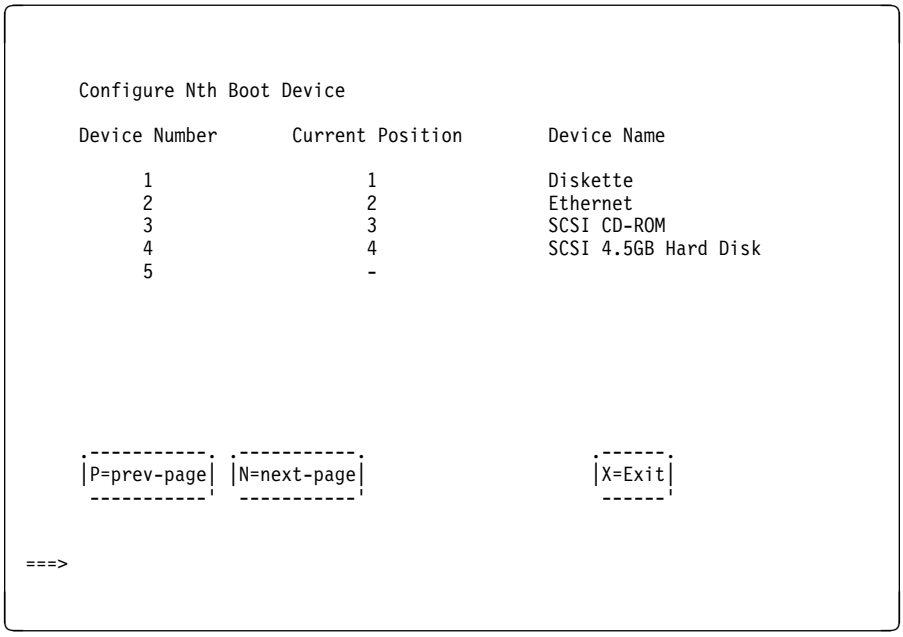
This selection enables you to view and change the custom boot list, which is the sequence of devices read at startup time.



Selecting the Display Current Settings option lists the current order of devices in the boot list. The following screen shows an example of this display.

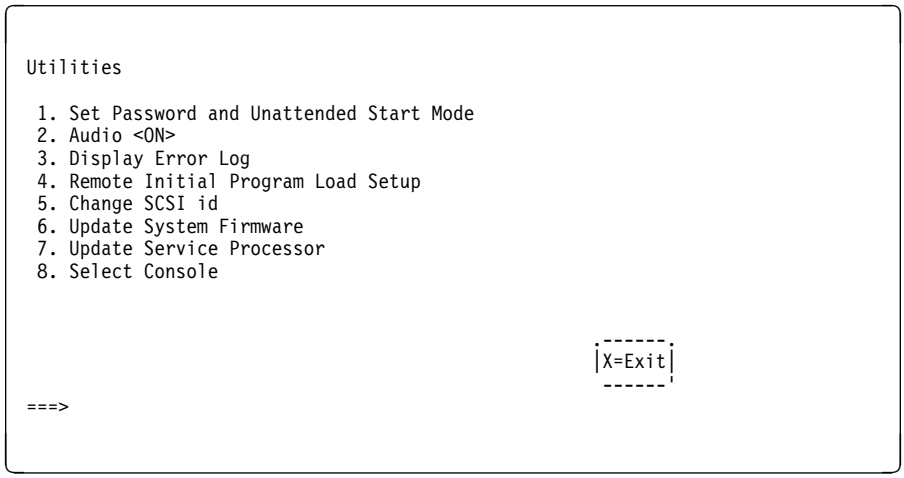

Current Boot Sequence
1. Diskette
2. Ethernet (Integrated)
3. SCSI CD-ROM id=3 (slot=1)
4. SCSI 500MB Hard Disk id=6 (slot=1)
5. SCSI 500MB Hard Disk id=5 (slot=5)
X=Exit
===>

Selecting any of the Configure Boot Device options displays the following screen.

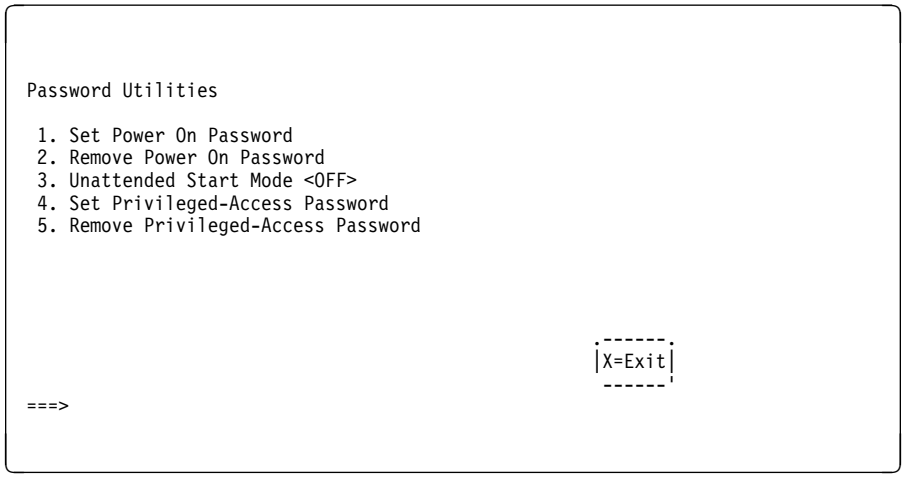


Utilities

The Utilities screen enables you to select from the following system management tools.



Set Password and Unattended Start Mode: Entering this selection permits access to the following options.



Set Power On Password: Setting a power-on password helps protect information stored in your computer. You can use any combination of up to eight characters (A–Z, a–z, and 0–9) for your password. The password you type is not displayed on the screen. Press **Enter** when you are finished; you are required to type the password again for verification.

If you previously had set a power-on password and wanted to remove it, select **Remove Power-On Password**.

Note: If you *forget* your password, you have to shut down the computer and remove the battery for at least 30 seconds to disable the password. See "Battery" on page 6-38 for details.

A password can be set only after the system is turned off and on again.

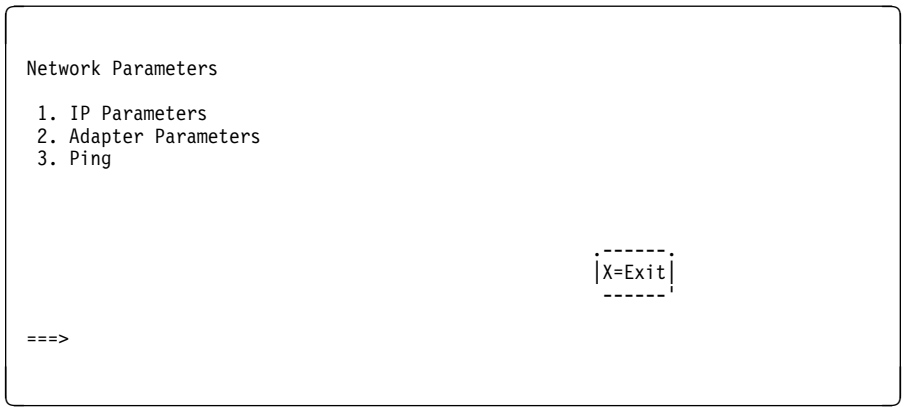
Set Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

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 have to shut down the computer and remove the battery for at least 30 seconds to disable the password. See "Battery" on page 6-38 for details.

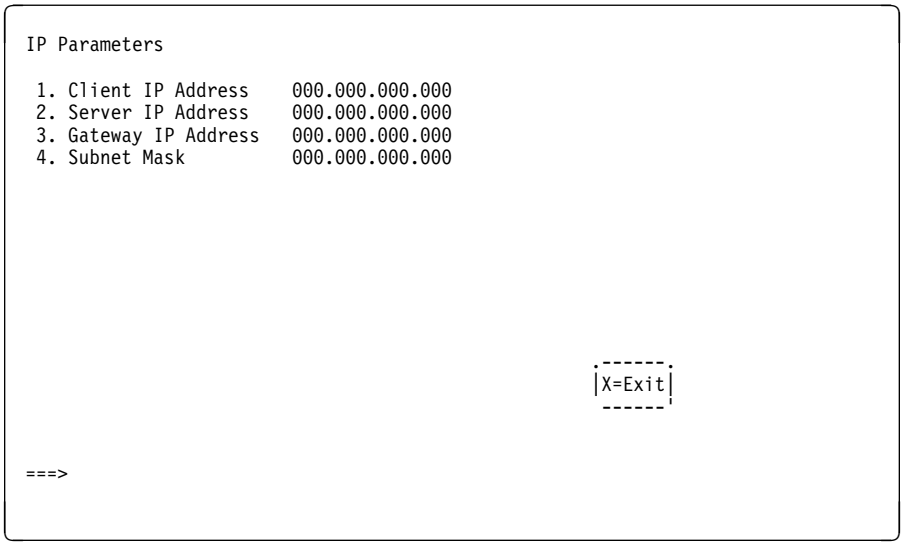
Audio: Selecting this utility turns on or off the system tones heard at power-on time.

Remote Initial Program Load Setup: This option allows you to enable and set up the remote startup capability of your computer. First, you are asked to specify the network parameters.

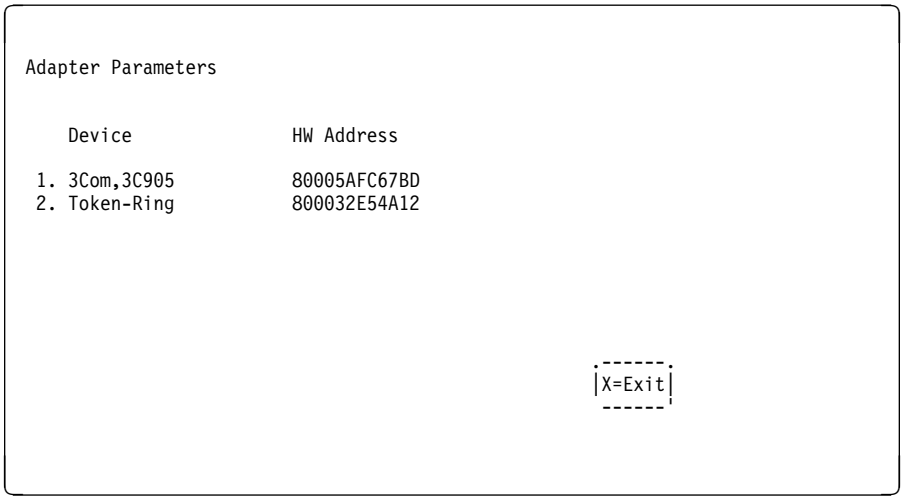


Note: Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 123.132.004.020.

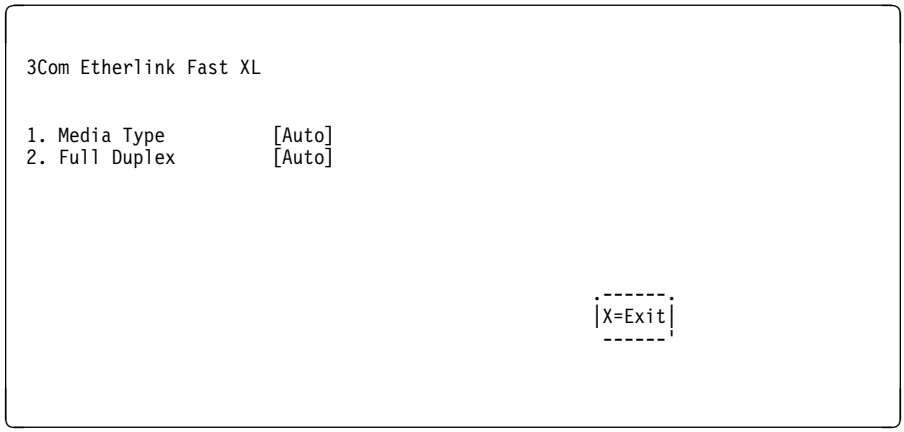
Selecting the IP Parameters option displays the following screen.



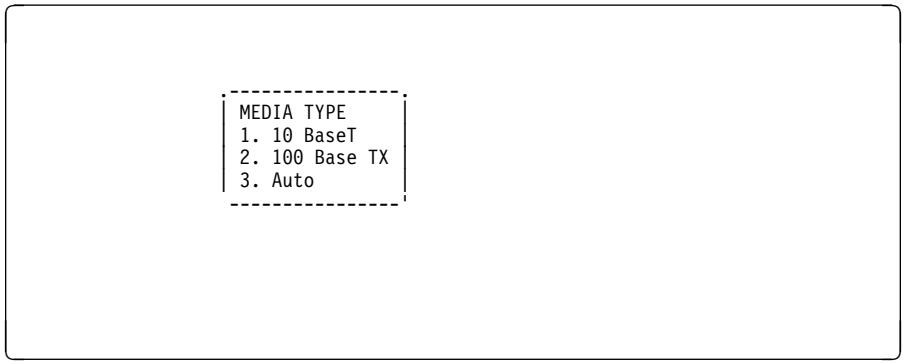
Selecting the Adapter Parameters option allows you to view an adapter's hardware address as well as configure network adapters that require setup.



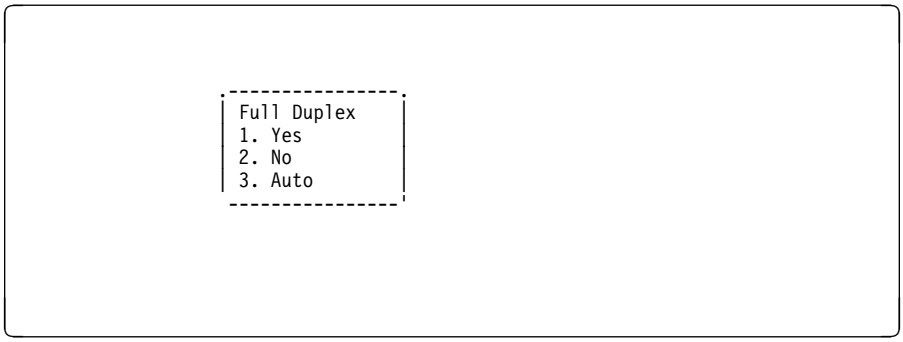
Selecting option 1 (3Com,3C905) displays the following 100Mb Ethernet configuration menus:



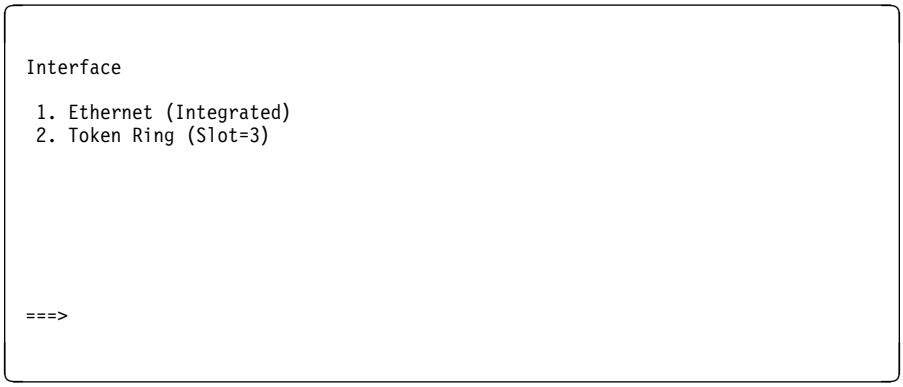
Selecting the Media Type option allows you the change the media employed by the Ethernet adapter:



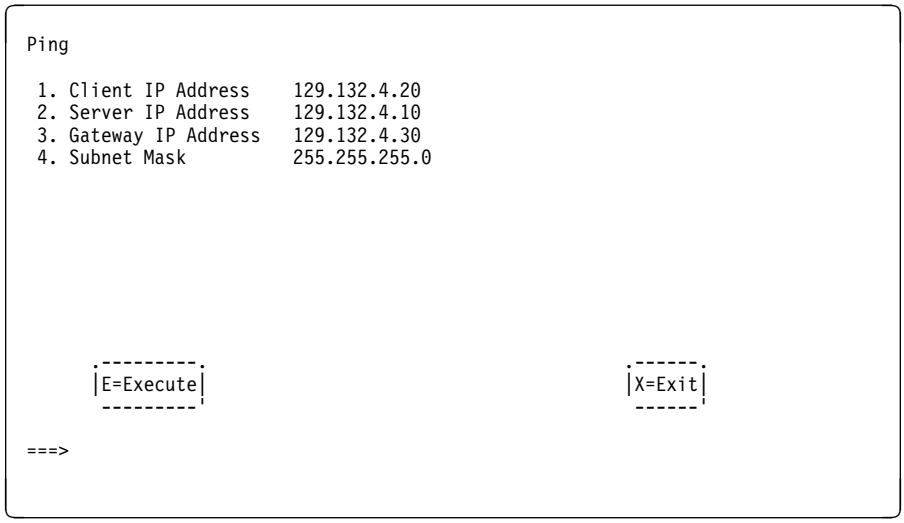
Selecting the Full Duplex option allows you to change how the Ethernet adapter communicates with the network:



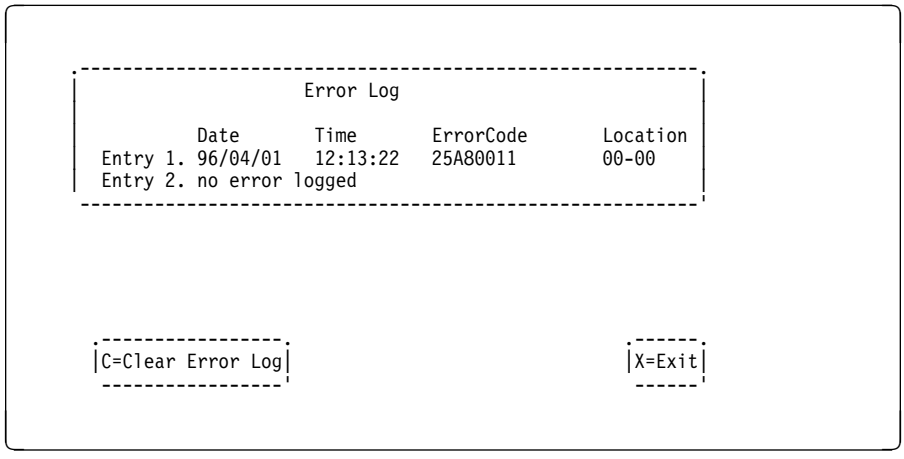
Ping, the last option available from the Network Parameters menu, allows you to test a connection to a remote system unit. After selecting the Ping option, you must choose which adapter communicates with the remote system.



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

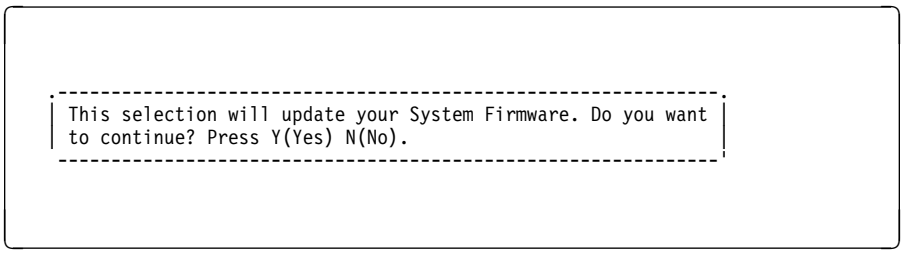


Display Error Log: A screen similar to the following is displayed when you select this option. Here, you can view or clear your computer's error log.



Change SCSI ID: This option allows you to view and change the addresses of the SCSI controllers attached to you computer.

Update System Firmware: This option allows you to update your system firmware. Note that you must insert a diskette containing the firmware update image after you see the following confirmation screen.



Firmware Recovery: If a troubleshooting procedure has indicated that the firmware information in your system unit has been corrupted, then you must perform a firmware recovery.

To perform a firmware recovery, do the following:

1. Locate your firmware update diskette.
2. Using another system unit, rename the
   ***.img**
   file on the firmware update diskette to
   precover.img
3. Make sure your system unit is turned off.
4. Insert the firmware recovery diskette into your system unit.
5. Turn on your system unit.
6. When the keyboard indicator appears, press the **1** key on the system console ASCII terminal.
7. When the System Management Services appear, choose Utilities and perform a System Firmware Update as described above.

Select Console: Selecting this option allows you to define which display is used by the system for system management.

