RS/6000 44P Series Model 170

Service Guide

SA38-0560-01

Second Edition (October 2000)

Before using this information and the product it supports, read the information in “Safety Notices” on page xi,

“Appendix A. Environmental Notices” on page 267, and “Appendix B. Notices” on page 269.

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Safety Notices

A *danger* notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. Danger notices appear on the following pages:

- xii
- 46
- 47
- 209

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

- xii
- xiii
- 46
- 209
- 221

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

Electrical Safety

Observe the following safety instructions anytime 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.

CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL À LASER DE CLASSE 1
IEC 825:1984 CENELEC EN 60 825:1991

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.

Data Integrity and Verification

IBM computer systems contain mechanisms designed to reduce the possibility of undetected data corruption or loss. This risk, however, cannot be eliminated. Users who experience unplanned outages, system failures, power fluctuations or outages, or component failures must verify the accuracy of operations performed and data saved or transmitted by the system at or near the time of the outage or failure. In addition, users must establish procedures to ensure that there is independent data verification before relying on such data in sensitive or critical operations. Users should periodically check the IBM support websites for updated information and fixes applicable to the system and related software.

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. This book also contains Maintenance Analysis Procedures (MAPs) that are not common with other systems. MAPs that are common to all systems are contained in the *Diagnostic Information for Multiple Bus Systems*, order number SA38-0509.

This book is used by a service technician to diagnose and repair system failures. This book assumes that the service technician has had previous training on the 44P Series Model 170.

ISO 9000

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

Online Publications

RS/6000 and p Series publications are available online. To access the online books, visit our Web site at: http://www.rs6000.ibm.com/resource/hardware_docs/

Related Publications

The following publications provide additional information about your system unit:

- The *IBM RS/6000 44P Series Model 170 User's Guide*, order number SA38-0559, contains information to help users use the system, use the service aids, and solve minor problems.
- The *Diagnostic Information for Multiple Bus Systems*, order number SA38-0509, contains diagnostic information, service request numbers (SRNs), and failing function codes (FFCs).
- The *Adapters, Devices, and Cable Information for Multiple Bus Systems*, order number SA38-0516, contains information about adapters, devices, and cables for your system. This manual is intended to supplement the service information found in the *Diagnostic Information for Multiple Bus Systems*.
- The *Site and Hardware Planning Guide*, order number SA38-0508, contains information to help you plan your installation.
- The *PCI Adapter Placement Reference*, order number SA38-0538, contains information about PCI adapter placement in your system unit.

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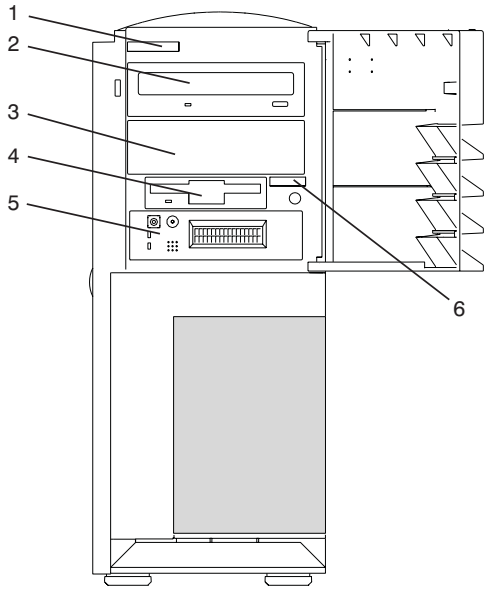
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Chapter 1. Reference Information

This chapter provices an overview of the 44P Series Model 170, including a physical overview of the system.

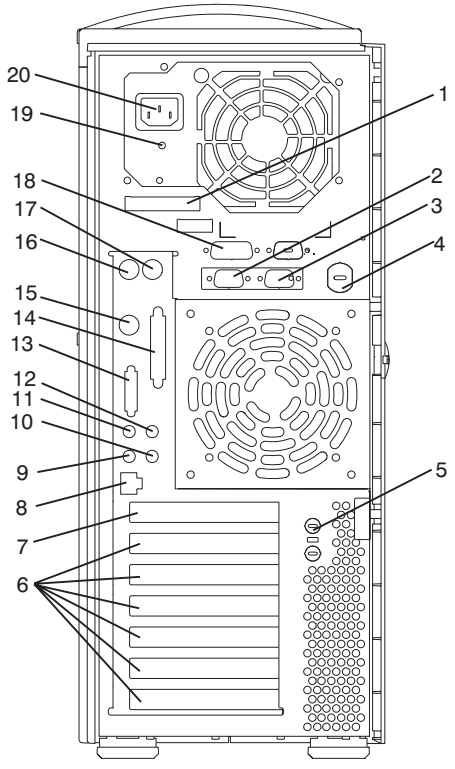
System Unit Locations

Front View with Bezel Door Open



1	System Type and Model Number Identification Tag
2	CD-ROM Drive
3	Optional Media Bay
4	Diskette Drive
5	Operator Panel
6	System Serial Number