Select Language

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



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

Chapter 6. Removal and Replacement Procedures

Before performing any of the removal or replacement procedures in this chapter, read the following notice.

DANGER

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

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

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

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

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

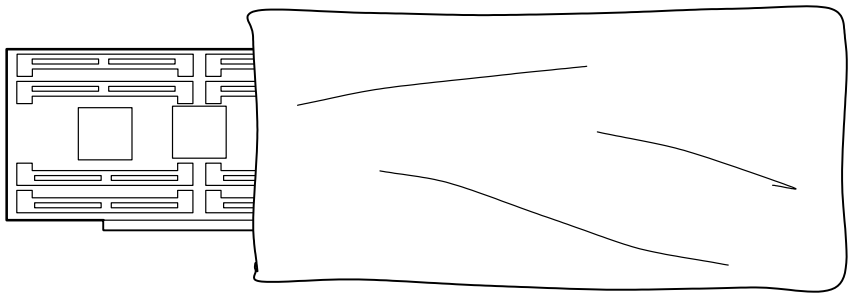
CAUTION:
This product is equipped with a 3-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.

Handling Static–Sensitive Devices

Attention: Adapters, planars, diskette drives, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags, as shown in this illustration, to prevent this damage.

Take the following precautions:

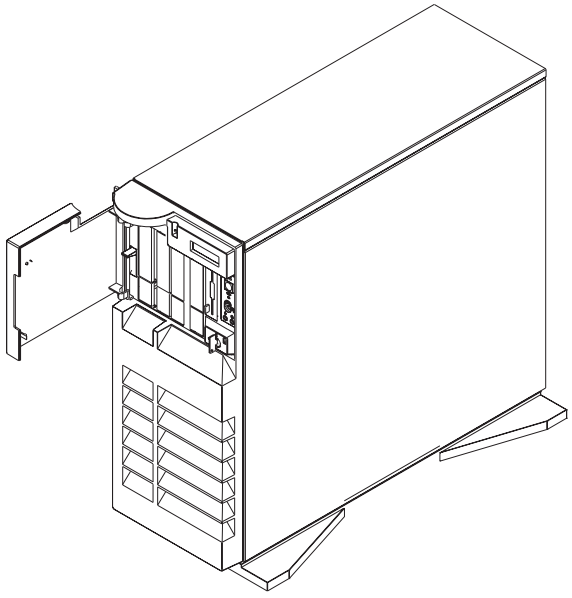
- If you have an antistatic wrist strap available, use it while handling the device.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.
- Handle the devices carefully in order to prevent permanent damage.



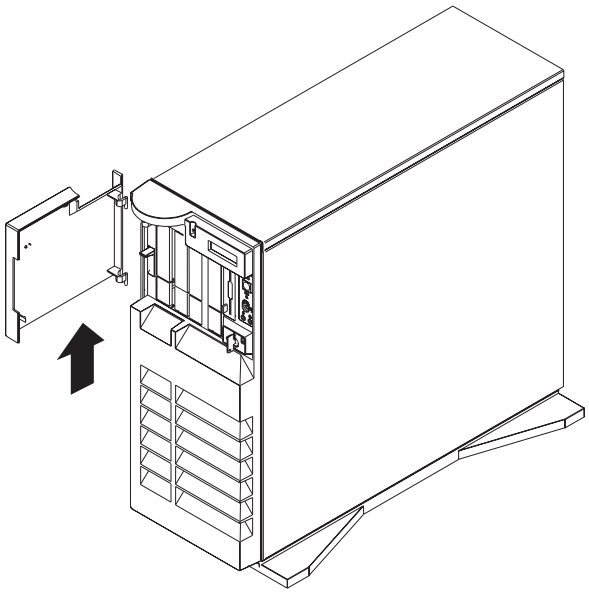
Covers

Removal

1. Open the door.

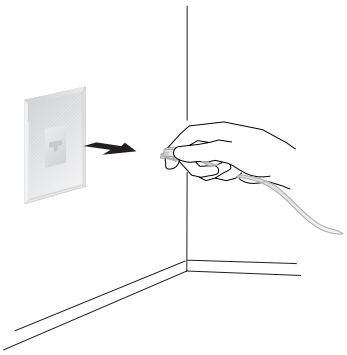


2. Remove the door by carefully lifting it up and off the hinges. Store it in a safe place.



3. Remove all media (diskettes, CDs, optical discs, or tapes) from drives; then turn the power off to the system and all attached devices.
4. Shutdown the operating system.
5. Turn off power to the system and all attached options.

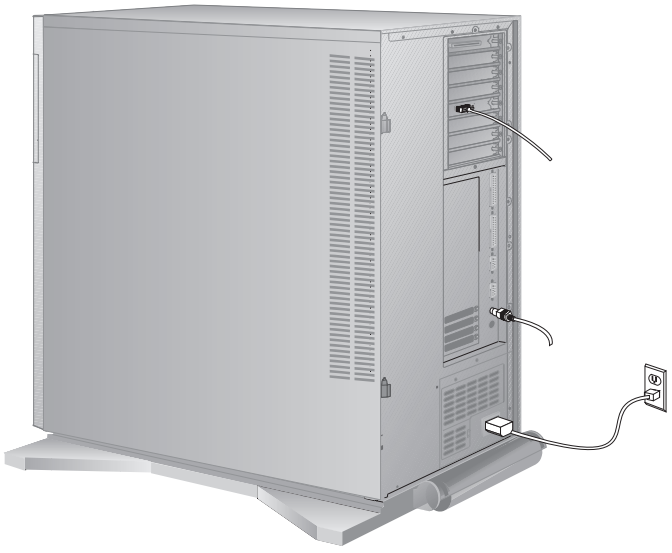
6. If you have a modem or fax machine attached to the system, disconnect the telephone line.

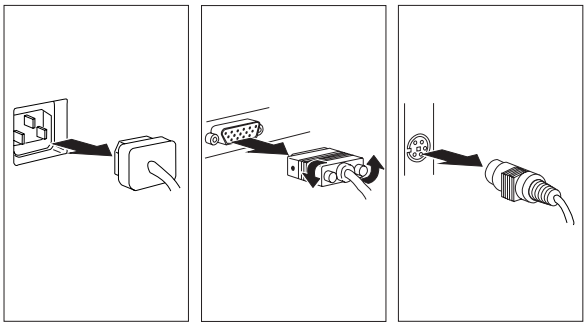


7. Unplug all power cords (cables) from electrical outlets.

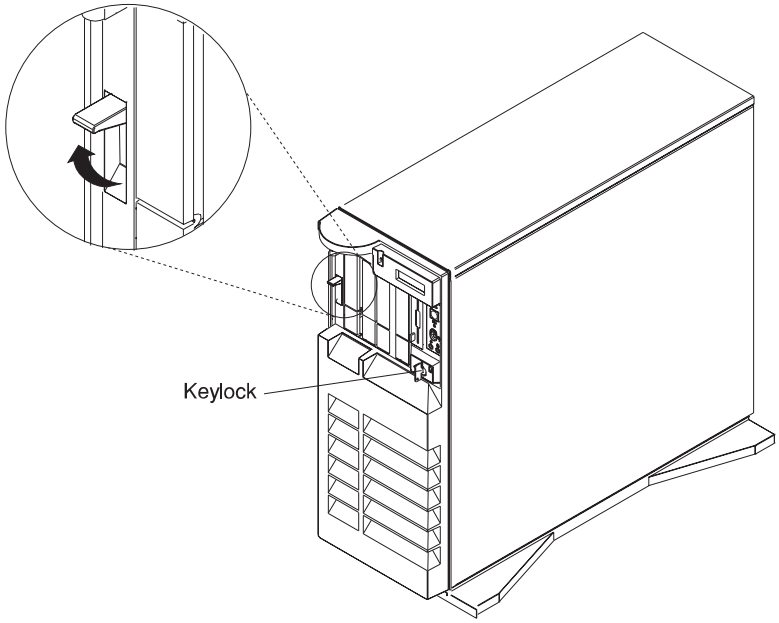
   Note the location of the following; then disconnect them from the back of the system:

   - Power cord
   - Display cable
   - Keyboard cable
   - Any other cables and cords



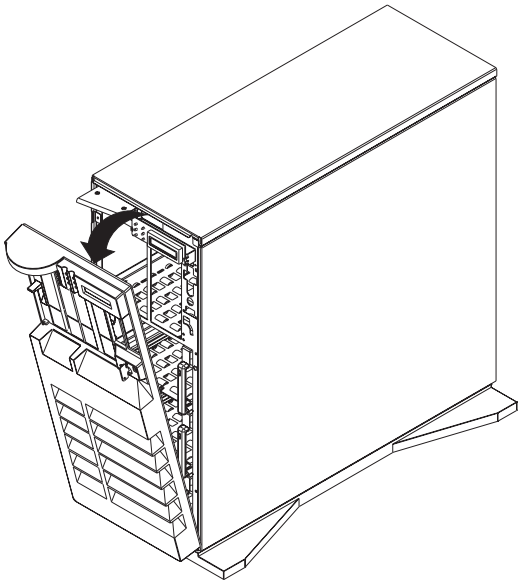


8. Remove the front cover:
   a. Unlock the keylock on the front cover.
   b. Lift up on the latch on the left side of the front cover.



c. Grasp the sides of the front cover near the top of the system and pull it forward. (The front cover is held in place by two spring detented ball studs.)

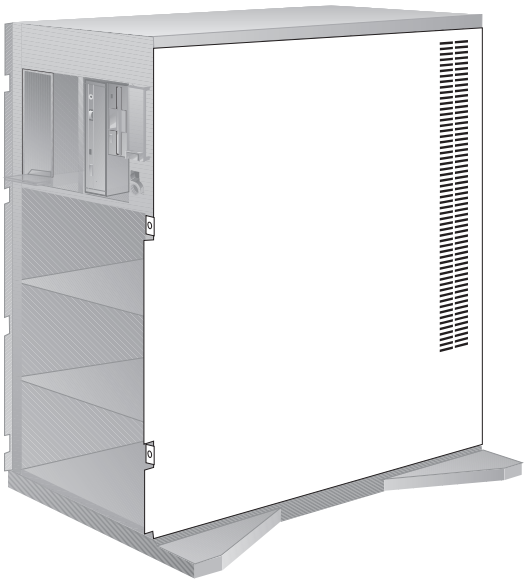
d. Detach the front cover's bottom hooks from the grooves located on the bottom of the system, and lift the front cover off the bottom of the system.

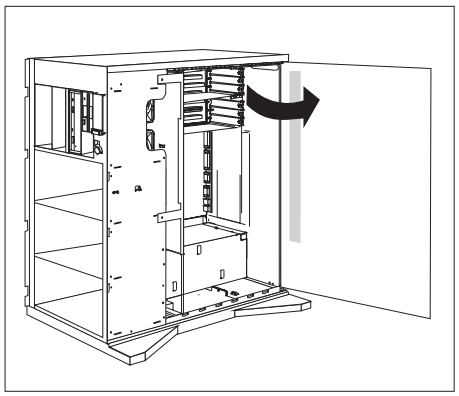


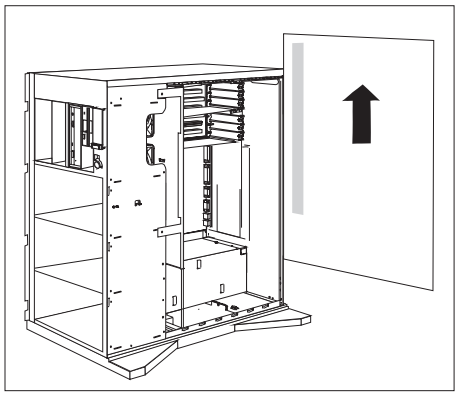
9. Remove the side cover:

   a. Open the side cover to a 90 degree angle.

   b. Remove the cover by carefully lifting it up and off the hinges. Store it in a safe place.



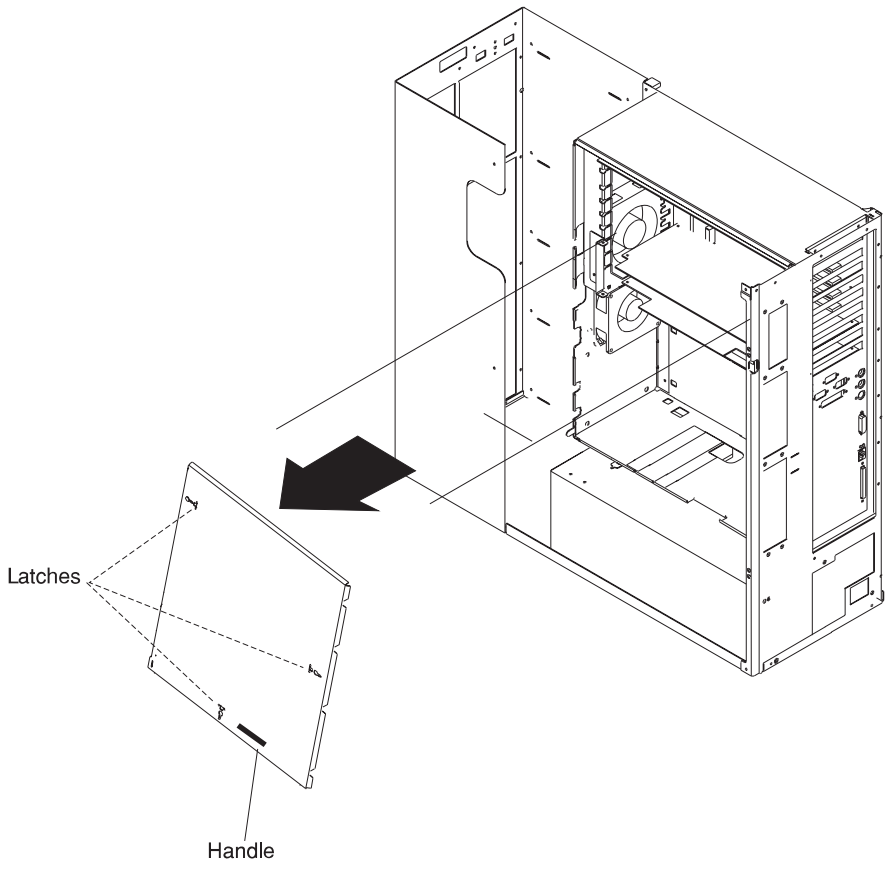




10. Remove the I/O Planar cover:

    Attention If your system has the SSA bulkhead cable installed, make sure that you do not damage the cable as you remove the I/O planar cover.

    a. Loosen the three screws (2 turns) on the I/O planar cover and unlatch the cover.



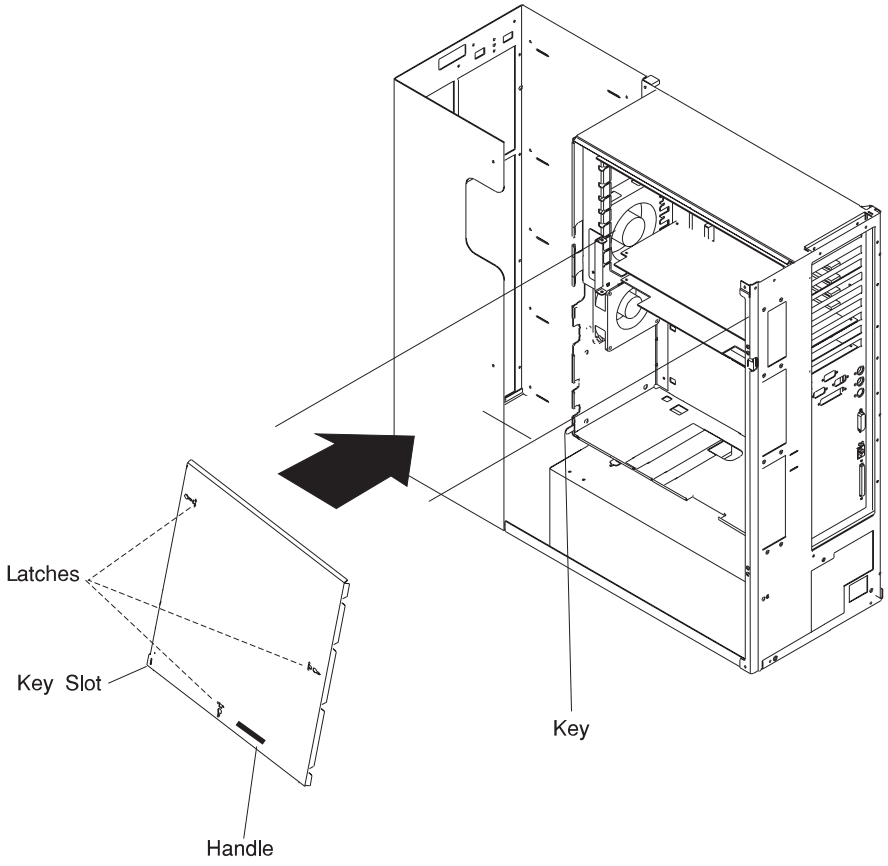
b. Remove the I/O planar cover.

Replacement

1. I/O Planar Cover

   a. Place the lip at the top of the I/O planar cover over the top of the system adapter housing. Push the bottom of the I/P planar cover in, aligning the key on the system with the key slot on the cover. Replace the I/O planar cover.

   b. Latch the cover and tighten the three screws.

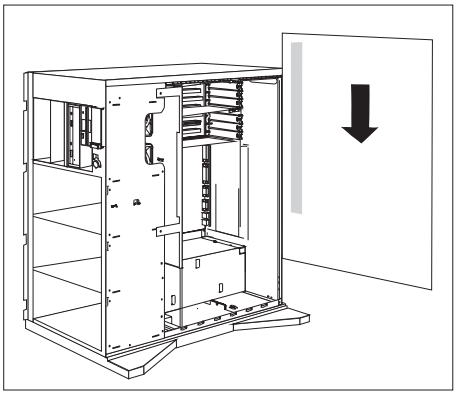


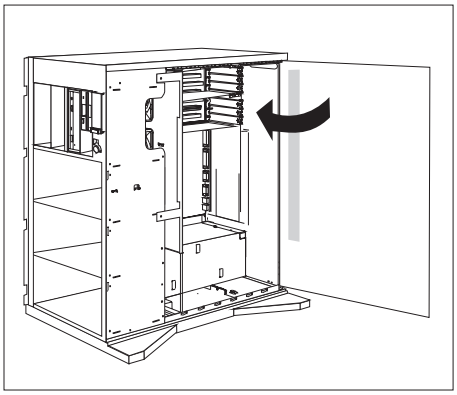
2. Reinstall the side cover:

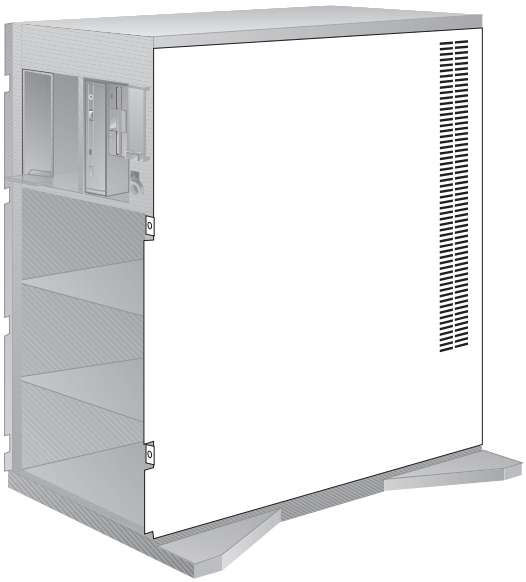
   a. Place the side cover at a 90 degree angle. Align the pins on the rear of the side cover with the two hinges on the rear of the system.

   b. Slide the side cover down.

   c. Push the side cover to close it.







3. Reinstall the front cover:

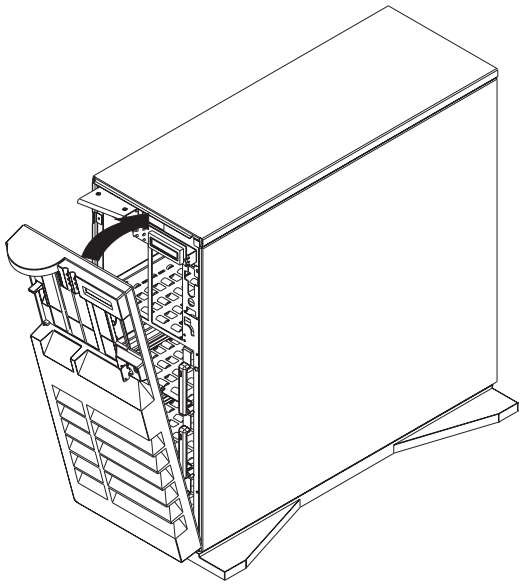
   Note: Before installing the front cover, verify that the side cover is installed correctly. If the side cover is not properly installed, the front cover will not align correctly when you attempt to install it.

   a. Align the bottom of the front cover with the bottom of the system.

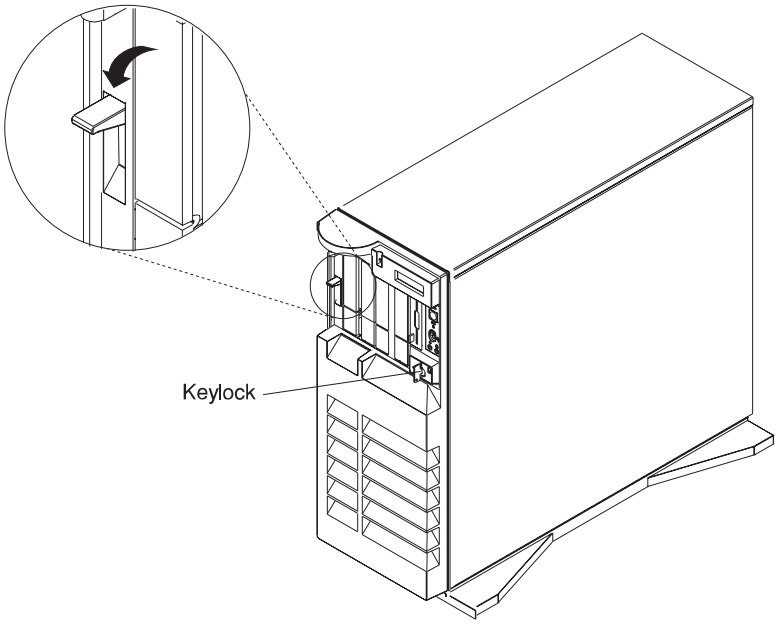
   b. Fit the front cover's bottom hooks into the grooves located on the bottom of the system.

   c. Pivot the front cover upward and press the top of the cover into the top of the system until they snap together.

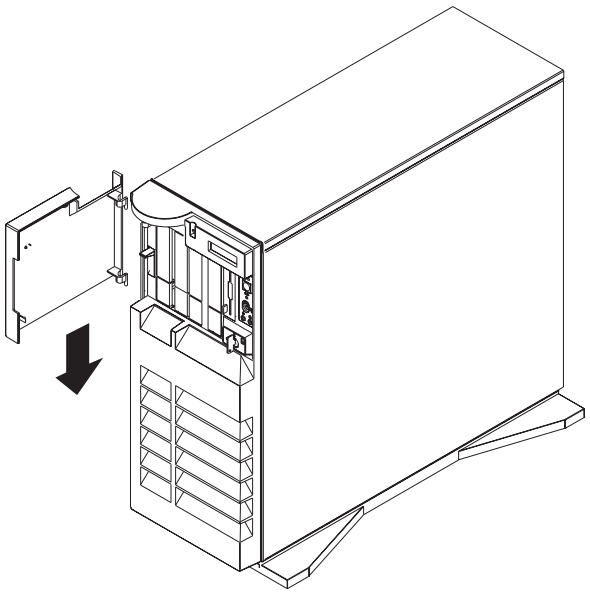
   d. Lock the front cover.



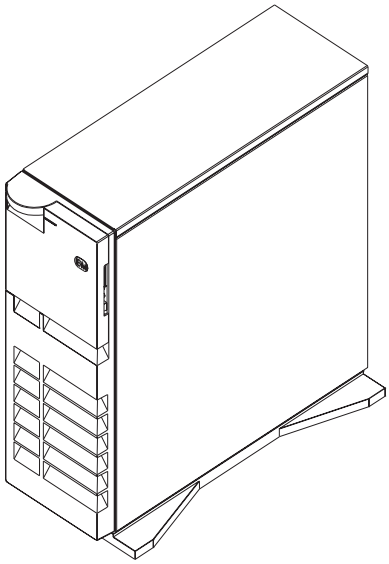
e. Latch the cover latch located on the left side of the front cover.



4. Reinstall the door at the front of the system by aligning the pins with the hinges, and sliding the door down.



5. Close the door.



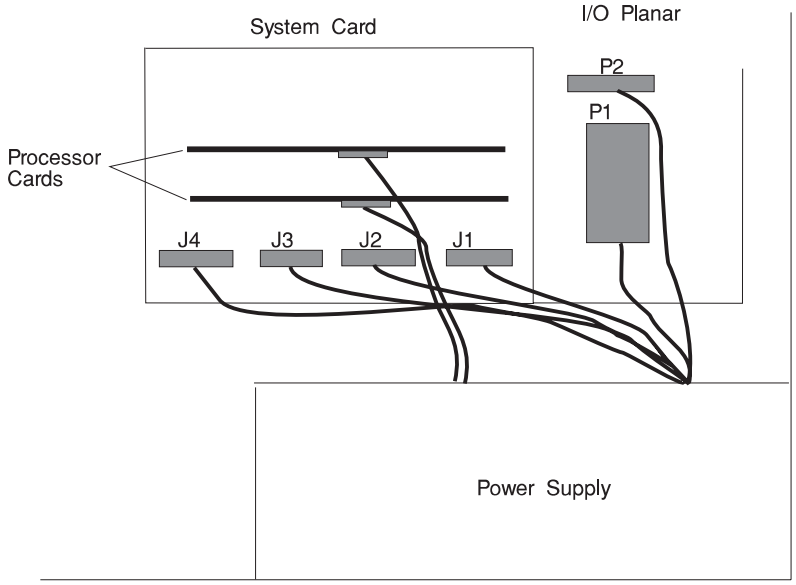
Power Supply

DANGER

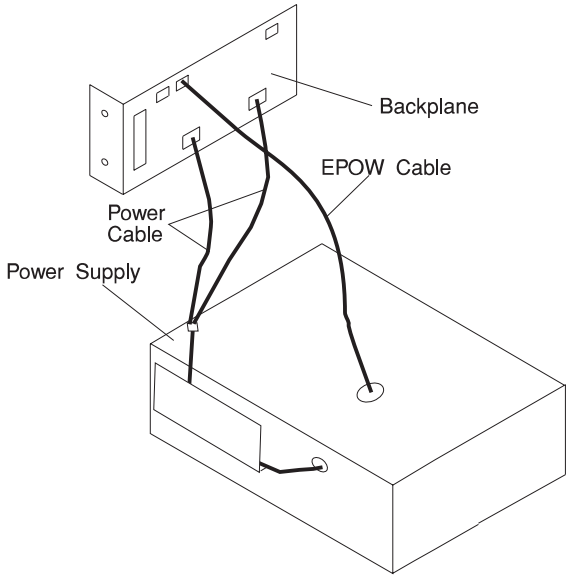
> **Do not attempt to open the covers of the power supply. Power supplies are not serviceable and are to be replaced as a unit.**

Removal

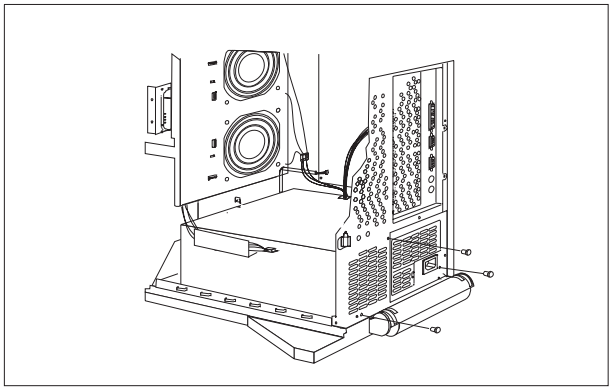
1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Disconnect the two cables from I/O Planar connectors P1, and P2.
3. Disconnect the four cables from the System Card connectors J1, J2 J3, and J4.
4. Disconnect the cables from the Processor Cards.



5. Disconnect the power cables at the power supply that connect to the backplanes.
   .



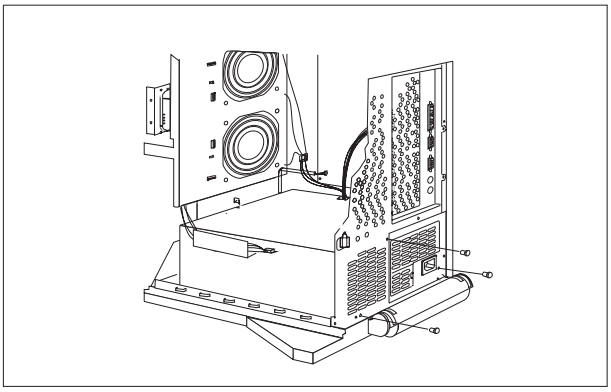
6. Disconnect the power cord from rear of the power supply.
7. Remove the three screws from the power supply.



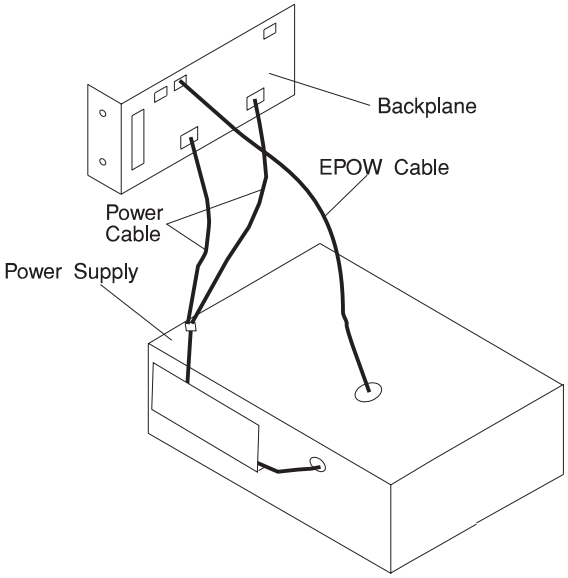
8. Remove the power supply from the system. Slide the power supply forward, toward the front. Lift it up and out of the system.

Replacement

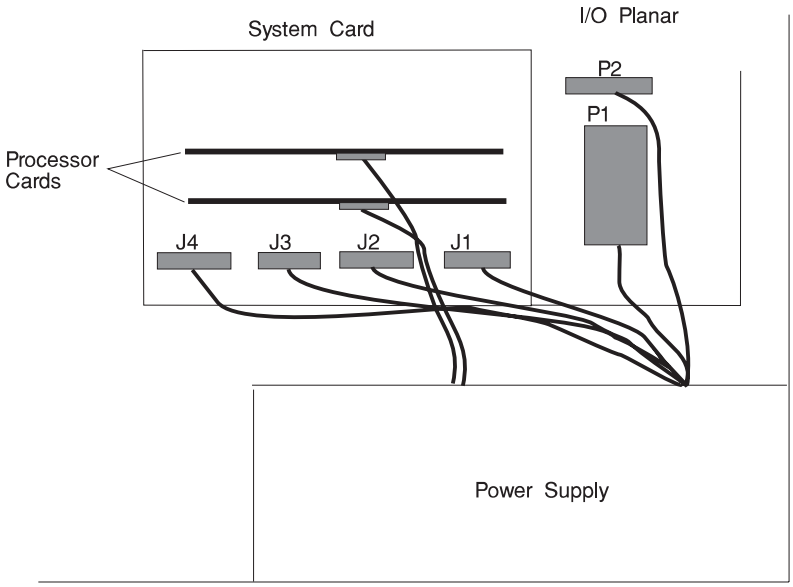
1. Place the power supply in the bottom of the system. Slide the power supply backward, toward the rear of the system.
2. Secure the power-supply assembly by installing the three screws that you removed in step 7 on page 6-16.



3. Reconnect the cables.
   a. Reconnect the power supply cables between the power supplies and backplanes that were removed in step 5 on page 6-16.



b. Reconnect the cable labeled P1 to I/O Planar connector P1.
c. Reconnect the cable labeled P2 to I/O Planar connector P2.
d. Reconnect the cable labeled P17 to system card connector J1.
e. Reconnect the cable labeled P16 to system card connector J2.
f. Reconnect the cable labeled P15 to system card connector J3.
g. Reconnect the cable labeled P7 to system card connector J4.
h. Reconnect the cable labeled P4 to top processor card.
i. Reconnect the cable labeled P3 to bottom processor card.



CD-ROM Drive, Tape Drive, Diskette Drive



CAUTION:
Do not open the drive; no user adjustments or serviceable parts are inside.

Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Disconnect the power and signal cables to the drive you are removing.
3. Slide the drive forward to remove.

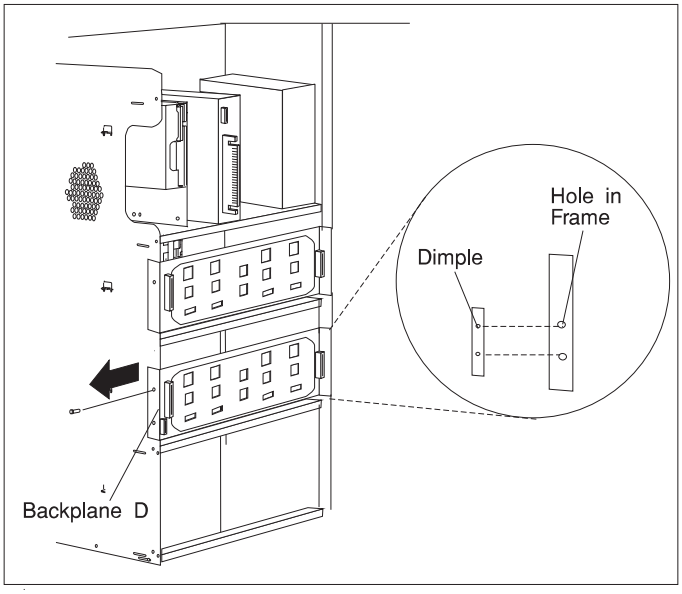
Replacement

Replace in reverse order.

Backplane

Removal

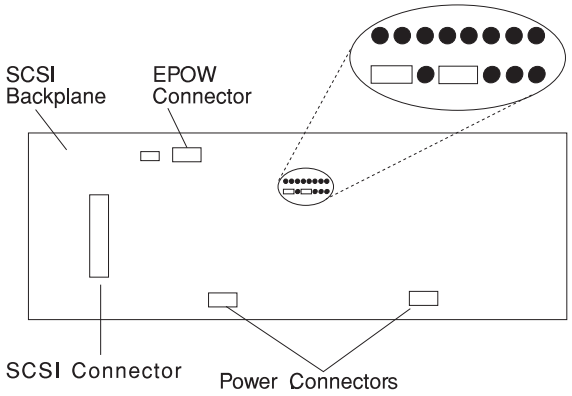
1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the screw from the backplane.



3. Slide the backplane out to gain cable access.
4. Disconnect the SCSI cable, EPOW cable, and power supply cable from the backplane.
5. Remove the backplane.

Replacement

If you installed a SCSI backplane, check the jumpers on the new backplane for proper setting. The jumpers should be set as shown.



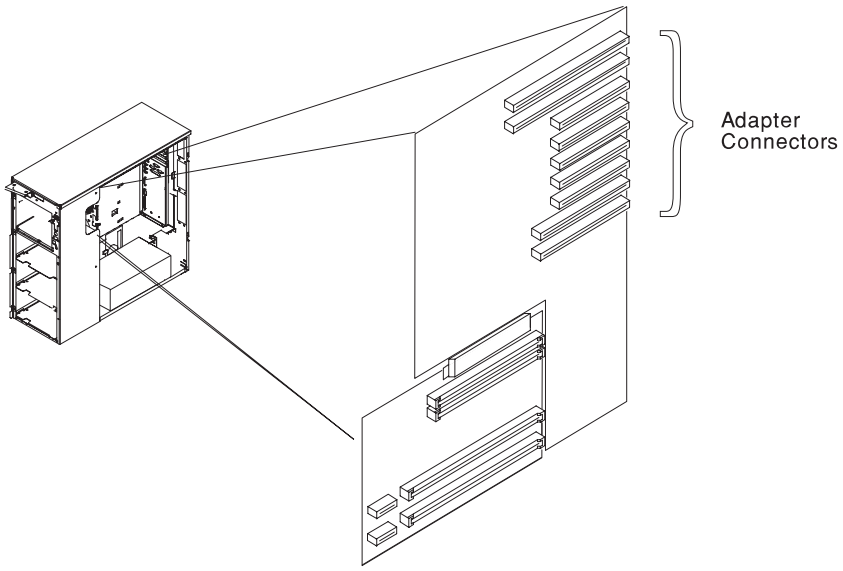
Replace in reverse order.

If you installed an SSA backplane, be sure to connect the internal SSA cable between the backplane and the internal connectors on the external SSA connector.

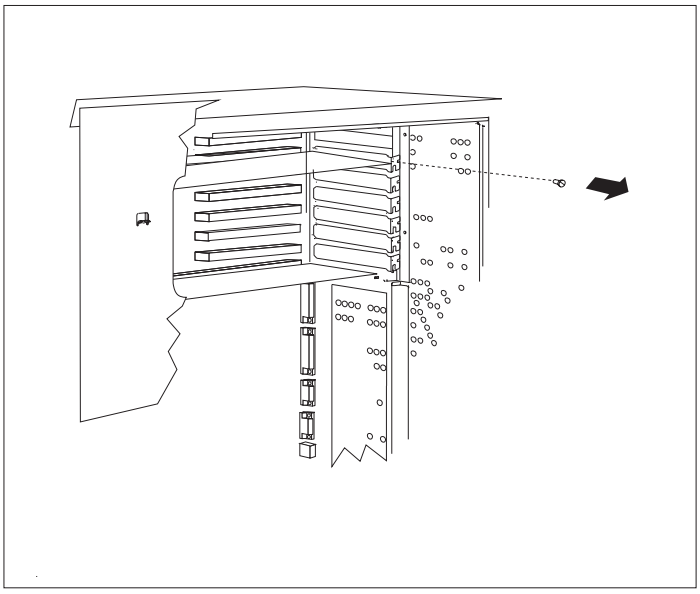
Adapters

Removal

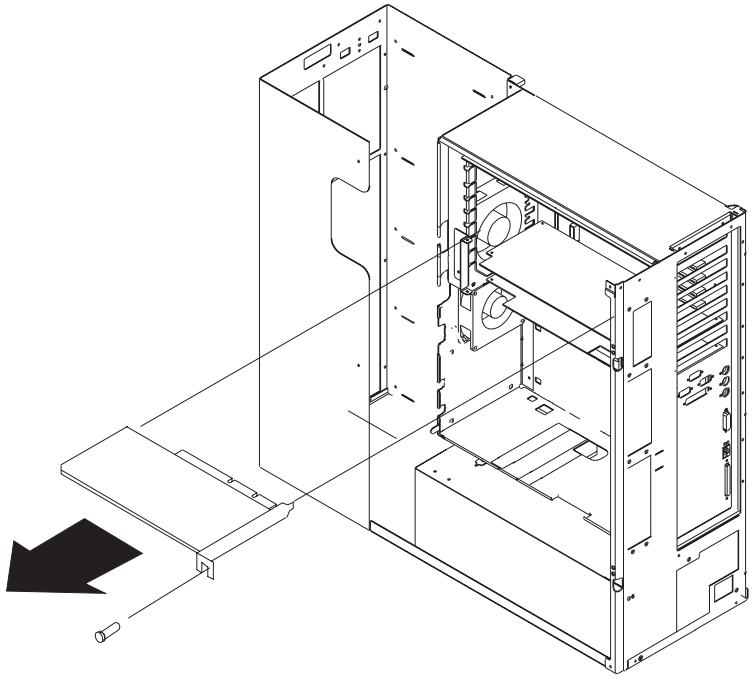
1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described in on page 6-8.
3. Locate the adapter connectors and determine which adapter you want to remove.