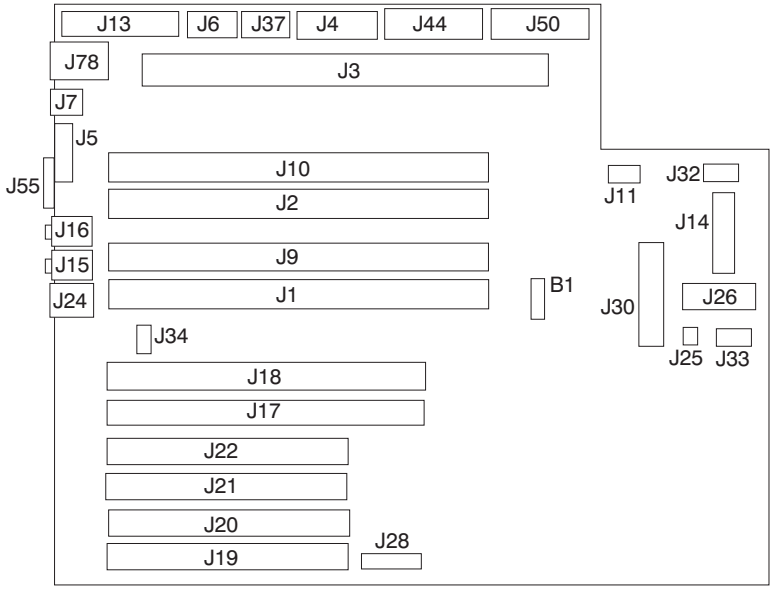
System Unit Rear View



1	Machine Serial Number Label
2	Serial Connector 1
3	Serial Connector 2
4	Keylock
5	Optional Security Bolt
6	Adapter Slots (6)
7	Empty Slot
8	Ethernet Connector (RJ-45)
9	Headphone Connector
10	Microphone Connector
11	Audio Line Out
12	Audio Line In
13	SCSI-LVD Connector
14	Parallel Connector
15	Tablet Connector

16	Mouse
17	Keyboard
18	AUI Ethernet
19	Status LED
20	Power Cord Connector

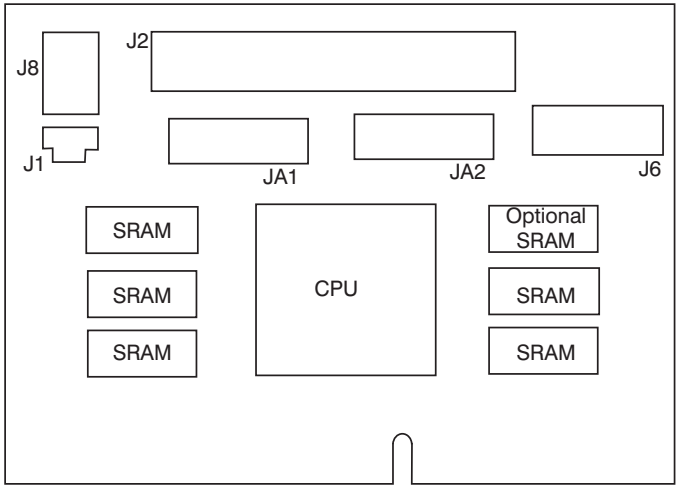
System Board Component Locations



J13	Diskette Drive Connector
J6	Serial Connector 1
J37	Serial Connector 2
J4	AUI Ethernet Connector
J44	Power Supply Connector
J50	Power Supply Connector
J3	CPU Card Connector
J11	CD-ROM Audio Connector
J32	Top Front Fan Connector
J14	Operator Panel Connector
J26	ESP Connector
J33	Bottom Front Fan Connector
J25	Speaker Connector

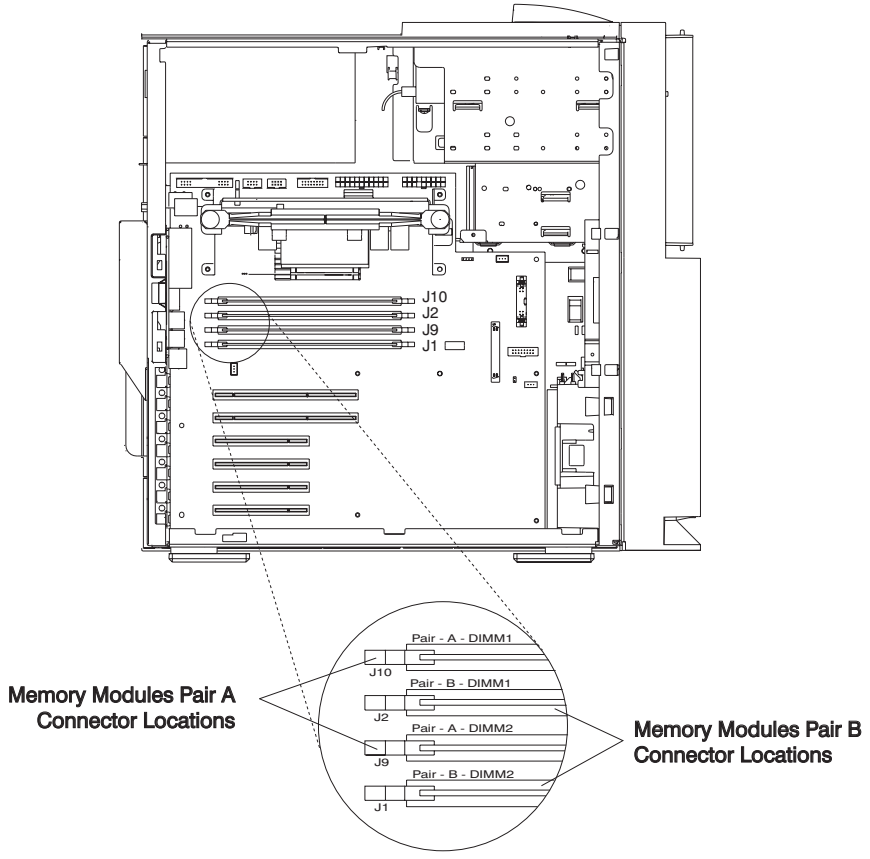
J30	Internal SCSI Connector
B1	Battery
J28	SP Connector
J19, J20, J21, J22	32-Bit PCI Connectors (4x)
J17, J18	64 Bit PCI Connectors (2x)
J34	Rear Fan Connector
J1, J9, J2, J10	Memory DIMM Connectors
J24	RJ-45 Ethernet Connector
J15	Headphone/Microphone Connectors
J16	Audio Line IN/OUT Connector
J55	External SCSI Connector
J5	Parallel Port Connector
J7	Tablet Connector
J78	Mouse/Keyboard