4. Remove the screw holding the adapter.



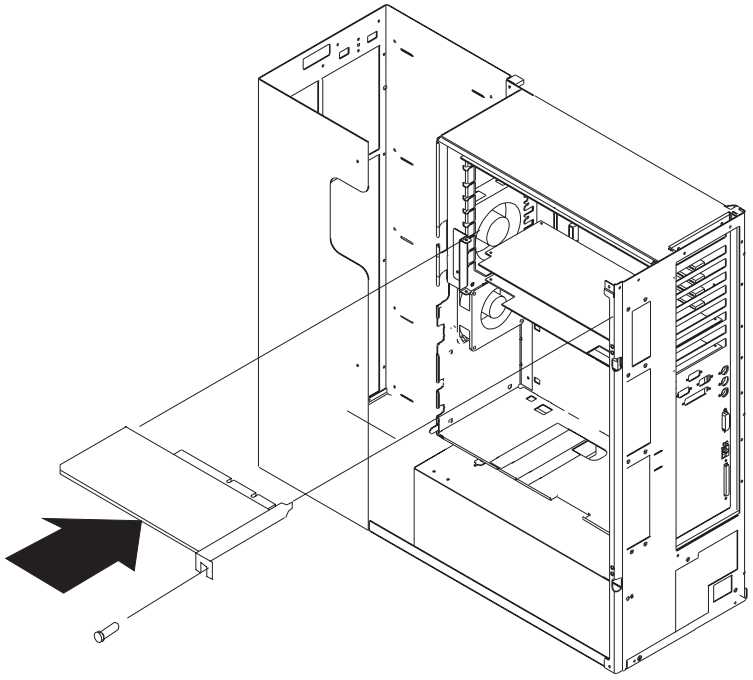
5. Remove the adapter.



Replacement

1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up the adapter.
2. Locate the adapter connector location on the I/O planar.

3. Install the new adapter.

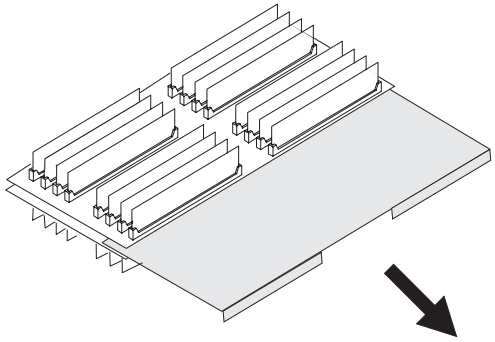


4. Replace any parts previously removed in reverse order.
5. Replace the covers as described in “Covers” on page 6-3.

Memory Cards

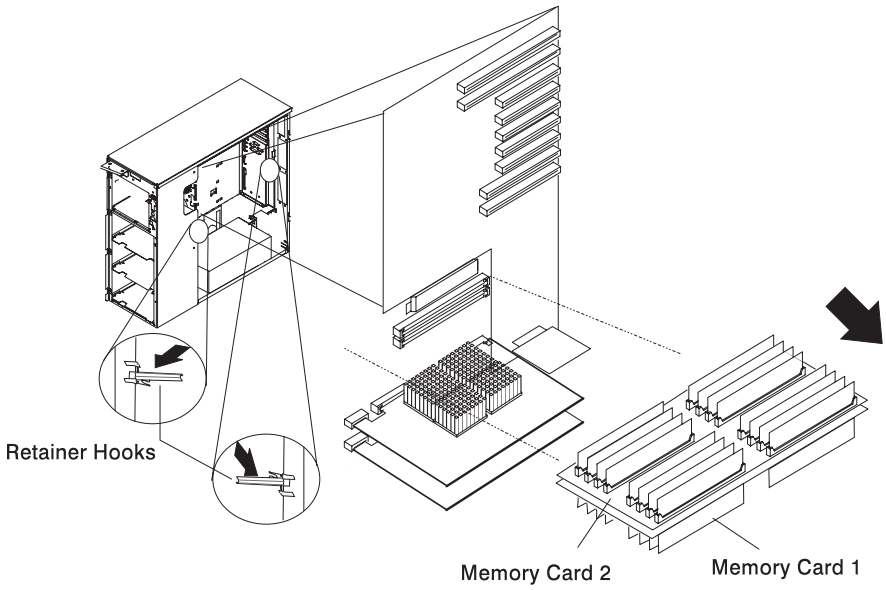
Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8; then return here to determine your next step.
3. Remove the memory adapter card shield.



4. The card is secured in place with card retainer hooks, one on each end of the card. Open the card retainer hooks and remove the card.

   Attention: To prevent damage to the card and the card connectors, open and close the retainer hooks at the same time.

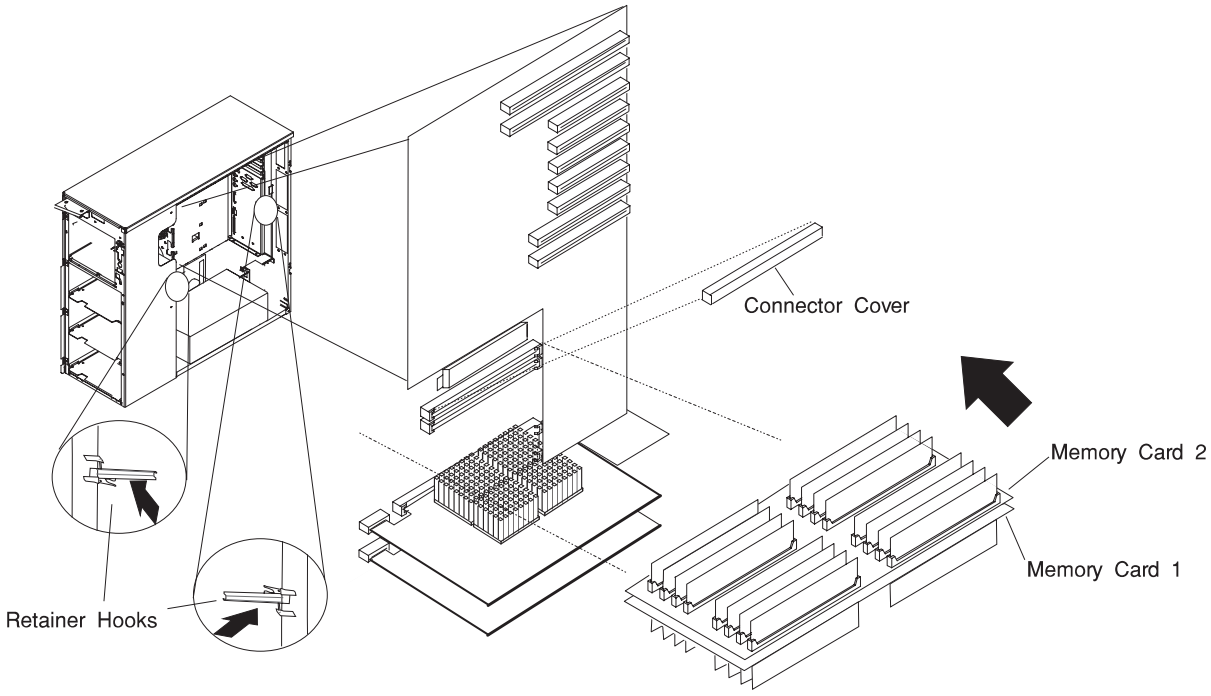


Replacement

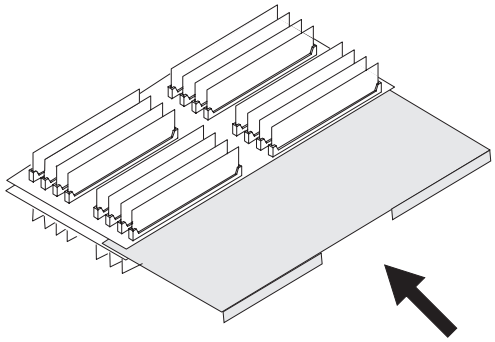
1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up the memory card.
2. Open the retainer hooks.

   Attention: To prevent damage to the card and the card connectors, open and close the retainer hooks at the same time.
3. Remove the connector cover if you are installing the card in an unused memory card slot.
4. Place the memory card in the card guide rails.
5. Make sure that the black tabs on the new card are captured by the retainer hooks.
6. Align the card with the connector.
7. Close the retainer hooks to set the card.

   Attention: To prevent damage to the card and the card connectors, open and close the retainer hooks at the same time.



8. Install the memory shield on the bottom memory card.



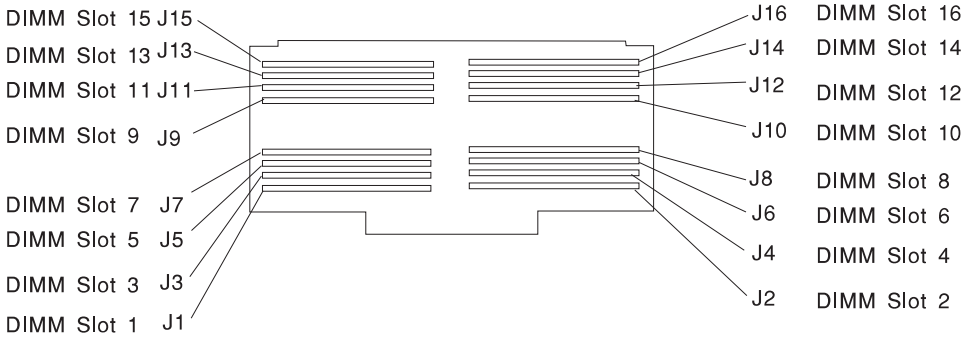
.

9. Replace any parts previously removed in reverse order.
10. Replace the covers as described in “Covers” on page 6-3.

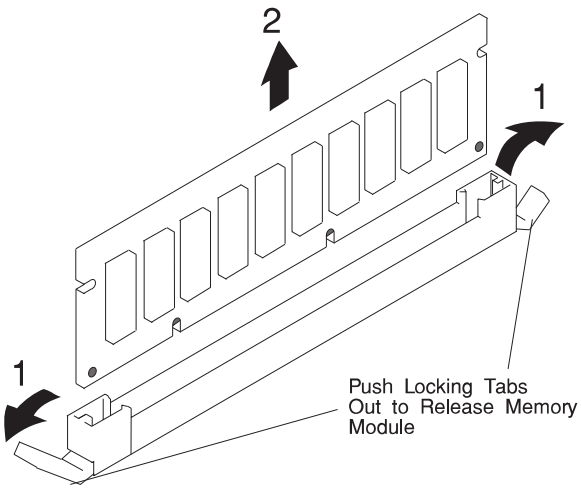
Memory Module

Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8.
3. Remove the memory card as described in “Memory Cards” on page 6-26.
4. Locate the memory module connectors and determine which module you want to remove.

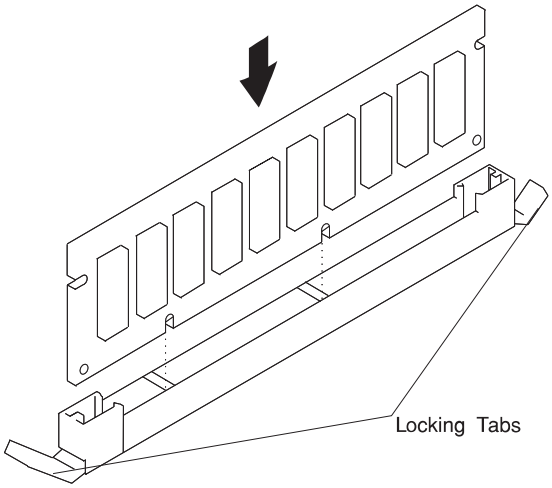


5. Remove the memory module by pushing the tabs out on the memory connectors.



Replacement

1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up a memory module.
2. Locate the memory module connector location on the memory card.
3. Install the new memory module.

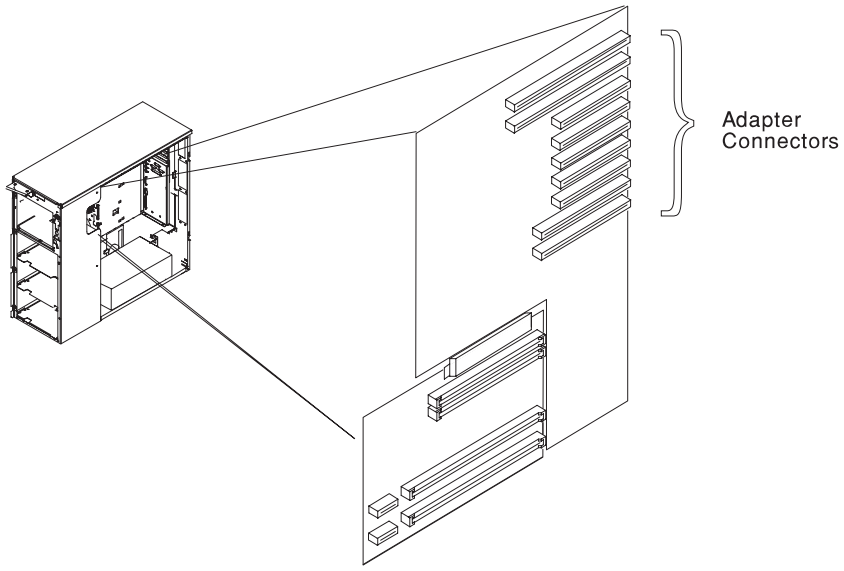


4. Replace the memory card.
5. Replace the covers as described in “Covers” on page 6-3.

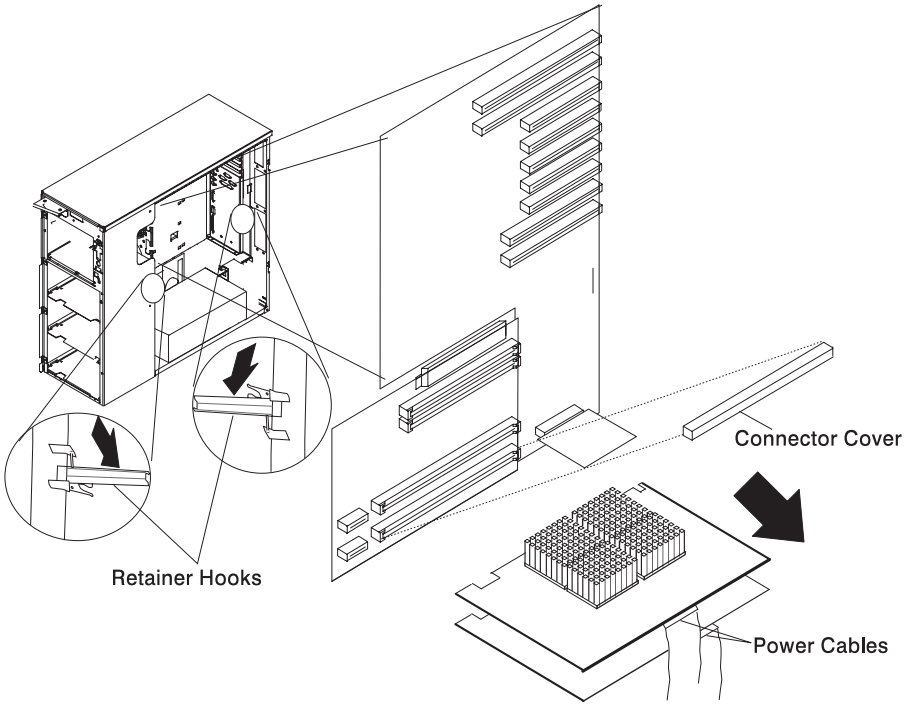
I/O Planar

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8.

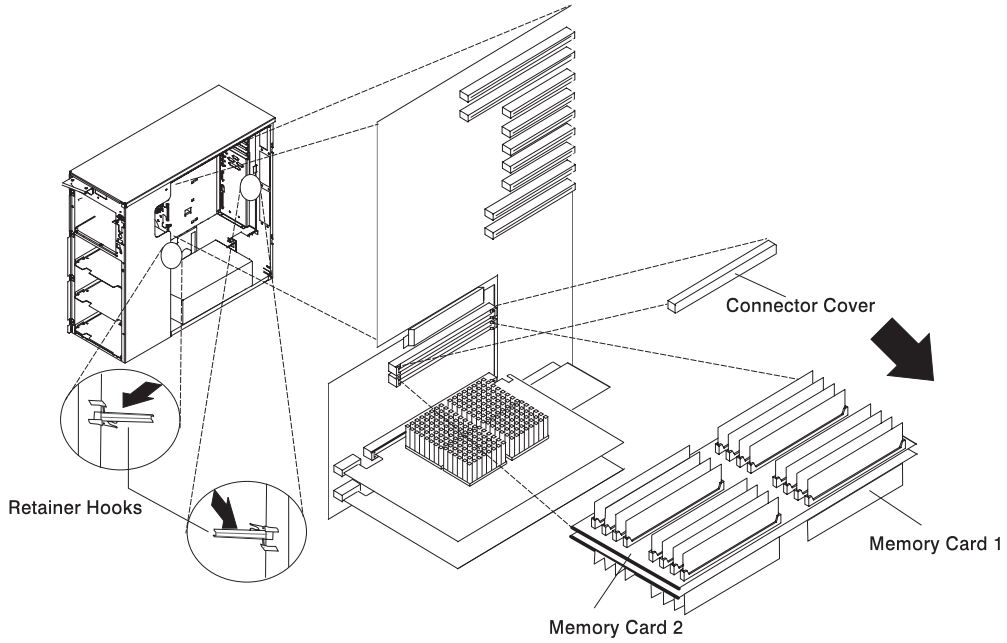
   Note: Adapter cables (SCSI) should be labeled to insure correct installation of cables to adapters slots. Rearranging the order of the SCSI slots to the disk drive banks causes errors.
3. Remove all adapter cards.



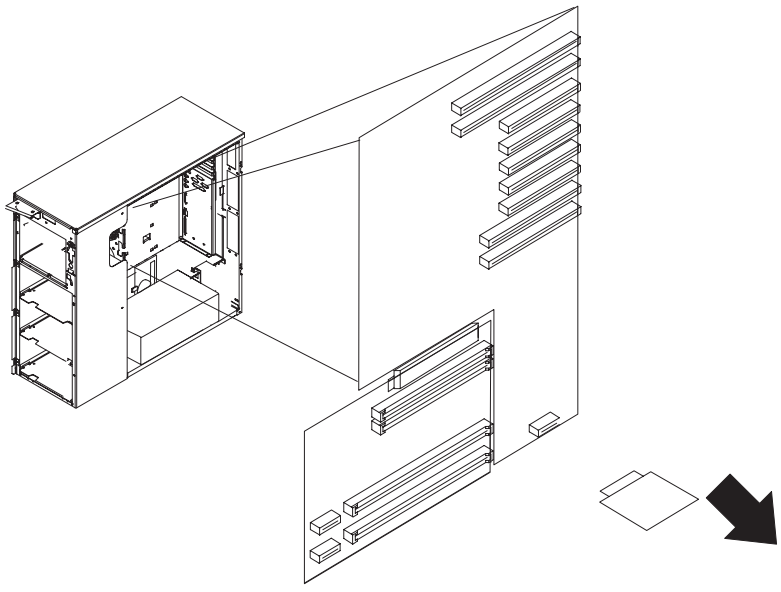
4. Remove the Processor card(s), as described in “Processor Card” on page 6-35.



5. Remove the memory card(s), as described in “Memory Cards” on page 6-26.



6. Remove the service processor.



7. Remove the system card.
8. Disconnect all cables from the connectors on the I/O planar.

9. Remove eight screws connecting the I/O planar to the rear of the system. Note that the screws in the SCSI connector are black.
10. Remove 12 screws from the I/O planar.
11. Remove I/O planar.

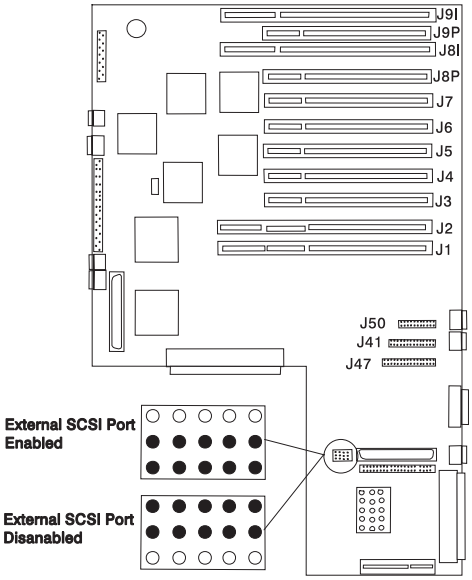
    Note: The system card can be removed without removing the I/O planar. However, you must remove the system card before removing the I/O planar.

Replacement

Replace in reverse order.

Note: Be sure to install the two black screws in the SCSI connector.

Verify that the security jumpers (J16) are in the correct position (same as the replaced I/O planar).

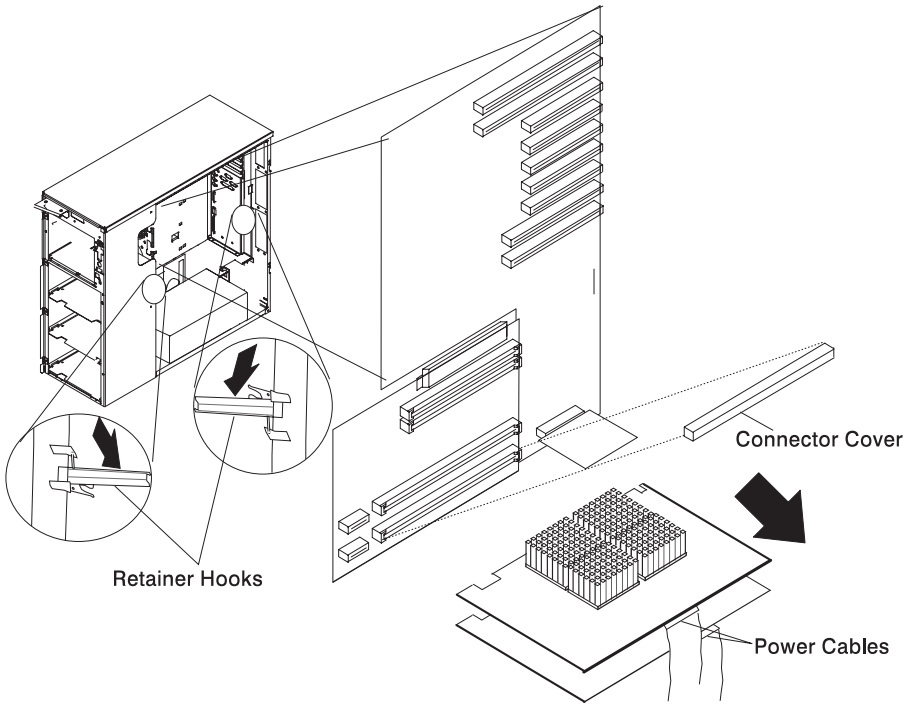


Processor Card

Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8.

   Attention: Make sure the power cord is unplugged and the power (Power LED) is OFF before removing the CPU card.
3. Remove the power cable from the CPU card by squeezing the tabs.
4. The card is secured in place with card retainer hooks, one on each end of the card. Open the card retainer hooks and remove the card.



Replacement

1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up the CPU card.
2. Install the new CPU card.
3. Replace any parts previously removed in reverse order.
4. Replace the covers as described in “Covers” on page 6-3.

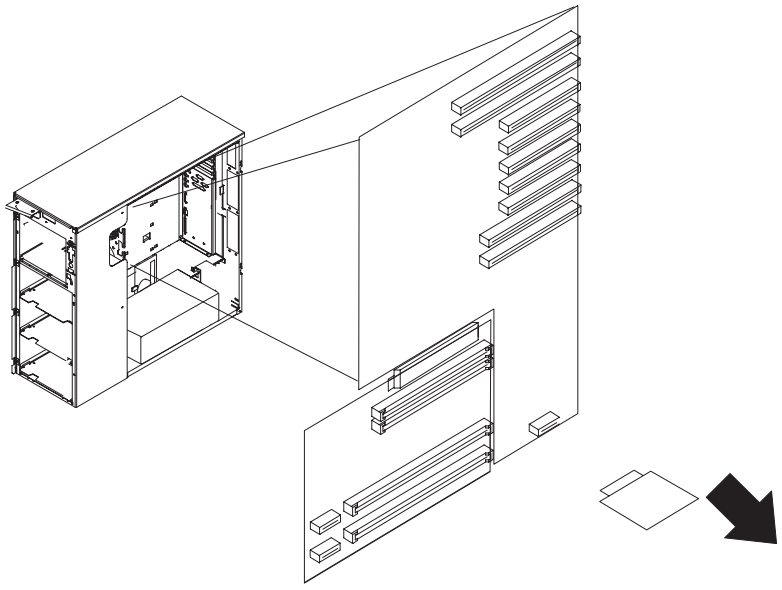
Note: If the system has only one CPU card, it must be installed in the primary CPU slot. See “AIX and Physical Location Code Reference Table” on page 3-48 for the location.

Service Processor

Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8.

   Attention: Make sure the power cord is unplugged and the power LED is OFF before removing the service processor.
3. Remove the service processor.



Replacement

To replace the service processor, perform the removal steps in the reverse order.

Battery

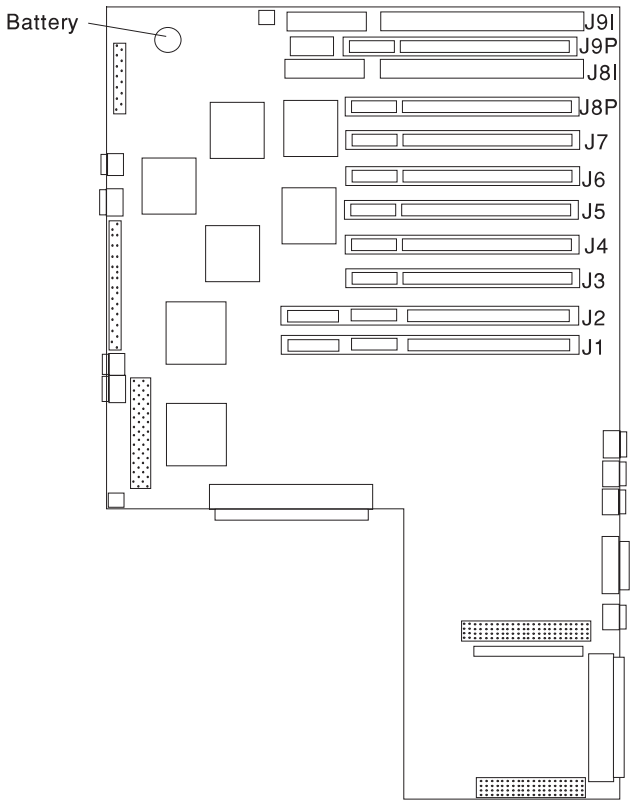
CAUTION:
A lithium battery can cause fire, explosion, or a severe burn. Do not recharge, disassemble, heat above 100°C (212°F), solder directly to the cell, incinerate, or expose cell contents to water. Keep away from children. Replace only with the part number specified for your system. Use of another battery may present a risk of fire or explosion.

The battery connector is polarized; do not attempt to reverse polarity.

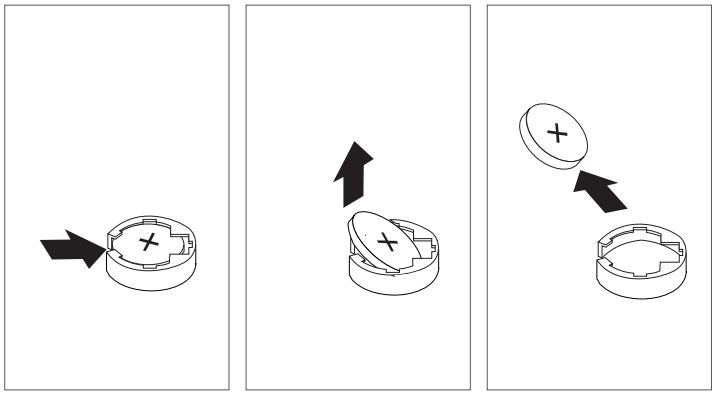
Dispose of the battery according to local regulations.

Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8.
3. Locate the battery on the I/O planar.

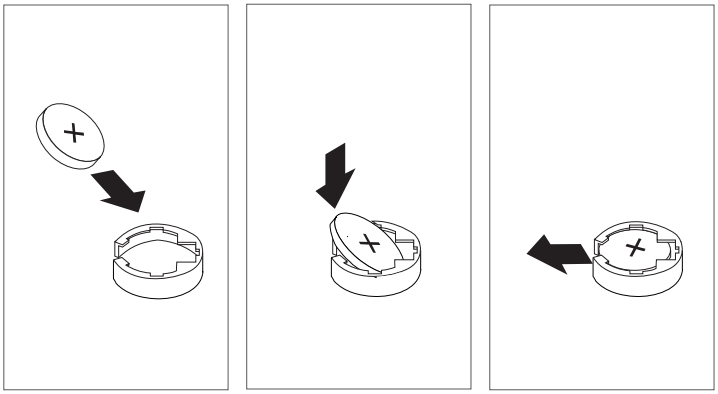

Battery
J9I
J9P
J8I
J8P
J7
J6
J5
J4
J3
J2
J1

4. Use one finger to slightly slide the battery toward the front of the server. (The spring mechanism behind the battery pushes it out toward you as you slide it forward.) Use your thumb and index finger to hold the battery as it pushes out of the socket.



Replacement

Tilt the battery so that you can insert it into the front of the socket. As you slide the battery toward the front of the server, push it down into the socket.



Notes:

1. Be sure to tell the customer that the time and date need to be reset.

   If running AIX the bootlist command may have to be run from AIX while logged in as root, this would restore the custom boot list and allow the option of Select Software under multiboot to start the operating system. Other parameters that may have to be rebuilt are the IP parameters.

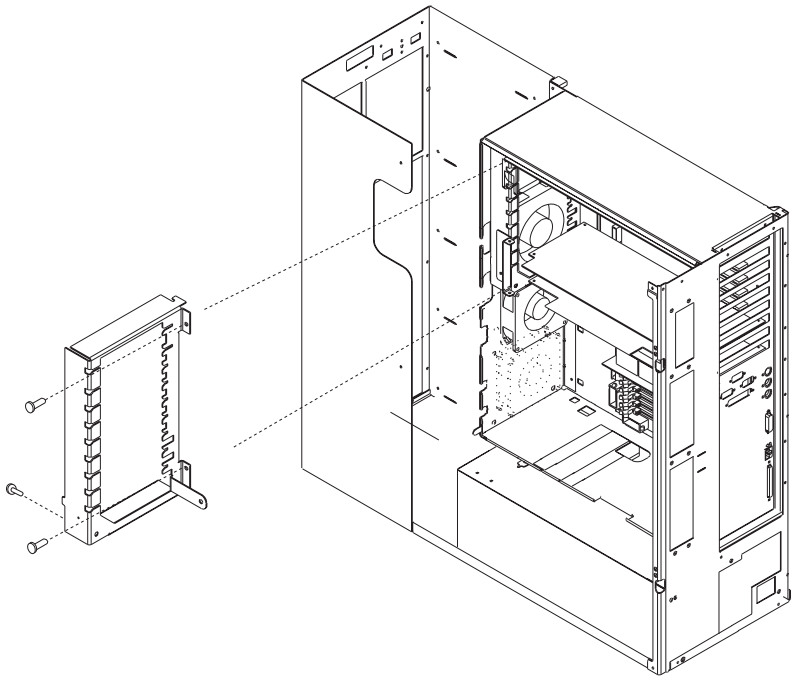
2. Ensure that the battery polarity is correct; place the battery in the holder with the positive side facing up.

Fans

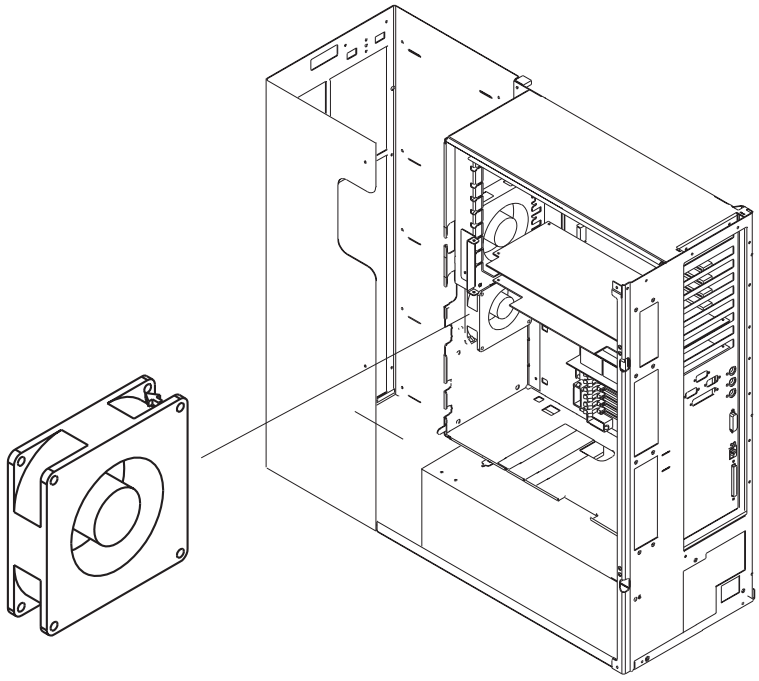
Removal

1. Do the cover removal procedure in “Covers” on page 6-3.
2. If removing one of the two upper fans, remove the adapter cards, remove the three screws from the adapter card bracket and remove the bracket.

   Note: The fans are numbered from bottom to top as fan 1, fan 2, fan 3, and fan 4. So the two upper fans are fans 3 and 4.



3. Disconnect the fan cable from the I/O planar.
4. Pull the shock mounts out of their mounting holes.
5. Remove the fan.



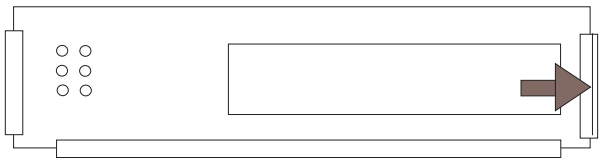
Replacement

Replace in reverse order.

Operator Panel Display

Removal

1. If you have not already done so, remove the front covers as described in “Covers” on page 6-3.
2. Press the snap in detent on the right side of the display card mounting bracket and remove the display card.
3. Rotate the display forward and out of the mounting bracket.



Operator Panel Display

4. Disconnect the display cable from the connector on the display assembly.

Replacement

Replace in reverse order. Ensure that the grounding clips located inside the mounting bracket are not bent or damaged and that they are positioned correctly.

Operator Panel Control Assembly

Removal

1. Do the cover removal procedure in “Covers” on page 6-3.
2. Remove the assembly by compressing the spring clip at the top and bottom of the assembly and pulling out toward the rear of the system.
3. Unplug the LCD cable from the assembly.
4. Unplug the control card cable from the I/O planar.
5. Swap the VPD module (U2 on the Operator Panel Control Assembly) from the old assembly to the new one. In the unlikely event that the old VPD module is determined to be the problem, return the new one to the system and call technical support for recovery instructions.

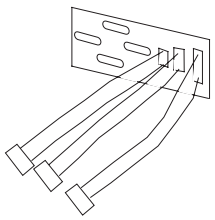
Replacement

Replace in reverse order.

Serial/Parallel Card

Removal

1. If you have not already done so, remove the covers as described in “Covers” on page 6-3.
2. Remove the I/O planar cover as described on page 6-8.
3. Remove the external serial and parallel connectors from the rear of the system.
4. Remove the cables from the I/O planar connectors J41, J47, and J50.
5. Remove the screws that attach the serial/parallel card to the system.



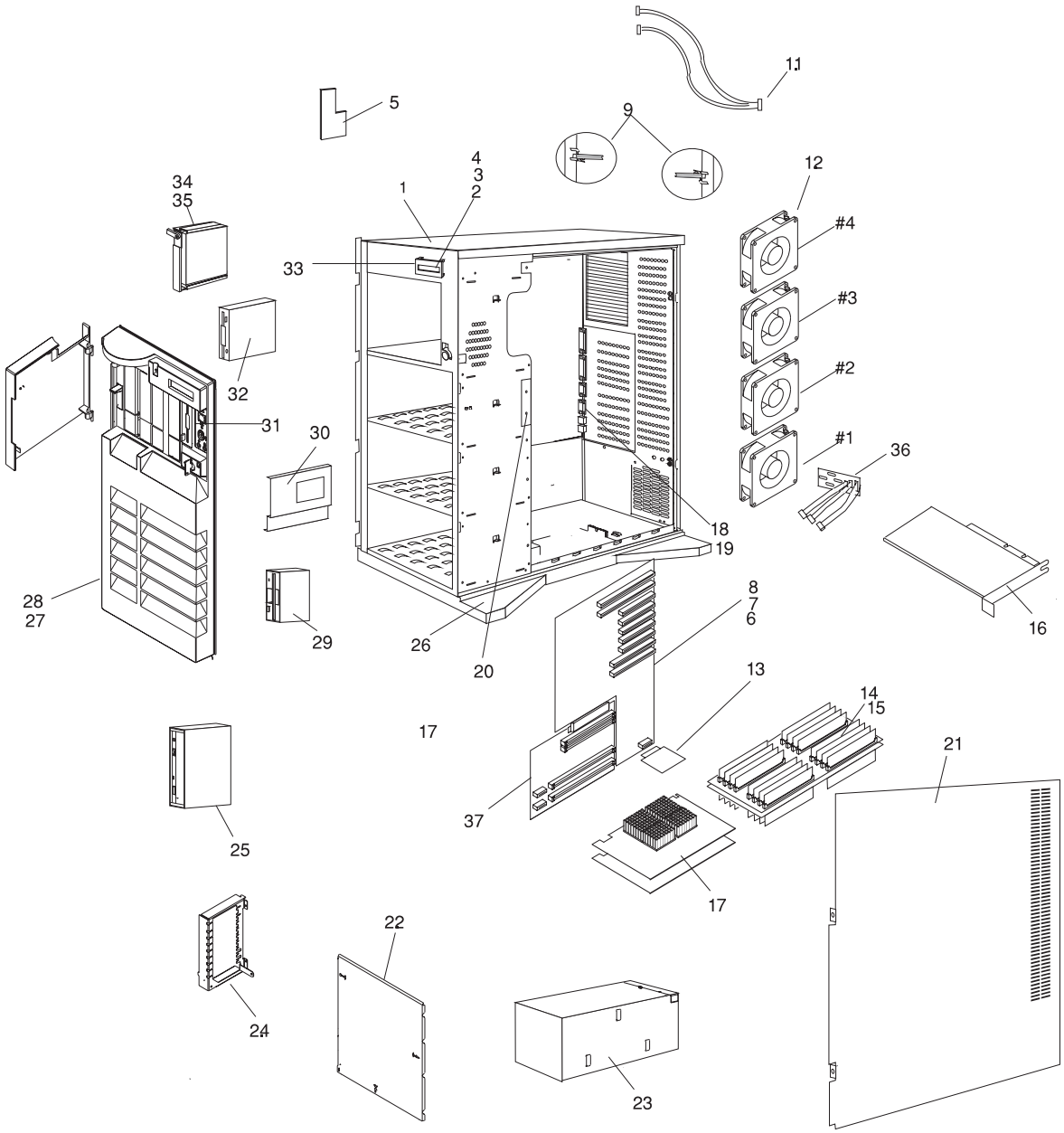
Replacement

Replace in reverse order.

Connect the cables as follows:

P1	J41 (I/O planar)
P2	J47 (I/O planar)
P3	J50 (I/O planar)

Chapter 7. Parts Information


11
5
9
4
3
2
1
12
34
35
#4
33
#3
#2
32
31
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18
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Index	Part Number	Units Per	Description
1	93H5758	1	Chassis assembly (includes covers and side door)
2	73H0898	1	EMC clip
3	06H7082	1	Display panel
4	93H1816	1	Cable (Display)
5	93H2922	1	Operator panel control assembly
6	07L6594	1	I/O Board
7	06H7697	13	Standoff
8	33F8354	1	Battery
9	73H3520	1	CPU Lever
	73H3525	1	Lever (front)
	73H3529	1	Lever (rear)
10	93H3960	1	Brace
	73H3531	1	Card Guide
11	93H6280	1	Cable (EPOW)
12	73H3577	1	Fan (#1)
	40H1424	1	Fan (#3)
	40H1433	2	Fan (#2 and #4)
13	93H4214	1	Service processor
14	93H2641	1 or 2	Memory Card
15	93H4700	Up to 8 pair	32MB memory module
	93H4702	Up to 8 pair	128MB memory module
16	See note	Up to 9	Adapter card
17	93H2679	1 or 2	166 MHz CPU card (1 way)
	73H4768	1 or 2	166 MHz CPU card (2 way)
	93H9018	1 or 2	332 MHz CPU card (1 way)
	93H8945	1 or 2	332 MHz CPU card (2 way)
18	93H3144	1	EMC gasket (I/O connectors)
19	93H3145	1	EMC gasket (Ext. SCSI connector)
20	93H2166	1	SCSI Backplane (Hot swap)
	93H6321	1	SSA Backplane (Hot swap)
21	93H8544	1	Door assembly, right side
22	93H9789	1	I/O Planar cover
23	93H9789	1	Power supply
24	93H4529	1	Adapter card bracket
25	CD ROM	1	See note
26	11H8156	1	Pedestal and wheel
27	73H1881	1	Front cover (IBM)
	73H1897	1	Front cover (OEM)
28	93H4297	1	Logo
29	See Note	1	Diskette drive
30	06H2792	1	Plate assembly
31	73H0870	1	Bezel (Operator panel)
32	See note	Up to 2	Media device
33	40H3142	1	Bracket (Display panel)
34	See note	Up to 18	Disk drive
35	See note	Up to 18	Disk drive carrier assembly
36	93H60109	1	Serial/Parallel Card and Cables
37	73H1925	1	System Board

Note: See *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* for part numbers.