Processor Card Component Locations



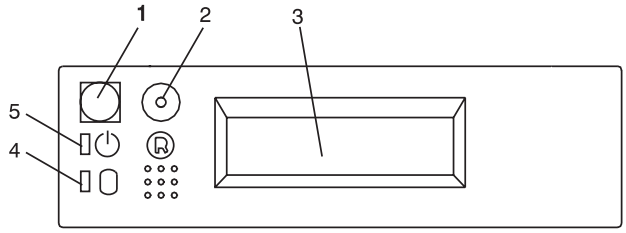
J1	Fan Power Connector
J2	Voltage Regulator
J8	Power Connector
JA1	Development/Manufacturing Use Only
JA2	Development/Manufacturing Use Only
J6	Development/Manufacturing Use Only

Memory DIMM Locations



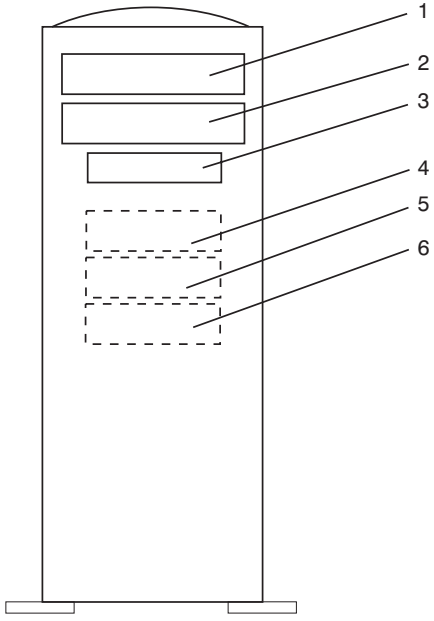
Note: Memory DIMMs must be installed in pairs and in the correct connector configuration. Connector ID numbers are labeled on the system board. Possible connector pair combinations are J1 and J2, J9 and J10.

Operator Panel Component Locations



1	Power-On Switch
2	Reset Switch
3	Display
4	Disk Drive Activity LED
5	Power-On LED

SCSI IDs and Bay Component Locations

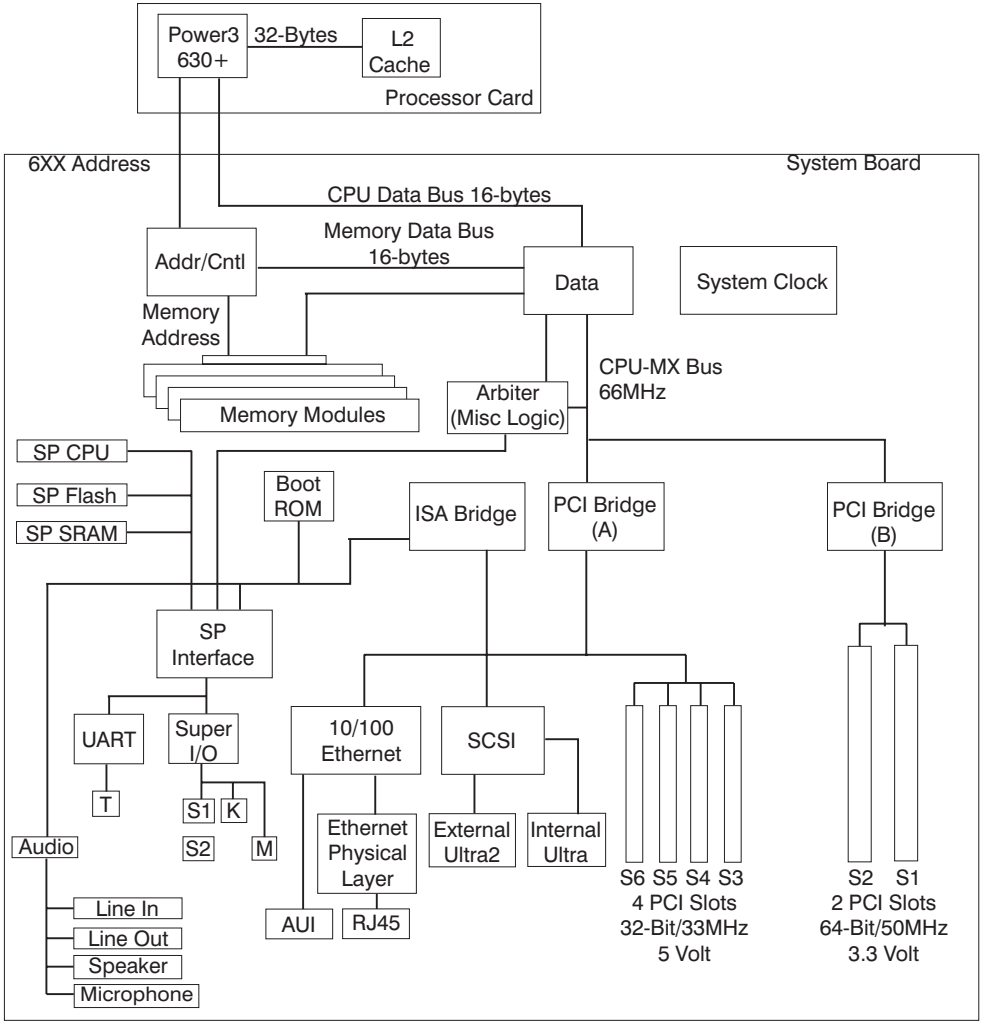


Index	Bay Location	Drive Name	SCSI ID
1	Bay D1	CD-ROM	SCSI ID 1
2	Bay D2	Media device	SCSI ID 2

Index	Bay Location	Drive Name	SCSI ID
3	Bay D3	Diskette drive	Non-SCSI
4	Bay D4	Disk drive	SCSI ID 4
5	Bay D5	Disk drive	SCSI ID 5
6	Bay D6	Disk drive	SCSI ID 6