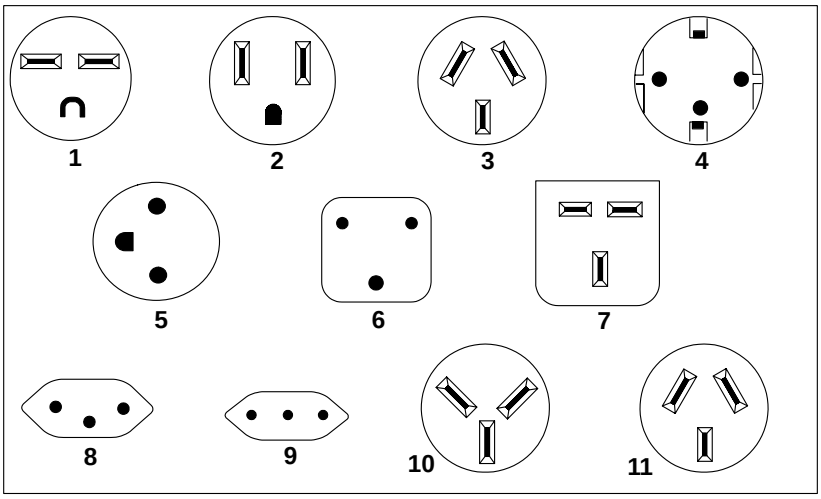


Index	Part Number	Units Per	Description
1	06H6660	Up to 3	Cable (SCSI adapter to backplane)
	73H1894	1	Cable (diskette)
	39H9994	1	Cable (Power 2-drop)
	92F1294	3	Cable clamp
	93H9816	A/R	Screw (3.5 x 6)
	93H4339	Up to 3	Cable SSA ground strap (backplane to chassis)
	93H4341	1	
	93H9821	1-2	Cable SSA (backplane to bulkhead)
	93H4340	Up to 3	Cable SSA (backplane to backplane)
		1	Cable SSA (adapter to backplane)
			Cable SSA 0.6m link (bulkhead to adapter)



Index	Part Number	Units Per	Description
1	82G3278	1	Keyboard, United States English
	1391402	1	Keyboard, French
	1393395	1	Keyboard, Italian
	1391403	1	Keyboard, German/Austrian
	1391406	1	Keyboard, United Kingdom English
	1391405	1	Keyboard, Spanish
	79F0167	1	Keyboard, Japanese
	64F7707	1	Keyboard, Brazilian Portuguese
	82G3279	1	Keyboard, Canadian French
	1391526	1	Keyboard, Belgian French/Dutch
	1391411	1	Keyboard, Finnish
	1391407	1	Keyboard, Danish
	1399583	1	Keyboard, Bulgarian
	1395881	1	Keyboard, Swiss French
	1385882	2	Keyboard, Swiss German
	1391409	1	Keyboard, Norwegian
	1391511	1	Keyboard, Dutch
	1391410	1	Keyboard, Portuguese
	1399046	1	Keyboard, Greek
	1391408	1	Keyboard, Hebrew
	1399581	1	Keyboard, Hungarian
	1391407	1	Keyboard, Icelanic
	1399580	1	Keyboard, Polish
	1399582	1	Keyboard, Romanian
	1399571	1	Keyboard, Slovakian
	1399570	1	Keyboard, Czechoslovakian
	1393286	1	Keyboard, Turkish (ID 179)
	8125409	1	Keyboard, Turkish (ID 440)
	8131596	1	Keyboard, Arabic
	06H5286	1	Keyboard, Korean
	1393990	1	Keyboard, Chinese
	006H3048	1	Keyboard, United States (OEM)
2	11H4878	1	Mouse, 3-button

Power Cables



Index	Part Number	Country
1	1838574	Bahamas, Barbados, Bolivia, Brazil, Canada, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Netherlands Antilles, Panama, Peru, Philippines, Taiwan, Thailand, Trinidad, Tobago, U.S.A. (except Chicago), Venezuela
2	6952300	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Saudi Arabia, Suriname, Trinidad, Taiwan, U.S.A. (except Chicago), Venezuela
2	62X1045	Chicago, U.S.A.
3	6952311	Argentina, Australia, New Zealand
4	13F9979	Abu Dhabi, Austria, Belgium, Bulgaria, Botswana, Egypt, Finland, France, Germany, Greece, Iceland, Indonesia, Korea (South), Lebanon, Luxembourg, Macau, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sudan, Sweden, Turkey, Yugoslavia
5	13F9997	Denmark
6	14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
7	14F0033	Bahrain, Bermuda, Brunei, Channel Islands, Cyprus, Ghana, Hong Kong, India, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Arab Emirates (Dubai), United Kingdom, Zambia

Index	Part Number	Country
8	14F0051	Liechtenstein, Switzerland
9	14F0069	Chile, Ethiopia, Italy
10	14F0087	Israel
11	6952291	Paraguay, Colombia, Uruguay

Appendix A. SSA Problem Determination Procedures

Problem determination procedures are provided by power-on self-tests (POSTs), service request numbers (SRNs), and maintenance analysis procedures (MAPs). Some of these procedures use the using system service aids that are described in “SSA Service Aids” on page 3-64.

Disk Drive Module Power-On Self-Tests (POSTs)

Attention: Disk drive modules are fragile. Handle them with care. Follow all ESD-sensitive parts procedures when handling disk drive modules. For ESD information, see “Handling Static–Sensitive Devices” on page 6-2.

The disk drive module POSTs start each time the module is switched on or when a **Send Diagnostic** command is received from the SSA adapter. They check whether the disk drive module is working correctly. The POSTs also help verify a repair after a FRU has been exchanged.

There are two power-on self-tests: POST-1 and POST-2.

POST-1 runs immediately after the ‘power-on reset’ line goes inactive, and before the disk drive module motor starts. POST-1 includes tests of the:

- Microprocessor
- ROM
- Safety circuits

If POST-1 completes successfully, POST-2 is enabled.

If POST-1 fails, the disk drive module check light stays on, and the disk drive module is not configured into the SSA network.

POST-2 runs after the disk drive module motor has started. POST-2 includes tests of:

- Motor control
- Servo control
- Read and write on the diagnostic cylinder (repeated for all heads)
- Error checking and correction (ECC)

If POST-2 completes successfully, the disk drive module is ready for use by the using system.

Adapter Power-On Self-Tests (POSTs)

Two power-on self-tests (POSTs) are resident in the SSA adapter. The tests are POST-1 and POST-2.

POST-1 tests all the functions that are necessary to enable the adapter to communicate with the Micro Channel. POST-1 can fail for either of two reasons:

- A hardware error has been detected. In such instances, the POST code enters a tight loop, and does not put the identification of the SSA adapter into the programmable option select (POS) registers. If this error occurs, the SSA adapter must be exchanged for a new one.
- The flash erasable programmable read-only memory (EPROM) has a check sum that is not valid. This error can be caused if the power fails while microcode is being downloaded. In such instances, the POST checks all the hardware that is needed to download the microcode. If all the hardware is correct, the POST sets the ROS level to zero, puts the identification of the SSA adapter into POS 0-1, and puts error data into the adapter status register.

  To recover from this type of error, microcode must be downloaded to the SSA adapter. If the using system can have an initial program load (IPL) without the adapter, the configuration code detects the down-level ROS code and downloads the latest level of code. The configuration code then uses control register bit 7 to reset the adapter and restart POST-1.

If no error is detected during POST-1, the identification of the SSA adapter is put into the POS registers, and POST-2 is started.

POST-2 tests the remaining hardware on the SSA adapter card and tests the other FRUs that are attached to the adapter. If this test fails, an error code is saved and sent to the using-system error log when the error logger becomes available. An internal health check continues to send the error code at regular intervals.

Service Request Numbers (SRNs)

Service request numbers (SRNs) are generated for the SSA Hot-Swap Disk Drive by the system error-log analysis, system configuration code, diagnostics, and customer problem-determination procedures. SRNs help you to identify the cause of a problem, the failing field-replaceable units (FRUs), and the service actions that might be needed to solve the problem.

The SRN Table

Table A-1 on page A-6 lists the SRNs and describes the actions you should perform. The table columns are:

SRN The service reference number.

FRU list The FRU or FRUs that might be causing the problem (see also "FRU Names Used in the SRN Table" on page A-5).

% How likely it is (by percentage) that the FRU is causing the problem.

Problem A description of the problem and the action you must take.

Abbreviations used in the table are:

DMA Direct memory access

FRU Field-replaceable unit

IOCC Input/output channel controller

POS Programmable option select (POS registers)

POST Power-on self-test

PAA P = adapter port number
AA = SSA address

Using the SRN Table

Important: You should have been sent here from "SSA Maintenance Analysis Procedures (MAPs)." Do not start problem determination from the SRN table; always go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-35 first.

1. Locate the SRN in the table. If you cannot find the SRN, you have a problem with the diagnostics, the microcode, or the documentation. Call your support center for assistance.
2. Read carefully the "Action" you must perform for the problem. *Do not exchange FRUs unless you are instructed to do so*.

3. Normally exchange only one FRU at a time, starting from the top of the FRU list for that SRN. Always use instructions given in the page reference when exchanging FRUs. After each FRU is exchanged, go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Software and Microcode Errors

Some SRNs indicate that a problem might have been caused by a software error or by a microcode error. If you have one of these SRNs, perform the following actions:

1. Make a note of the contents of the error log for the device that has the problem.
2. Go to the using-system service aids and select Display Vital Product Data to display the VPD of the failing system. Make a note of the VPD for all the SSA adapters and disk drive modules.
3. Report the problem to your support center. The center can tell you whether you have a known problem and can, if necessary, provide you with a correction for the software or microcode.

FRU Names Used in the SRN Table

This section provides a glossary of the FRU names used.

FRU Name in Table	*Definition*
Backplane assembly	The disk drive modules, blank disk drive modules, and internal SSA cables, are connected to the backplane assembly.
Disk drive module	A disk drive assembly to a carrier that plugs into the backplane in the system unit.
Blank Disk drive module	This module must be installed in a slot that does not contain a disk drive module. This completes the SSA loop through the system unit.
External SSA cable	A cable that connects the bulkhead to the SSA adapter or to an SSA subsystem.
Internal SSA cable	Attaches the backplane to the SSA adapter card.
SSA adapter card	The SSA adapter card, which is located in the using system.

Table A-1 (Page 1 of 9). Service Request Numbers

SRN	FRU List	%	Problem
10101	**Disk drive module**	100	**Description:** Disk drive motor stopped. The disk drive module is bad. **Action:** If this SRN was received by one disk drive module only, then exchange that disk drive module.
10112	None	–	**Description:** Format degraded. A format operation has been ended before it has completed. **Action:** Use the Format service aid to format the disk drive module.
1*xxxx*	**Disk drive module**	100	**Description:** Disk drive module error. **Action:** Exchange the FRU for a new FRU. **Note:** In this SRN, an *x* represents a digit from 0 to F.
20PAA	**Disk drive module** **SSA adapter card External** **SSA Cables** **Backplane assembly** **Internal SSA Cable**	45 45 6 2 2	**Description:** An open SSA link has been detected. **Action:** Run the Link Verification service aid to isolate the failure. See "Link Verification Service Aid" on page 3-73. If the SSA service aids are not available: • When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-35. • When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
21PAA to 29PAA	**Disk drive module** **SSA adapter card** **External SSA Cables** **Backplane assembly** **Internal SSA Cable**	45 45 6 2 2	**Description:** An SSA threshold-exceeded-link error has been detected. **Action:** Run the Link Verification service aid to isolate the failure. See "Link Verification Service Aid" on page 3-73. If the SSA service aids are not available: • When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-35. • When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.

Table A-1 (Page 2 of 9). Service Request Numbers

SRN	FRU List	%	Problem
2A002	**Disk drive module** **SSA adapter card**	50 50	**Description:** Async code 02 has been received. A software error has probably occurred. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging any FRUs.
2A003	**Disk drive module** **SSA adapter card**	50 50	**Description:** Async code 03 has been received. A software error has probably occurred. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging any FRUs.
2A004	**Disk drive module** **SSA adapter card**	50 50	**Description:** Async code 04 has been received. A software error has probably occurred. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging any FRUs.
2A005	**Backplane**	–	**Description:** Async code 05 has been received. This code indicates that a disk drive module has detected a loss of power. **Action:** Use the Link Verification service aid (see "Link Verification Service Aid" on page 3-73) to determine if any devices are missing from the SSA link. • If a device is missing, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-35 to isolate the problem. • If no device is missing, the problem might have been caused by a temporary, or partial, loss of power to the SSA Hot-Swap Disk Drive.

Table A-1 (Page 3 of 9). Service Request Numbers

SRN	FRU List	%	Problem
2A006	**Disk drive module** **Backplane**	70 30	**Description:** Async code 06 has been received. This code indicates that a disk drive module has detected the loss of one of its power inputs. **Action:** • If the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-35, exchange the disk drive module. • If the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
2A106	**Backplane assembly**	100	**Description:** Async code 06 has been received. This code indicates that multiple disk drive modules have detected the loss of one of its their power inputs. **Action:** • If the failing devices are SSA Hot-Swap Disk Drives, exchange the backplane. • If the failing devices are not SSA Hot-Swap Disk Drives, go to the service information for those devices.
2A206	**Disk drive module**	100	**Description:** A disk drive module has detected that one of its SSA links has failed the POSTs. **Action:** 1. Use the Link Verification service aid (see "Link Verification Service Aid" on page 3-73) to determine where the SSA link is broken. 2. Run diagnostics in the system verification mode to the two disk drive modules that are nearest to, and on each side of, the place where the link is broken. The diagnostics show which disk drive module detected the problem.
2FFFF	None	–	**Description:** An async code that is not valid has been received. **Action:** Go to "Software and Microcode Errors" on page A-5.

Table A-1 (Page 4 of 9). Service Request Numbers

SRN	FRU List	%	Problem
300C0	**Backplane**	100	**Description:** A disk drive module has detected the loss of one of its power inputs. **Action:** • If the failing device is an SSA Hot-Swap Disk Drive, exchange the backplane. • If the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
301C0	**Backplane assembly**	100	**Description:** Multiple disk drive modules have detected the loss of one of their power inputs. **Action:** • If the failing devices are SSA Hot-Swap Disk Drives, exchange the backplane. • If the failing devices are not SSA Hot-Swap Disk Drives, go to the service information for those devices.
303FF	**Disk drive module**	100	**Description:** An SCSI status that is not valid has been received. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging any FRUs.
40000	**SSA adapter card**	100	**Description:** The SSA adapter card has failed. **Action:** Exchange the FRU for a new FRU.
43PAA	**Disk drive module** **SSA adapter card**	90 10	**Description:** An SSA device on the link is preventing the completion of the link configuration. **Action:** If the SSA service aids are available, run the Link Verification service aid (see "Link Verification Service Aid" on page 3-73) to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)

Table A-1 (Page 5 of 9). Service Request Numbers

SRN	FRU List	%	Problem
44PAA	**Disk drive module**	100	**Description:** A disk drive module has failed. **Action:** If the SSA service aids are available, run the Link Verification service aid (see "Link Verification Service Aid" on page 3-73) to find the failing disk drive module. Before you exchange the failing disk drive module, run diagnostics in the system verification mode to the module to determine the cause of the problem.
45PAA	**Disk drive module** **Backplane assembly**	40 40 20	**Description:** The SSA adapter has detected an open SSA link. This problem is caused either by a disk drive module that is failing, or by a disk drive module that has been switched off from another using system on the same SSA link. (That using system has itself been switched off.) **Action:** If the SSA service aids are available, run the Link Verification service aid (see "Link Verification Service Aid" on page 3-73) to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)
48000	None	–	**Description:** The SSA adapter has detected a link configuration resource that is not valid. **Action:** See "SSA Loop Configurations That Are Not Valid" on page A-15.
50000	**SSA adapter card**	100	**Description:** The SSA adapter failed to respond to the device driver. **Action:** Exchange the FRU for a new FRU.
50001	**SSA adapter card**	100	**Description:** A data parity error has occurred. **Action:** Exchange the FRU for a new FRU.
50002	**SSA adapter card**	100	**Description:** An SSA adapter direct memory access (DMA) error has occurred. **Action:** Exchange the FRU for a new FRU.
50004	**SSA adapter card**	100	**Description:** A channel check has occurred. **Action:** Exchange the FRU for a new FRU.

Table A-1 (Page 6 of 9). Service Request Numbers

SRN	FRU List	%	Problem
50005	**SSA adapter card**	100	**Description:** A software error has occurred. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging the FRU.
50006	**SSA adapter card**	100	**Description:** A channel check has occurred. **Action:** Exchange the FRU for a new FRU.
50007	**SSA adapter card**	100	**Description:** The input/output channel controller (IOCC) detected an internal error. **Action:** Exchange the FRU for a new FRU.
50008	**SSA adapter card**	100	**Description:** Unable to read or write the POS registers. **Action:** Exchange the FRU for a new FRU.
50010	**SSA adapter card**	100	**Description:** An SSA adapter or device drive protocol error has occurred. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging the FRU.
50012	**SSA adapter card**	100	**Description:** The SSA adapter microcode is in a suspended state. **Action:** Run diagnostics in System Verification mode to the SSA adapter. • If the diagnostics fail, exchange the FRU for a new FRU. • If the diagnostics do not fail, go to "Software and Microcode Errors" on page A-5 before exchanging the FRU.

Table A-1 (Page 7 of 9). Service Request Numbers

SRN	FRU List	%	Problem
50100	None	–	**Description:** An attempt was made to log an error against a pdisk that is not available to the using system. **Action:** This problem has occurred for one of the following reasons: • A user has deleted a pdisk from the system configuration. In such an instance, the hdisk that is related to the pdisk continues to operate normally. If the disk drive module tries to log an error, however, this SRN (50100) is produced. Enter the **cfgmgr** command to return the pdisk to the system configuration. • A disk drive module has tried to log an error during system configuration. To find the failing disk drive module, run diagnostics to the disk drive modules that are connected to this SSA adapter.
60000	**SSA adapter card**	100	**Description:** The SSA adapter is missing from the expected configuration. **Action:** Verify that the SSA adapter card is installed in the expected slot of the using-system. • If it is in the expected slot, exchange the FRU for a new FRU. • If it is not in the expected slot, enter the **diag -a** command, and answer the questions that are displayed.
7*xxxx*	**Disk drive module** **Backplane assembly**	80 20	**Description:** An SSA Hot-Swap Disk Drive module is missing from the expected configuration of the SSA loop. **Action:** Replace the FRUs one at a time. Go to "MAP 410: Repair Checkout" in *IBM RS/6000 Diagnostic Information for Multiple Bus Systems* to verify each repair.
D0000	**Disk drive module**	100	**Description:** The using system cannot configure the disk drive module. This is probably a software problem. **Action:** 1. Try again to configure the disk drive module. 2. If the problem remains, go to “Software and Microcode Errors” on page A-5 before exchanging the FRU.

Table A-1 (Page 8 of 9). Service Request Numbers

SRN	FRU List	%	Problem
D0100	**Disk drive module**	100	**Description:** Unable to clear a disk drive module reservation. **Action:** Exchange the FRU for a new FRU.
D0101	**Disk drive module**	100	**Description:** The disk drive module has been reserved since the diagnostics started. The disk drive module is in use. **Action:** Release the disk drive module, and run the diagnostics again.
D0200	**Disk drive module**	100	**Description:** The disk drive module timed out while the diagnostics were running. **Action:** Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.
D0300	**Disk drive module**	100	**Description:** The disk drive module failed the diagnostic test. **Action:** Exchange the FRU for a new FRU.
D0400	**Disk drive module**	100	**Description:** The disk drive module is not ready while the diagnostics are running. **Action:** Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.
D0450	None	–	**Description:** A format operation is in progress. The format operation that was started on this disk drive module has not yet finished. A format operation can take up to 30 minutes to run. **Action:** Wait for the format operation to finish before you run the diagnostics again. You can observe the progress of the Format operation by running the Format service aid again on this disk drive module.
D0460	None	–	**Description:** A format operation has been degraded. The format operation that was started on this disk drive module did not finish. Possibly, the disk drive module was switched off while the format operation was running. **Action:** Run the Format service aid to format this disk drive module.
D4000	**SSA adapter card**	100	**Description:** The diagnostics cannot configure the SSA adapter. **Action:** Exchange the FRU for a new FRU.