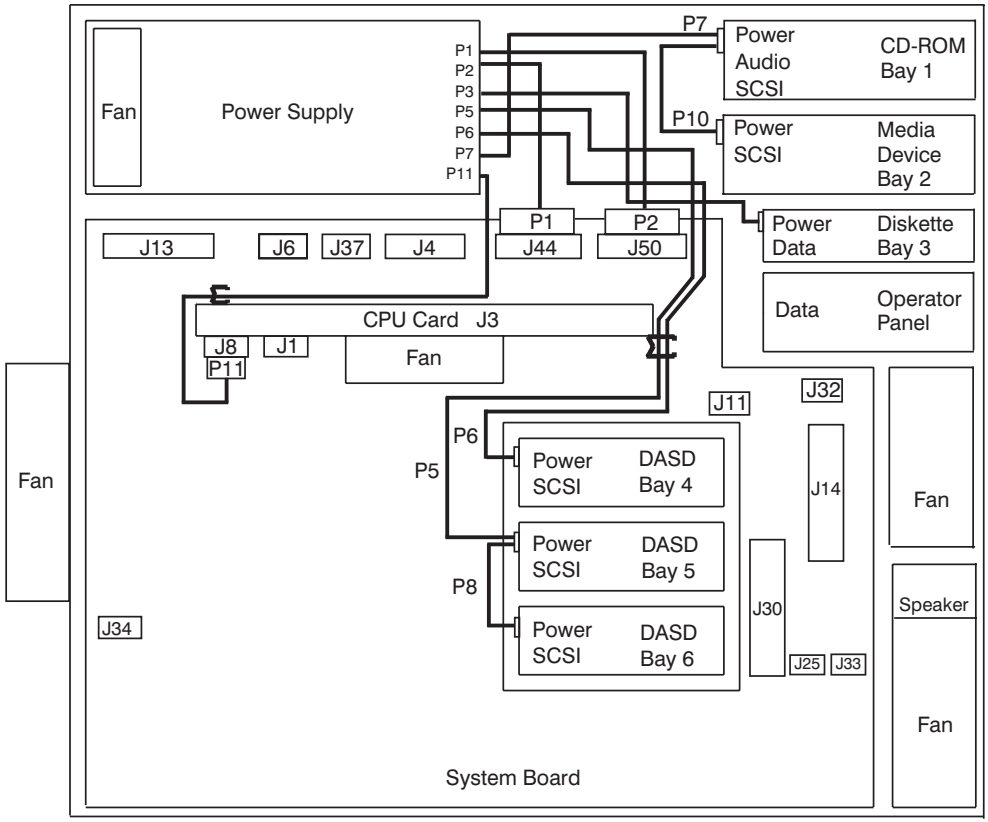
Note: The SCSI bus IDs are the recommended values. The SCSI IDs shown for media devices indicate how the devices are set when they are shipped from the factory. Field installations may not comply with these recommendations.

System Logic Flow Diagram



System Cables

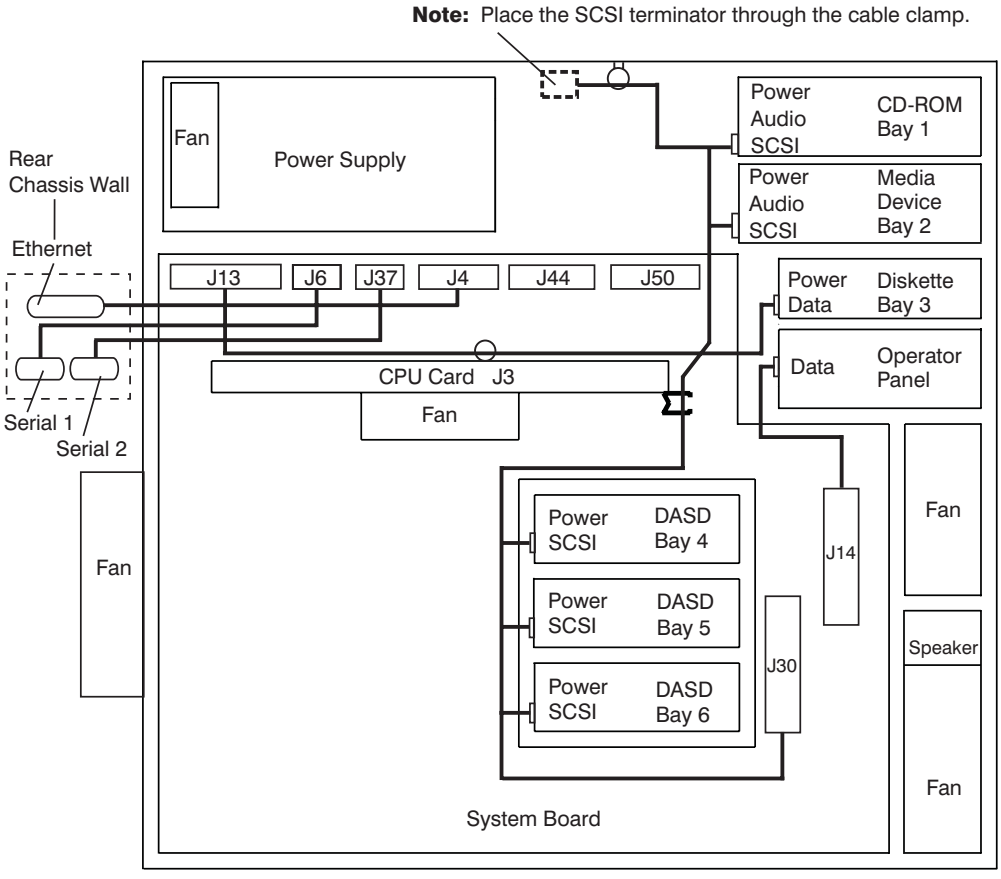
Power Cable Routing



Note: If Bay 4 DASD is not installed, store the excess length of P6 cable in the cable clamp.

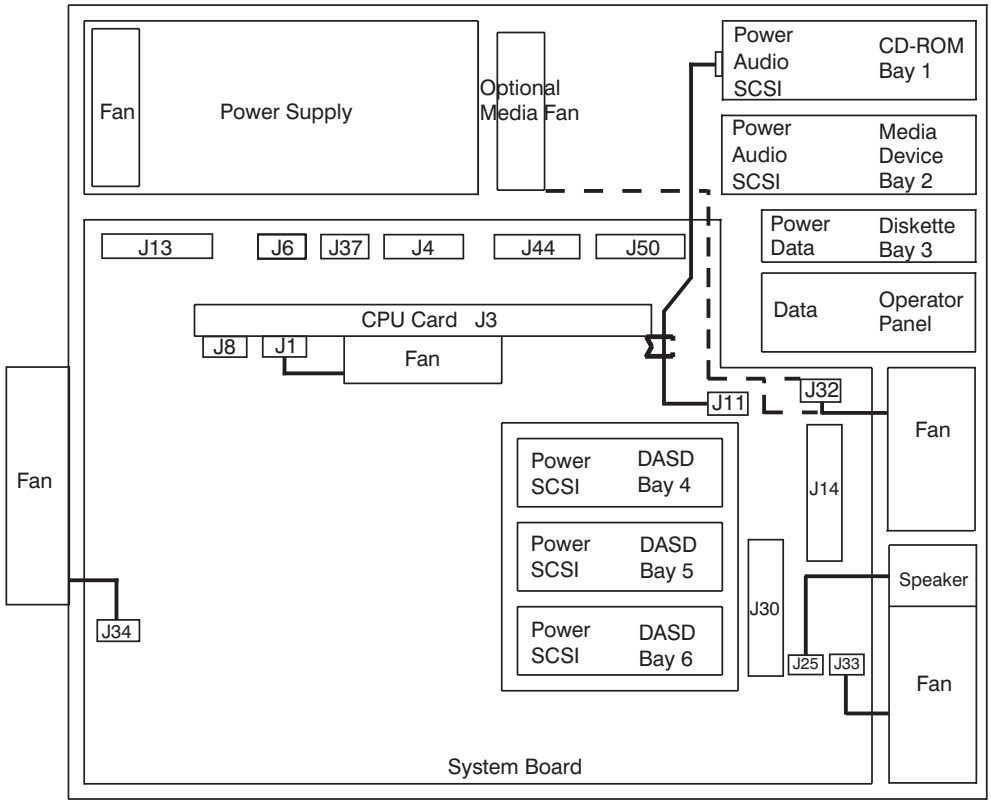
Power Supply Connector	Connector Number and Assembly
P1	J50 System Board
P2	J44 System Board
P3	Power Connector Diskette Drive
P5/P8	Power Connector DASD Bay 5/Bay 6
P6	Power Connector DASD Bay 4
P7/P10	Power Connector CD-ROM Bay 1/Bay 2
P11	J8 CPU Card

Signal Cable Routing



Connector Location	Connector Number and Assembly
Ethernet Connector (back panel)	J4 System Board
Serial 1 Connector (back panel)	J6 System Board
Serial 2 Connector (back panel)	J37 System Board
Data Connector Diskette Drive	J13
SCSI Terminator (through clamp)	SCSI Connector CD-ROM
SCSI Connector Bay 1	SCSI Connector Bay 2
SCSI Connector Bay 2	SCSI Connector Bay 4
SCSI Connector DASD Bay 4	SCSI Connector DASD Bay 5
SCSI Connector DASD Bay 5	SCSI Connector DASD Bay 6
SCSI Connector DASD Bay 6	SCSI Connector J30
J14 System Board	Data Connector Operator Panel

Fan/Audio Cable Routing



System Board Connector Number	Device or Number and Assembly
J11	Audio Connector CD-ROM Bay 1
J32	Top Front Fan
J33	Bottom Front Fan
J25	Speaker (Bottom Front Fan)
J34	Rear Fan
J1 CPU Card	CPU Fan

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 location code is an alphanumeric string of variable length, consisting of a series of location identifiers, separated by a dash (-), or slash (/), or a pound sign (#) character. The series is hierarchical; that is, each location identifier in the string is a physical or logical 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 processor 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.
- The # (pound sign) separator character indicates a cable connection between a connector and parent.

The following are examples:

- P1-C1 identifies processor card C1 plugged into planar P1.
- P1-M1 identifies memory card M1 plugged into planar P1.
- P2/S1 identifies serial port 1 controller on I/O board P2 or the connector for serial port 1.
- P1-K1 identifies a keyboard attached to connector K1 on planar P1.
- P2/Z1 identifies an integrated SCSI port controller on planar P2 which drives connector Z1.
- P2-Z1-... points to the actual SCSI bus and devices attached to Z1.

The . (period) identifies sub locations (DIMMs on a memory card or SCSI addresses). The following are examples:

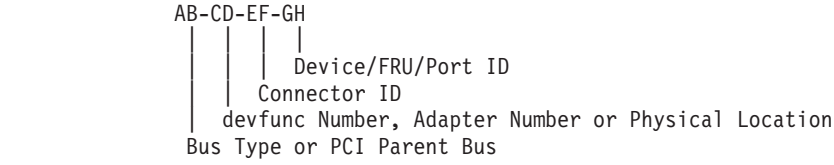
- P1-M1.4 identifies memory DIMM 4 on memory card 1 plugged into planar P1.
- P1-C1.1 identifies processor 1 on processor card 1 plugged into planar P1.
- P2-Z1-A3.1 identifies a SCSI device with SCSI address of LUN 1 at SCSI ID 3 attached to SCSI bus 1, which is integrated on planar P2.
- P2.1 identifies a riser card plugged into planar P2.