Table A-1 (Page 9 of 9). Service Request Numbers

SRN	FRU List	%	Problem
D4100	**SSA adapter card**	100	**Description:** The diagnostics cannot open the SSA adapter. **Action:** Exchange the FRU for a new FRU.
D4300	**SSA adapter card**	100	**Description:** The diagnostics have detected an SSA adapter POST failure. **Action:** Exchange the FRU for a new FRU.
D44xx	**SSA adapter card**	100	**Description:** The diagnostics have detected that the SSA adapter has corrupted the microcode, but cannot download a new version of the microcode. **Action:** Exchange the FRU for a new FRU. **Note:** In this SRN, an x represents a digit 0 through F.
DFFFF	**SSA adapter card**	100	**Description:** A command or parameter that has been sent or received is not valid. This problem is caused either by the SSA adapter or by an error in the microcode. **Action:** Go to "Software and Microcode Errors" on page A-5 before exchanging the FRU.

SSA Loop Configurations That Are Not Valid

Note: This section is related to SRN 48000.

SRN 48000 shows that the SSA loop contains more devices or adapters than are allowed. The following condition exist: the loop contains more than 48 devices.

If the SRN occurred when either you or the customer switched on the using system:

1. Switch off the using system.
2. Review the configuration that you are trying to make, and determine why that configuration is not valid.
3. Review “Rules for SSA Loops” on page 3-61.
4. Correct your configuration by reconfiguring the SSA cables or by removing the excess devices or adapters from the loop.
5. Switch on the using system.

If the SRN occurred because additional devices or adapters were added to a working SSA loop:

1. Remove the additional devices or adapters that are causing the problem, and put the loop back into its original, working configuration.

   Note: It is important that you perform these actions, because they enable the configuration code to reset itself from the effects of the error.
2. Review “Rules for SSA Loops” on page 3-61.
3. Review the configuration that you are trying to make, and determine why that configuration is not valid.
4. Correct your system to a valid configuration.

Appendix B. Service Processor Menus

The Service Processor menus enable you to configure Service Processor options and to enamle and disable functions.

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

During the first power up (i.e. power cord is plugged into the outlet), Service Processor menus are not available for 45 seconds while the Service Processor is running self-tests and initializing the server. If the server powers down, Service Processor menus become available after 15 seconds.

For a summary of the Service Processor functions and the methods for invoking them, see the table on page B-2.

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

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

Service Processor Menus

The Service Processor menus are divided into two groups:

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

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

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

Menu Inactivity

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

How to access Service Processor menus locally

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

How to access Service Processor menus remotely

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

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

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

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

General User Menus

The menu options presented to the General user are a subset of the options available to the Privileged user. The user must know the General Access Password in order to access these menus.

```
      GENERAL USER MENU

 1. Power-On System

 2. Read VPD

 3. Read Progress Indicators from Last System Boot

 4. Read Service Processor Error Logs

 5. Read System POST Errors

 6. View System Environmental Conditions

99. Exit from Menus
```

- **Power-On System**

  Allows the user to power-on the system.

- **Read VPD**

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

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

  Displays the boot progress indicators (check points), up to a maximum of 100, from the system boot prior to the one in progress now. This historical information may be useful to help diagnose system faults.

  The progress indicators are displayed in two sections. Above the dashed line are the progress indicators from the boot that produced the current sessions. Below the dashed line are progress indicators from the boot preceding the one that produced the current sessions.

  The progress indication codes are chronological from bottom to top. The dashed line merely represents the point where the latest boot started.

- **Read Service Processor Error Logs**

  Displays the Service Processor error logs.

  The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time. See B-35 for an example of the error log.

- **Read System POST Errors**

  Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults. See B-36 for an example of the POST error screen.

- **View System Environmental Conditions**

  On selection of this menu, the Service Processor reads all environmental sensors and reports the results to the user. This option maybe useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure. See B-14 for an example of the System Environmental Conditions screen.

Privileged User Menus

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

MAIN MENU

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

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

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

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

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

```
            Service Processor Firmware
            EPROM:  19970915
            FLASH:  19970512
            Copyright 1997, IBM Corporation
                 SYSTEM NAME


       MAIN MENU

  1. Service Processor Setup Menu

  2. System Power Control Menu

  3. System Information Menu

  4. Language Selection Menu

  5. Call-In/Call-Out Setup Menu

  6. Set System Name

 99. Exit from Menus
```

Service Processor SETUP MENU

```
       Service Processor SETUP MENU

  1. Change Privileged Access Password

  2. Change General Access Password

  3. Enable/Disable Console Mirroring:
       Currently Disabled

  4. Start Talk Mode

  5. OS Surveillance Setup Menu

  6. Reset Service Processor

  7. Reprogram Service Processor Flash EPROM

 98. Return to Previous Menu

 99. Exit from Menus
```

Note

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

Passwords

Passwords can be any combination of up to 8 alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first 8 characters. Passwords can be set from the Service Processor menu or from the SMS 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 (via a modem). The error threshold is 3.

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

If the error threshold is reached by someone entering passwords remotely, the Service Processor disconnects the modem to prevent potential security attacks on the server by unauthorized remote users.

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

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

- **Change Privileged Access Password**

  Set or change the Privileged Access Password. It provides the user with the capability to access all 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.

- **Enable/Disable Console Mirroring**

When Console Mirroring is enabled, the Service Processor sends information to both serial ports. This capability may be enabled by local or remote users. This provides local users the capability to monitor remote sessions. Console mirroring may be enabled for the current session only. For more information, see “Console Mirroring” on page B-32.

- **Start Talk Mode**

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

- **Surveillance Setup Menu**

  This option may be used to setup operating system surveillance.

```
        OS Surveillance Setup Menu

  1. Surveillance:
       Currently Disabled

  2. Surveillance Time Interval:
       Currently 5

  3. Surveillance Delay:
       Currently 10


 98. Return to Previous Menu
```

  - **Surveillance**

    May be set to Enabled or Disabled.
  - **Surveillance Time Interval:**

    May be set to any number from 2 to 255 minutes.
  - **Surveillance Delay:**

    May be set to any number from 0 to 255 minutes.

  Refer to “Service Processor System Monitoring - Surveillance” on page B-29 for more information about surveillance.

- **Reset Service Processor** - Allows the user to reinitialize the Service Processor.
- **Reprogram Service Processor Flash EPROM** - This is an automatic process.

  An update diskette can be acquired from the RS/6000 Support page on the Internet or from your service team. The Internet address is:

  `http://www.rs6000.ibm.com/support/micro`

  The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort. When this process is selected, you are prompted to place the diskette into the drive and to indicate to the system that the diskette in available and the automatic process starts. If the system has other needs, you are prompted. See “Service Processor Firmware Updates” on page B-33 for additional information and update methods.

SYSTEM POWER CONTROL MENU

```
       SYSTEM POWER CONTROL MENU

 1. Enable/Disable Unattended Start Mode:
      Currently Disabled

 2. Ring Indicate Power-On Menu

 3. Reboot/Restart Policy Setup Menu

 4. Power-On System

 5. Power-Off System

98. Return to Previous Menu

99. Exit from Menus
```

- **Enable/Disable Unattended Start Mode**

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

- **Ring Indicator Power-On Menu**

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

```
       Ring Indicator Power-On Menu

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

98. Return to Previous Menu
```

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

- **Reboot/Restart Policy Setup Menu**, see “Reboot/Restart Policy Setup Menu” on page B-23.
- **Power-on System**

  Lets you power-on the system immediately. For other power-on methods see “System Power-On Methods” on page B-26.
- **Power-off System**

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

SYSTEM INFORMATION MENU

```
      SYSTEM INFORMATION MENU

 1. Read VPD

 2. Read VPD Image from Last System Boot

 3. Read Progress Indicators from Last System Boot

 4. Read Service Processor Error Logs

 5. Read System POST Errors

 6. Read NVRAM

 7. View System Environmental Conditions

98. Return to Previous Menu

99. Exit from Menus
```

- **Read VPD**

  Displays manufacturer's vital product data, such as serial numbers, part numbers, etc.
- **Read VPD Image from Last System Boot**

  Displays the VPD information that was in effect after the last system boot. This information will usually be identical with the results from the menu selection "Read VPD," but in the case of configuration updates or certain faults, this

historical comparison can be useful to System Administrators and service personnel.

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

  Displays the boot progress indicators (check points), up to a maximum of 100, from the system boot prior to the one in progress now. This historical information may be useful to help diagnose system faults.

  The progress indicators are displayed in two sections. Above the dashed line are the progress indicators from the boot that produced the current sessions. Below the dashed line are progress indicators from the boot preceding the one that produced the current sessions.

  The progress indication codes are chronological from bottom to top. The dashed line merely represents the point where the latest boot started.

- **Read Service Processor Error Logs**

  Displays error conditions detected by the Service Processor.

  The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time. See B-35 for an example of the error log.

- **Read System POST Errors**

  Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults. See B-36 for an example of the POST error screen.

- **Read NVRAM**

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

- **View System Environmental Conditions**

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

  The following is an example of system environment conditions:

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

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

LANGUAGE SELECTION MENU

```
      LANGUAGE SELECTION MENU

 1. English

 2. Francais

 3. Deutsch

 4. Italiano

 5. Espanol

 6. Svenska

98. Return to Previous Menu

99. Exit from Menus
```

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

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

CALL-IN/CALL-OUT SETUP MENU

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

   1. Modem Configuration Menu

   2. Serial Port Selection Menu

   3. 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

   8. Ring Indicate Power-On Menu

  98. Return to Previous Menu

  99. Exit from Menus
```

- **Modem Configuration Menu**, see “Modem Configuration Menu.”
- **Serial Port Selection Menu**, see “Serial Port Selection Menu” on page B-17.
- **Telephone Number Setup Menu**, see “Telephone Number Setup Menu” on page B-18.
- **Call-Out Policy Setup Menu**, see “Call-Out Policy Setup Menu” on page B-20.
- **Customer Account Setup Menu**, see “Customer Account Setup Menu” on page B-22.
- **Ring Indicate Power-On Menu**, see on page B-12.

Modem Configuration Menu

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

For information on choosing a modem configuration file, see “Sample Modem Configuration Files” on page D-1 and “Seamless Transfer of a Modem Session” on page D-6.

```
        Modem Configuration Menu

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

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

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

Modem Configuration File Name:
   3. modem_f_sp
   4. modem_f0_sp
   5. modem_f1_sp
   6. modem_z_sp
   7. modem_z0_sp
   8. none

   9. Save configuration to NVRAM and Configure modem

  98. Return to Previous Menu
```

Serial Port Selection Menu

```
        Serial Port Selection Menu

   1. Serial Port 1 Call-Out:
       Currently Disabled

   2. Serial Port 2 Call-Out:
       Currently Disabled

   3. Serial Port 1 Call-In:
       Currently Disabled

   4. Serial Port 2 Call-In:
       Currently Disabled

  98. Return to Previous Menu
```

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

Serial Port Speed Setup Menu

```
        Serial Port Speed Setup Menu

 1. Serial Port 1 Speed:
        Currently 9600

 2. Serial Port 2 Speed:
        Currently 9600

98. Return to Previous Menu
```

Serial port speed can be set for terminal performance or to accommodate modem capabilities. A 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

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

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

```
       Telephone Number Setup Menu

 1. Service Center Telephone Number:
     Currently Unassigned

 2. Customer Administration Center Telephone Number:
     Currently Unassigned

 3. Digital Pager Telephone Number:
     Currently Unassigned

 4. Customer Voice Telephone Number:
     Currently Unassigned

 5. Customer System Telephone Number:
     Currently Unassigned

98. Return to Previous Menu
```

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

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

For digital pagers that require a personal Identification Number (PIN) for access, include the PIN in this field as in the following example:

```
1 800 123 4567,,,,87654
```

where the commas create pauses[1] for the voice response system, and the 87654 represents the PIN.

- **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

```
      CALL-OUT POLICY SETUP MENU

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

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

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

 4. Number of retries:
     Currently 2

98. Return to Previous Menu
```

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

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

[1] The length of these pauses is set in modem register S8. The default is usually 1 or 2 seconds each.

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

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

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

Number of retries is the number of times you want the server to retry calls that resulted in busy signals or other error messages.

Customer Account Setup Menu

```
        Customer Account Setup Menu

  1. Customer Account Number:
      Currently Unassigned

  2. Customer RETAIN Login UserID:
      Currently Unassigned

  3. Customer RETAIN Login Password:
      Currently Unassigned

 98. Return to Previous Menu
```

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

Reboot/Restart Policy Setup Menu

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

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

```
       Reboot/Restart Policy Setup Menu

 1. Number of reboot attempts:
      Currently 3

 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
```

- **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 reboots attempts count, not reboots that occur after a restart attempt. At restart, the counter is set to 0.
- **Use OS-Defined restart policy** lets the Service Processor react or not react the same 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 may 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 systems 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 the Service Processor surveillance, 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.

   Refer to “Service Processor Reboot/Restart Recovery” on page B-27.

- **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 item is valuable if the number of these events becomes excessive, signalling a bigger problem.

Service Processor Functions and Features

The following section discusses some of the Service Processor functions and features more fully.

The RS/6000 7025 F50 Series supports the following functions:

Built-in Functions	Initialization and Test	Service Processor Basic Instructions Test (BIST)
		JTAG System Chip Initialization
	Error Data Collection	BIST/POST errors and status
		Checkstop FIR data logout
		Machine check logout
	Configuration	CPU Complex validation
		VPD Collection
	System Management	Reset and Reboot on System Firmware fail
		Reboot on system failure

Local User Function	User Interface	Local async console
		Text based menus with NLS
		Operator Panel messages
	Power and Miscellaneous	Power On/Off
		Configurable Reboot Policy
	Status and Data Access	VPD
		Error data (Service Processor)
		Error data (system)
		Environmental data
	Service Processor Setup Utilities	Passwords
		Phone numbers
		Language (NLS) selection
		Call In/Call Out enable/disable
		Flash (Gold/Recovery block) Update
		Flash (Composite block) Update
		System Name
		Modem Configuration
Remote User Functions	Call Out (Call Home) Reporting	Boot failure
		OS Termination
		Surveillance failure
		Critical EPOW reporting
		Checkstop
		Machine check
	Indentify system by name	Call In
		Power-on via ring-indicate
		Password/security check
		Console mirroring/Quick disconnect
Application Interface Functions	Monitor/Sense	Thermal/Voltage/fan speed
		SP Flash Update(Recovery and Composite)

System Power-On Methods

- Power-on Switch - see 'Starting the System Unit' in &ugtitle..
- SP Menu power-on request

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

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

  Refer to “Seamless Transfer of a Modem Session” on page D-6 for information on transferring modem sessions from Service Processor to the operating system.
- Unattended start mode - refer to **Enable/Disable Unattended Start Mode** on page B-12.

  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.
- 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.

  Because of the potential for AC power loss, the Timed Power-On function of AIX can only be assured when Unattended Power-On Mode is enabled. If a Timed Power-On event occurs during an AC power loss, and if Unattended Power-On Mode is enabled, the system starts when AC power is restored.

  If Unattended Start Mode is disabled (the default), the system power state remains off when AC power is restored, regardless of the power state of the system when AC loss occurred.
- Ring Indicate Power-On

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

- Follow-up to a Failed Boot Attempt

  The Service Processor will initiate a power-on sequence upon detection of a failed boot attempt.

Service Processor Reboot/Restart Recovery

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

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

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

Failure During Normal System Operation: When the boot process completes and control transferers 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, 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 SP parameter, Use OS-Defined Restart Policy, is Yes (the default), the Service Processor takes over for AIX to reboot/restart after a Check Stop 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 SP 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 **Use OS-Defined restart policy** default setting is YES. This causes the SP 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 Service Processor refers to Enable supplemental restart policy for its action.

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 the Service Processor surveillance, 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.

   Refer to “Service Processor Reboot/Restart Recovery” on page B-27.

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	SP to use OS-Defined restart policy?	SP 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

Service Processor System Monitoring - Surveillance

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

Surveillance is available during two phases:

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

System Firmware Surveillance: Provides the Service Processor with a means to detect boot failures while the system firmware is running.

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

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

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

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

Operating system surveillance can be enabled and disabled via:

- service processor Menus
- service processor Service Aids

Three parameters must be set for operating system surveillance:

1. Surveillance enable/disable
2. Surveillance interval

   This is the maximum time in minutes the Service Processor should wait for a heartbeat from the operating system before timeout.

3. Surveillance delay

   This is the length of time in minutes for the Service Processor to wait from when the operating system is started to when the first heartbeat is expected.

Surveillance will take effect immediately after setting the parameters from the Service Processor menus.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and the Service Processor does not detect any heartbeats from the operating system, the Service Processor assumes the system is hung. The machine is left powered on and the Service Processor enters standby phase, displaying the operating system surveillance failure code on the operator panel. If Call-out is enabled, the Service Processor calls to report the failure.

Call Out (Call-Home)

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

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

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

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

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

Console Mirroring

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

System Configuration:

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

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

1. Remote session first, then local session added
    a. Remote session already in progress.
    b. Remote user uses the Service Processor 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 Service Processor receives a call from the remote user.
    c. The local user selects the option to enable console mirroring. The Service Processor immediately begins mirroring Service Processor menus.

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

Service Processor Firmware Updates

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

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

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

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

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

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

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

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

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

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

An update diskette can be acquired from the RS/6000 Support page on the Internet or from your service team. The Internet address is:

`http://www.rs6000.ibm.com/support/micro`

The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort.

Refer to the downloaded update instructions, or to the System Management Services "Config" on page 5-5 or "Display Configuration" on page 5-26 or Service Processor menus on page B-7, to determine the level of the system unit or service processor flash.

Updating Firmware from the Service Processor Menus: The Service Processor Menus are available while the server is powered off. From the Service Processor Main Menu, select Service Processor Setup to bring up a menu containing the item, Reprogram Service Processor Flash EPROM. Selecting that item starts the update process. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested.

Updating Firmware from the SMS Utilities: From a powered down or reset condition, bring up the SMS Utilities and select the menu item for updating firmware. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested.

Updating Firmware from the Service Aids

Note: This service aid is only supported for Online Diagnostics.***:*** This service aid allows you to update the system or service processor flash.

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

Using this service aid to update the system or service processor flash will not save the current contents of the flash.

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

Updating Firmware from AIX

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

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

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

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

Service Processor Logs

Service Processor Error Log: The Service Processor error logs contain error conditions detected by the Service Processor.

```
                          Error Log

19970626223337  0. Loss of Redundant Fan #5
                    40210091



   Press "C" to clear error log, any other key to continue.  >
```

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time.

System POST Errors: If POST (Power-On Self Test) errors occur during start-up, this error log help isolate faults when used with the diagnostics.