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 follows:



- The AB value identifies a bus type or PCI parent bus as assigned by the firmware.
- The CD value identifies adapter number, the 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 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-location' 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). Location codes therefore uniquely identify multiple adapters on individual PCI cards.
- For pluggable ISA adapters, CD is equal to the order of the ISA cards defined/configured either by SMIT or the ISA Adapter Configuration Service Aid.
- For an integrated ISA adapters, CD is equal to a unique code identifying the ISA adapter. In most cases, this code 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 to which a resource is attached.

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 re 00 a to 15.
- For a diskette drive, H identifies either diskette drive 1 or 2. G is always 0.
- For all other devices, GH is equal to 00.

For an 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 follows:

```
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.

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

Examples of physical location codes displayed by AIX are:

- First processor card plugged into planar 1:

  P1-C1

- Second memory card in planar P1:

  P1-M2

- Memory DIMM 12 on second memory card plugged into planar P1:

  P1-M2.12

Examples of AIX location codes displayed are:

- Integrated PCI adapter:

10-80	Ethernet
10-60	Integrated SCSI Port 1 (internal)
10-88	Integrated SCSI Port 2 (external)

- 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

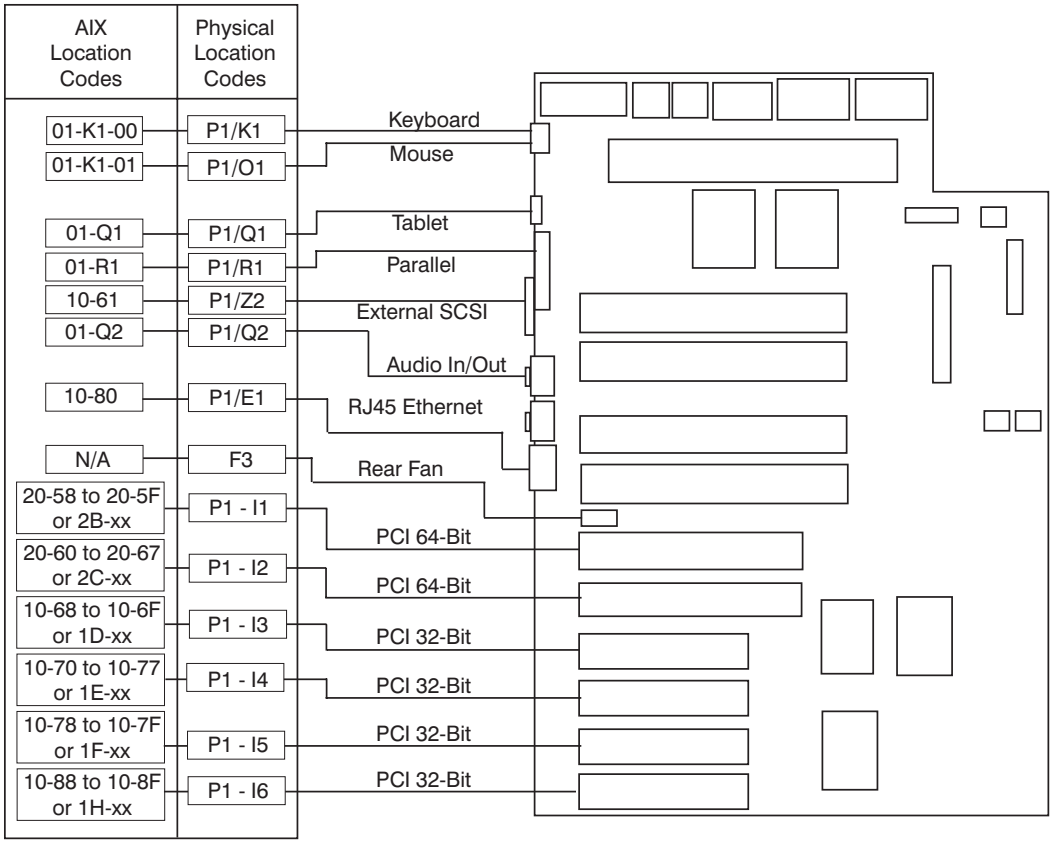
- Integrated ISA adapters:

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

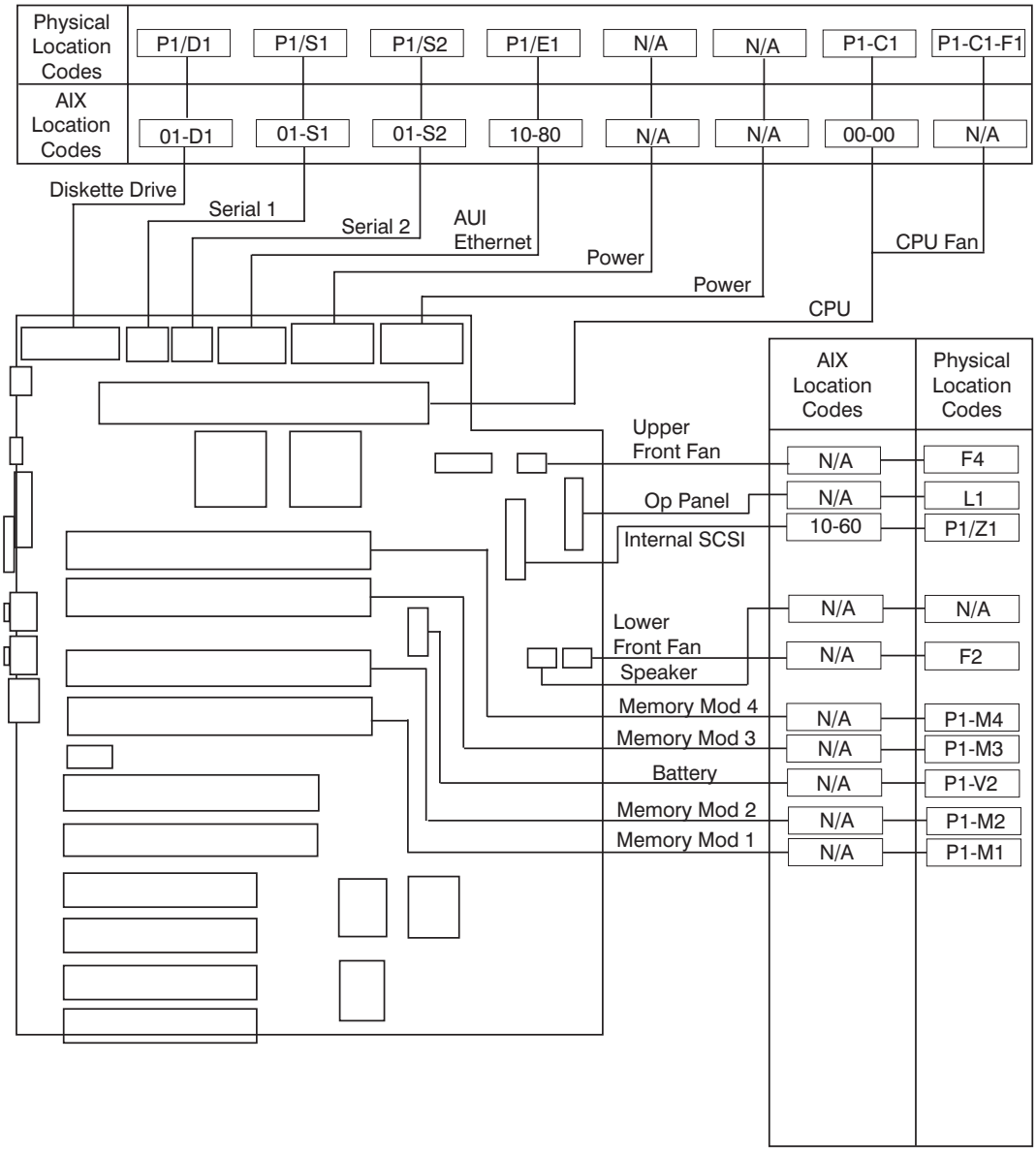
- Device attached to SCSI controller:

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

AIX and Physical Location Code Reference Table



Note: Also see the figure on the following page for P1/E1.



Note: Also see the figure on the previous page for P1/E1.

Component Name	AIX Location Code	Physical Location Code	Physical Connection
Central Electronics Complex (CEC)			
System board	N/A	P1	N/A
Processor card	00-00	P1-C1	Processor connector J3
Memory DIMM 1	N/A	P1-M1	System board connector J1
Memory DIMM 2	N/A	P1-M2	System board connector J9
Memory DIMM 3	N/A	P1-M3	System board connector J2
Memory DIMM 4	N/A	P1-M4	System board connector J10
Integrated Devices			
Diskette Drive	01-D1-00-00	P1-D1	System board connector J13
Keyboard	01-K1-00-00	P1-K1	System board connector J78
Mouse	01-K1-01-00	P1-O1	System board connector J78
Diskette Port	01-D1	P1/D1	System board connector J13
Keyboard Port	01-K1-00	P1/K1	System board connector J78
Mouse Port	01-K1-01	P1/O1	System board connector J78
Tablet Port	01-Q1	P1/Q1	System board connector J7
Audio In/Out	01-Q2	P1/Q2	System board connector J16
Serial Port 1	01-S1	P1/S1	System board connector J6
Serial Port 2	01-S2	P1/S2	System board connector J37
Parallel Port	01-R1	P1/R1	System board connector J5
AUI Ethernet Port	10-80	P1/E1	System board connector J4,
RJ45 Ethernet Port	10-80	P1/E1	System board connector J24
Internal SCSI Port	10-60	P1/Z1	System board connector J30
External SCSI Port	10-61	P1/Z2	System board connector J55

Component Name	AIX Location Code	Physical Location Code	Physical Connection
PCI Host Bridge 1	00-FEEE00000	P1	
Pluggable Adapters			
Card in PCI Slot 1	20-58 to 20-5F or 2B-xx	P1-I1	System board connector J18
Card in PCI Slot 2	20-60 to 20-67 or 2C-xx	P1-I2	System board connector J17
PCI Host Bridge 0	00-FEF00000	P1	
Card in PCI Slot 3	10-68 to 10-6F or 1D-xx	P1-I3	System board connector J22
Card in PCI Slot 4	10-70 to 10-77 or 1E-xx	P1-I4	System board connector J21
Card in PCI Slot 5	10-78 to 10-7F or 1F-xx	P1-I5	System board connector J20
Card in PCI Slot 6	10-88 to 10-8F or 20-xx	P1-I6	System board connector J19
SCSI Devices			
Base CD-ROM Bay 1	10-60-00-1,0	P1-Z1-A1	
SCSI Device Bay 2	10-60-00-2,0	P1-Z1-A2	
DASD Bay 4	10-60-00-4,0	P1-Z1-A4	
DASD Bay 5	10-60-00-5,0	P2-Z1-A5	
DASD Bay 6	10-60-00-6,0	P1-Z1-A6	
Fans			
Top Front Fan		F4	System board fan connector J32
Bottom Front Fan		F2	System board fan connector J33
Rear Fan		F3	System board fan connector J34
Processor Card Heatsink Fan		P1-C1-F1	Processor card heatsink fan connector J1
Operator Panel			
Operator panel		L1	System board connector J14
Power Supply			
Power supply		V1	
Battery			
Battery		P1-V2	System board connector B1
System VPD module			

Component Name	AIX Location Code	Physical Location Code	Physical Connection
System VPD module		L1-N1	

Notes:

1. The physical location code for the PCI slots, when empty, uses the P1/Ix notation, where the '/' identifies an integrated device (in this case the empty slot). A PCI device plugged into the slot uses the P1-Ix notation, where the '-' identifies a plugged device.