```
                          Read System POST Errors


Version : 0
Severity : 0
Disposition : 0
Initiator : 0
Event being reported : 0
Extended Error Log Data:
0xC2 0x00 0x84 0x09 0x00 0x00 0x00 0x00
0x20 0x00 0x00 0x00 0x00 0x00 0x72 0x74
0x63 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x28 0x03 0x00 0x05 0x00 0x01
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x49 0x42 0x4D 0x00 0x55 0x30 0x2E 0x31
0x2D 0x50 0x31 0x2D 0x58 0x31 0x00

                    (Press Return to Continue)
```

Appendix C. Service Processor Setup and Test

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

Service Processor Setup Checklist

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

   Attention: Server power should remain off.
4. Bring up the Service Processor Menus, see Appendix B, “Service Processor Menus” on page B-1.
5. Set the System Name, “Privileged User Menus” on page B-6.
6. Enable Surveillance, see B-8, and “Service Processor Functions and Features” on page B-24
7. Configure Call-In/Call-Out, see “CALL-IN/CALL-OUT SETUP MENU” on page B-16 and “Modem Configuration Menu” on page B-16.
8. Exit the Service Processor menus
9. **Unplug** the power cord from the server.
10. Attach modem(s) (if needed), page B-3
11. Plug in the server

    Attention: Server power should remain off.
12. Test

    Call-In, page C-2
    Call-Out, page C-2
13. Backup the service processor settings, as described in 'Save or Restore Hardware Management Policies Service Aid' in &ugtitle..

    Note: This 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 Setup

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

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

The server should be powered off as a result of the “Service Processor Setup Checklist” on page C-1.

Call-In:

1. Go to your remote terminal and call-in to your server. Your server should answer and offer you the Service Processor Main Menu after requesting your privileged access password.
2. Enter item 2, **System Power Control Menu.**
3. Enter item 4, **Power-On System.**

   Answer "y" when asked if you wish to continue powering on the system.
4. After the system firmware and operating system have initialized the server, the login prompt should appear at your remote terminal if you set up seamless modem transfer (refer to page D-6 for more information). This may take several minutes. When this occurs, you have successfully called into 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 should answer and offer you the login prompt.

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

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

Call-Out:

During the setup, you entered your phone number for the Pager (on page B-19) and Customer Voice (on page B-20) phone numbers. These numbers are used for this test.

1. Your remote terminal should be disconnected as a result of the Call-In test.

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

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

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

Serial Port Configuration

To configure the serial port on an AIX system, 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 D. Modem Configurations

Sample Modem Configuration Files

With nearly 1000 modems to choose from, and various programming standards, configuring a modem for use with the Service Processor can be challenging. The Service Processor is designed to place little demand on an attached modem, thereby increasing the setup and connection success rates. Several sample modem configurations files are supplied that will either work directly with your modem, or provide a good starting point for a custom setup, if required. These files are included on the Sample Modem Configuration Files diskette and in your Service Processor firmware with the following names:

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

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

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

Configuration File Selection

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

   If yes, go to 3
   If not, continue with 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.

   If yes, go to 5 on page D-3
   If not, continue with 3 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, and `enabled` is the default, this test must be disabled. See “Customizing the Modem Configuration Files” on page D-3 for more information.
   If not, continue with 4 on page D-3.

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. Selection is complete. If you find it necessary to adjust any of these configuration files, do so with reference to the manual that came with your modem.[1] Choose settings that enable hardware flow control and respond to DTR.

Examples

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 *				X	
Bocamodem 1440E			X		
Hayes Smart Modem 300	X				
IBM 5841	X				
IBM 5843	X				
IBM 7851				X	
IBM 7852-010				X	
IBM 7855					X
USRobotics 33.6K Sportster					X
Zoom V.32			X		

*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 Service Processor menus.

---

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

Note: If you have already set up your serial ports, line speeds, authorizations and telephone numbers from the Service Processor 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 Service Processor 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 to modify.

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

   Make this change to the third line of each of the following stanzas:
   - `condout`
   - `condin`
   - `ripo`
4. Save the changes.

Use this new modem configuration file as described at the top of this section.

Xon/Xoff Modems

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

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

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

Ring Detection

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

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

Terminal Emulators

The Service Processor 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 the Service Processor to the operating system that agreeing terminal emulators becomes important.

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

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

Recovery Procedures

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

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

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

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

Seamless Transfer of a Modem Session

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

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

Usually the command &D2 will work, but not always. The sample modem configuration files[2] take this high percentage position. You should consult your modem's manual for its specific response scheme for the &Dn command.

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

1. Recovery
2. Prevention

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

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

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

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

   If no, try another &Dn setting for your server's modem. See your modem manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files[2].

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

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

   If no, try another &Dn setting for your server's modem. See your model manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files[2].

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

---

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

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

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

Prevention Strategy

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

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

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

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

Modem Configuration Samples

Sample File modem_z.cfg

```
#
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP Z
#
# FUNCTIONS: Modem configuration file for many early Hayes* compatible modems.
#  This example uses the ATZ reset command to choose the factory defaults.
#  This setup will work for many modems, but it is required for early vintage
#  modems which respond to neither the ATZ0 reset command nor the extended (&)
#  commands.  Refer to your modem manual.
#
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#
#
# 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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# 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
# &F1  Reset. Restore profile 1 Q0   Turn on responses
#  E0  Turn echo off            Q1   Turn off responses
#  V0  Use numeric responses    S0=0 Automatic answer inhibit
# +++  Escape to command mode   S0=2 Answer on second ring
#  H0  Hang-up                  X0=0 Limit modem response codes
#                               T =  Tone mode.  When used as T\r, it is a
#                                    no op to maintain program synchronization
#                                    when modem may/will echo the commands.
#
# &C1  Detect CD                &D2  Respond to DTR (often the default)
# &R1  Ignore RTS (CTS)
#
#  %N  Call-Out phone number    %P   Paging phone number
#  %S  Modem speed (available to users)
#
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses.  Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=OK
#
# PROGRAMMING NOTE: No blanks between double quote marks (").

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

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

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

```
 timeout 60
            done

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

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

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

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

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

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

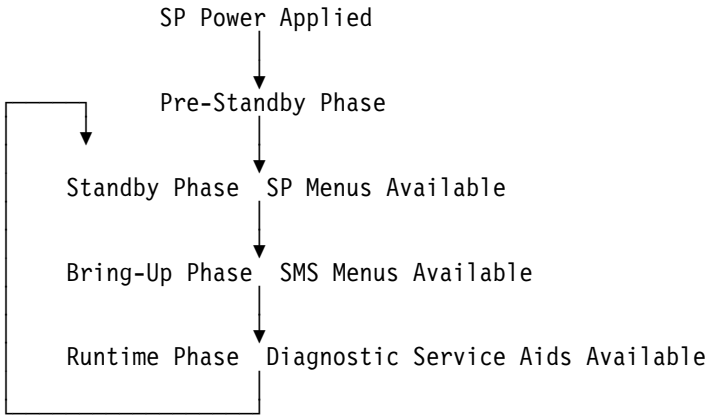
                                                # Confirm successful command.
            expect "0\r" timeout 60
            delay 2                             # Wait before hanging up.
            send "ATH0T\r"                       # Hang up.
            expect "0\r" timeout 2              # Confirm successful command.
            done

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

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

Appendix E. Service Processor Operational Phases

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



Pre-Standby Phase

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

The Pre-Standby phase components are:

- SP Initialization

  SP performs any necessary hardware and software initializations.

- SP POST

  SP conducts Power-On Self Tests on its various work and code areas.

- SP Unattended Start Mode Checks

  To assist fault recovery. If unattended start mode is set, the SP automatically reboots the server. SP will not wait for a user-input or power-on command, but will move straight through the phase and into the Bringup Phase. The unattended start mode can be reset by accessing SMS menus, or SP menus.

Standby Phase

The standby phase can be reached in two ways:

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

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

The Standby phase components are:

- Modem Configuration

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

- Dial In

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

- Menus

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

- Retry Request Check

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

- Dial Out

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

- Update Operator Panel

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

- Environmental Monitoring

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

- System Firmware Surveillance (Heartbeat Monitoring)

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

- Responding to System Processor Commands

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

Runtime Phase

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

- Environmental Monitoring

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

- Responding to System Processor Commands

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

- Run-Time Surveillance (Heartbeat Monitoring)

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

Index

Numerics

1.12 GB, 2.25 GB, and 4.51 GB SSA
  disk drives 3-93

A

about this book xv
account number B-22
active
  SSA link 3-60
adapter
  code package ID 3-92
  description of 3-93
  finding the physical location 3-90
  POSTs (power-on self-tests) A-2
  SSA 3-59
    port connector 3-90
    vital product data (VPD) 3-93
adapters
  removal and replacement 6-22
aids, diagnostic
  adapter POSTs (power-on
    self-tests) A-2
  disk drive module POSTs (power-on
    self-tests) A-1
  SRNs (service request
    numbers) A-3, A-5
aids, service
  Certify Disk 3-81
  Configuration Verification 3-77
  Format Disk 3-79
  Link Verification 3-73
  Set Service Mode 3-67
  starting 3-65
  unavailable 3-90
  vital product data (VPD) 3-93
AIX location codes 3-48, 3-54

B

backplane
  removal and replacement 6-20
battery
  removal and replacement 6-38
beginning the service aids 3-65
boot list 4-2
broken loop
  cable removed 3-86
  disk drive module removed 3-88
bus SRN to FRU Table 3-27

C

cables
  power 1-12, 7-7
cache module, fast-write 3-94
call home, see call out
call out (call-home) B-31
call-in
  testing C-2
call-out
  policy B-20
  testing C-2
card, SSA adapter 3-59
CD-ROM drive
  removal and replacement 6-19
cfgmgr command 2-38
check points B-5, B-14
checklist, setup C-1
checkpoints 3-29
  firmware 3-32
  service processor 3-29
codes, location 3-58

commands
cfgmgr 2-38, 3-92
diag -a A-12
lsattr -E -l adapter -a ucode 3-92
send diagnostic A-1
configuration
complete system 3-92
invalid SSA loop A-15
manager command 3-92
Configuration Verification service aid 3-77
connector
port, on SSA adapter 3-90
console mirroring
enable/disable B-9
quick disconnect B-32
system configuration B-32
continuous failure 2-35
covers
removal and replacement 6-3
customer administration center B-19

D

data flow 1-8
data path 3-59, 3-62, 3-86
data, vital product 3-93
definition of FRU names used in the SRN table A-5
device configuration method 3-92
device driver level 3-93
devices, handling static–sensitive 6-2
devices, startup 5-8
diag -a command A-12
diagnostic aids
adapter POSTs (power-on self-tests) A-2
disk drive module POSTs (power-on self-tests) A-1
SRNs (service request numbers) A-3, A-5
diagnostics, online 4-1
diagnostics, standalone 4-1
dial-out telephone numbers, setting B-18
disk
certify, service aid 3-81
format, service aid 3-79
formatting, incompatible with the system 2-38
disk drive module
1.12 GB, 2.25 GB, and 4.51 GB 3-93
broken loop 3-86, 3-88
finding the physical location 3-90
Format Disk service aid 3-79
identification 3-61
missing 3-75
POSTs (power-on self-tests) A-1
serial number 3-61
strings 3-60
unavailable to the using system 3-67
diskette drive
removal and replacement 6-19
DRAM (dynamic random-access memory) 3-93
dynamic random-access memory (DRAM) 3-93

E

entry point, MAPs 2-37
EPROM
updates B-33
EPROM (programmable read-only memory) A-2
error
microcode and software A-5
unrecoverable 3-83

error code to FRU index 3-1
error codes
  firmware 3-2
  POST 3-1
error logs B-14

F

failed
  application program 3-83
  status 3-74
failure
  continuous 2-35
  link 3-83
fans
  removal and replacement 6-42
fast-write cache module 3-94
finding the physical location of a device 3-90
Format Disk service aid 3-79
format, location code 3-58
fragility of disk drive modules A-1
FRU
  names used in the SRN table A-5
  used in the SRN table A-5
Function Select menu 3-65
function, identify 3-65, 3-90

G

general access password, changing B-9
general user menus B-4
glossary of FRU names used in the SRN table A-5
good status 3-74
green light
  on connectors 3-59, 3-60

H

handling static–sensitive devices 6-2
hdisk (LUN) 3-61
heartbeat B-29
how to use MAPs 2-35

I

I/O planar
  removal and replacement 6-31
I/O planar locations 1-4
ID, adapter code package 3-92
identification, pdisks, hdisks, and disk drive module 3-61
identify function 3-65, 3-70, 3-90
inactive
  SSA connector 3-60
index, error code to FRU 3-1
information
  SSA network 3-76
invalid SSA loop configurations A-15

L

language selection B-15
laser safety information xiii
level
  device driver 3-93
light
  on connectors 3-60
link
  active 3-60
  failure 3-83
Link Verification service aid 3-73
loading the system diagnostics 4-1
location
  code format 3-58
  physical, of a device 3-90
location code
  format 3-46

location codes 3-46, 3-48
AIX 3-54
physical 3-46
ssa 3-58
locations
I/O 1-4
memory 1-6
system card 1-6
system unit 1-1
logical units (LUN) 3-61
loop
broken 3-86
configurations, SSA, invalid A-15
data paths, description of 3-62
links 3-59
SSA, rules 3-61
loops 3-60
lsattr -E -l adapter -a ucode
command 3-92
LUN (logical units) 3-61

M

maintenance analysis procedures
(MAPs) 2-1, 2-35
minimum configuration Map 2-17
power MAP 2-12
problem determination MAP 2-6
maintenance, microcode 3-92
manufacturer and plant code 3-93
MAPs (maintenance analysis
procedures)
starting 2-37
using 2-35
memory bits 3-26
memory card locations 1-6
memory hang
memory module
removal and replacement 6-29
menu inactivity B-3
menus
Certify Disk service aid 3-81
Configuration Verification service
aid 3-77
Format Disk service aid 3-79
Function Select 3-65
general user B-4
Link Verification service aid 3-73
privileged user B-6
service processor B-3
service processor call-in/call-out
setup B-16
service processor call-out policy
setup B-20
service processor customer account
setup B-22
service processor language
selection B-15
service processor reboot policy
setup B-23
service processor serial port
selection B-17
service processor serial port speed
setup B-18
service processor setup B-8
service processor system
information B-13
service processor system power
control B-12
service processor telephone
setup B-18
Set Service Mode service aid 3-67
SSA Service Aids 3-65
support menus
service processor menus B-2
service processor service
aids B-2
SMS B-2

messages, SP checkpoints 3-29
microcode
  maintenance 3-92
  software errors A-5
minimum configuration Map 2-17
missing disk drive module 3-75
mode, set service 3-67
modem
  configuration file selection D-2
  configurations D-1
  seamless transfer D-6
modem_f.cfg, sample file D-13
modem_f0.cfg, sample file D-16
modem_f1.cfg, sample file D-19
modem_z.cfg, sample file D-9
modem_z0.cfg, sample file D-11
module, disk drive
  1.12 GB, 2.25 GB, and 4.51 GB 3-93
  broken loop 3-86, 3-88
  finding the physical location 3-90
  Format Disk service aid 3-79
  identification 3-61
  missing 3-75
  power-on self-tests (POSTs) A-1
  serial number 3-61
  strings 3-60
  unavailable to the using system 3-67
module, fast-write cache 3-94

N

names used in the SRN table A-5
network information, SSA 3-76
numbers, service request
  description of A-3
  software and microcode errors A-5
  table A-6
NVRAM B-14

O

OK 2-1, 3-31, E-2
online diagnostics 4-1
operational phases, SP
  standby E-2
operator panel 1-7
operator panel control assembly
  operator panel control assembly 6-45
  removal and replacement 6-45
operator panel display
  removal and replacement 6-44

P

pager B-18, B-19
parallel card
  removal and replacement 6-46
parts information 7-1
passwords
  changing general access password B-9
  changing privileged access password B-9
  overview B-9
paths, data
  broken loop 3-86
  description of 3-62
pdisk
  identification 3-61
  with no associated hdisk 2-38
physical
  disk drives (pdisks) 3-61, 3-67
  location of a device 3-90
physical location codes 3-46, 3-48
plant code and manufacturer 3-93
pluggable fast-write cache module 3-94

port
(P) value 3-90
connector on SSA adapter 3-90
POS (programmable option select) A-2
POST error codes 3-1
POST errors
read B-5, B-14
POSTs (power-on self-tests) A-1
power
status 3-74
power cables 1-12, 7-7
power MAP 2-12
power supply
removal and replacement 6-15
power-on methods B-26
power-on self-tests (POSTs) A-1, A-2
preface xv
primary console D-8
privileged access password, changing B-9
privileged user menus B-6
problem determination
POSTs, adapter A-2
POSTs, disk drive module A-1
SRNs (service request numbers) A-3
using service aids 3-84
problem determination MAP 2-6
Processor card
removal and replacement 6-35
programmable option select (POS) A-2
programmable read-only memory (EPROM) A-2
progress indicators B-5, B-14

R

RAM (random-access memory) 3-93
Random-access memory (RAM) 3-93
read system, POST errors B-5, B-14
read-only memory (ROM) 3-93
Read-only storage (ROS) 3-93
reboot recovery B-23, B-27
related publications xv
remote latency B-21
remote timeout B-21
removal and replacement procedures 6-1
adapters 6-22
backplane 6-20
battery 6-38
CD-ROM drive 6-19
covers 6-3
diskette drive 6-19
fan 6-42
I/O planar 6-31
memory module 6-29
operator panel display 6-44
power supply 6-15
Processor card 6-35
serial cable 6-46
service processor 6-37
tape drive 6-19
reserved status 3-65, 3-74
reset Service Processor B-11
restart recovery B-23, B-27
RETAIN B-22
retries B-21
ring indicator power-on B-12
ROM (read-only memory) 3-93
ROS (read-only storage) 3-92, 3-93
rules for SSA loops 3-61

S

safety
electrical xi

safety notices xi
seamless transfer of a modem session D-6
select, function menu 3-65
send diagnostic command A-1
sequence, startup 5-8
serial cable
  removal and replacement 6-46
serial number 3-61
service aids
  available 3-90
  Certify Disk 3-81
  Configuration Verification 3-77
  Format Disk 3-79
  link failure 3-83
  Link Verification 3-73
  Set Service Mode 3-67
  starting SSA 3-65
  unavailable 3-90
  vital product data (VPD) 3-93
service center B-19
service inspection guide 1-13
service processor 6-37
  removal and replacement 6-37
service processor checklist C-1
  checklist C-1
service processor menus
  accessing locally B-3
  accessing remotely B-3
  call-in/call-out B-16
  call-out policy B-20
  customer account B-22
  general user B-4
  language selection B-15
  menu inactivity B-3
  privileged user B-6
  reboot policy B-23
  restart policy B-23
  serial port selection B-17
  serial port speed setup B-18
service processor menus *(continued)*
  setup menu B-8
  supported menu options B-2
  system information B-13
  system power control B-12
  telephone number B-18
service processor setup C-1
service processor setup checklist C-1
service processor test C-1
service provider B-19
service request numbers (SRNs)
  description of A-3
  software and microcode errors A-5
  table A-6
Set Service Mode service aid 3-67
software and microcode errors A-5
sp checklist C-1
SP checkpoints 3-29
sp installation
  checklist C-1
SP operational phases E-1
sp setup C-1
sp test C-1
specifications, system unit 1-10
SRNs (service request numbers) A-3, A-5, A-6
SSA (serial storage architecture)
  adapter 3-59, 3-93
  address (AA) value 3-90
  inactive connector 3-60
  link
    active 3-60
  loop
    configurations, invalid A-15
    links 3-59
    rules 3-61
  network information 3-76
  service aids 3-64
    Certify Disk 3-81
    Configuration Verification 3-77
    error codes 3-83

SSA (serial storage architecture) *(continued)*
service aids *(continued)*
finding the physical location of a device 3-90
Format Disk 3-79
identify function 3-65
Link Verification 3-73
Set Service Mode 3-67
starting 3-65
SSA Hot-Swap Disk Drive
vital product data (VPD) 3-93
SSA-address (AA) value 3-91
standalone diagnostics 4-1
start talk mode B-10
Start Up program 5-8
starting
MAPs 2-37
service aids 3-65
starting system programs 5-1, 5-24
STBY 2-1, 2-19, 2-20, 2-21, 2-22, 2-23, 3-31, E-2
strings, disk drive module 3-60
surveillance
failure B-29
operating system B-29
set parameters B-11
system firmware B-29
Sys Config program 5-5
system administrator B-19
system card locations 1-6
system data flow 1-8
system information menu B-13
system phone number B-20
system POST errors
read B-5, B-14
system power-on methods B-26
system programs 5-1
Start Up 5-8
starting 5-1, 5-24
system programs *(continued)*
Sys Config 5-5
Utilities 5-10
system unit locations 1-1

T

table
service request numbers (SRNs) A-6
tape drive
removal and replacement 6-19
test, memory 3-42
testing the setup
call-in C-2
call-out C-2

U

unattended start mode, enable/disable B-12
unavailable service aids 3-90
Unplug all power cords (cables) 6-5
unrecoverable error 3-83
using
MAPs 2-35
service aids 3-65
SRN table A-3
Utilities program 5-10

V

value, port (P) 3-90
verification
configuration, service aid 3-77
link, service aid 3-73
serial number 3-80, 3-82
vital product data (VPD) 3-93
voice phone number B-20
VPD (vital product data) B-13

VPD, vital product data 3-93

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