2. The SCSI bus IDs are the recommended values. The SCSI IDs shown for media devices indicate how the devices are set when they are shipped from the factory. Field installations may not comply with these recommendations.

Specifications

The mechanical packaging, cooling, power supply, and environmental requirements for the system unit are as follows:

Dimensions

With pedestal:

- Height - 490 mm (19.25 inches)
- Depth - 515 mm (20.25 inches)
- Width - 200 mm (7.9 inches)

Weight

Minimum Base Configuration - 17.7 Kg (39 Lbs)

Maximum Base Configuration - 20.4 Kg (45 Lbs)

Operating Environment

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

Humidity - 8% to 80% noncondensing

Maximum Altitude - 2135 m (7000 feet)

Power Source Loading

Typical Configuration - 0.4 kVA

Maximum - 0.6 kVA

Power Requirements

Maximum - 390 watts

Typical power requirements not to exceed 250 watts.

Power Factor

0.96

Operating Voltage

100 to 127V ac; 50 to 60 Hz

200 to 240V ac; 50 to 60 Hz

Heat Output

Typical - 850 Btu/hr

Maximum - 1330 Btu/hr

Maximum - 240 joules/sec

Acoustics

5.5 Bels operating

5.4 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 the following:

- 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 10. Parts Information” on page 257 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 owner of the system unit is responsible to correct any unsafe conditions.

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 correctly 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 plug and the metal frame of the device.

13. Install the covers.

Chapter 2. Diagnostics Overview

44P Model 170 systems use an integrated set of software diagnostic procedures to facilitate isolation of failing components and system maintenance. This book, along with the *Diagnostic Information for Multiple Bus Systems*, is the basis of the diagnostic procedures for 44P Model 170 servers. In particular, “Chapter 4. Checkpoints” on page 67, “Chapter 5. Error Code to FRU Index” on page 95, “Chapter 6. Loading the System Diagnostics” on page 141, and “Chapter 10. Parts Information” on page 257, in this book are important for the trained service representative to understand and use when isolating a failure on the system.

The manufacturer recommends that systems configured with 4GB of memory or greater have access to a 4mm or 8mm tape drive for submission of system dump information if required. This function can be accomplished through locally attached or network-attached devices, as appropriate.

Maintenance Analysis Procedures (MAPs)

Maintenance Analysis Procedures (MAPs) guide the trained service person through the 44P Model 170 server. These MAPs are the entry point for all isolation and error recovery procedures. The MAPs are consistent with existing procedures and methods. 44P Model 170 servers use a set of integrated procedures, mentioned earlier, to which the MAPS are the primary entry point.

The MAPS are as follows:

- Entry MAP
- Quick Entry MAP
- Problem Determination MAP
- Power MAP
- Minimum Configuration MAP

The Entry Map is the starting point for problem determination. The purpose of this MAP is to quickly point to the appropriate MAP or service reference information either in this book, or in the common book set, which includes the *Diagnostic Information for Multiple Bus Systems* and *PCI Adapter Placement Reference*.

The Quick Entry MAP is a subset of the Entry MAP and helps to save time for some types of problems.

The Problem Determination MAP provides a structured analysis method to get an error code if one is not provided by the customer, or if diagnostics cannot be loaded.

The Power MAP deals with isolation of components to diagnose a power problem. Power problems can be related to powering up and powering down the system, or power failures that occur after power is turned on.

The Minimum Configuration MAP is used to locate defective components not found by normal diagnostics or error-isolation methods. This MAP provides a systematic method of isolation to the failing item or items.

Checkpoints

44P Model 170 servers use various types of checkpoints, error codes, and SRNs, which are referred to throughout this book (primarily in “Chapter 4. Checkpoints” on page 67, “Chapter 5. Error Code to FRU Index” on page 95, “Chapter 6. Loading the System Diagnostics” on page 141, and “Chapter 10. Parts Information” on page 257). These codes may appear in the service processor boot progress log, the AIX error log, and the operator panel display. Understanding the definition and relationships of these codes is important to the service personnel who are installing or maintaining 44P Model 170 servers.

Codes that can appear on the operator panel or in error logs are as follows:

Checkpoints

Checkpoints display in the operator panel from the time AC power is connected to the system until the AIX login prompt is displayed after a successful operating system boot. These checkpoints have the following forms:

E000 - E075

These checkpoints display from the time ac power is connected to the system until the

```
0K
```

prompt displays on the operator panel display. During this time, the service processor performs self-test and NVRAM initialization.

E0A0 - E0E1

When power up is initiated, the service processor starts built-in self-test (BIST) on the central electronics complex (CEC). VPD data are read.

E0E2 - E2xx

This range indicates that the system processor is in control and is initializing system resources.

E3xx These codes indicate that the system processor is running memory tests.

E1xx The system firmware attempts to boot from devices in the boot list. Control is passed to AIX when E105 (normal mode boot) or E15B (service mode boot) displays on the operator panel display.

0xxx 0xxx codes are AIX checkpoints and configuration codes. Location codes may also be shown on the operator panel display during this time.

Error Codes

If a fault is detected, an 8-digit error code is displayed in the operator panel display. A location code may be displayed at the same time on the second line of the display.

Checkpoints can become error codes if the system fails to advance past the point at which the code was presented.

For a list of checkpoints, see “Chapter 4. Checkpoints” on page 67. Each entry provides a description of the event and the recommended action if the system fails to advance.

SRNs Service request numbers, in the form xxx-xxx, may also be displayed on the operator panel display and be noted in the AIX error log.

SRNs are listed in the *Diagnostic Information for Multiple Bus Systems*.

FRU Isolation

For a list of error codes and recommended actions for each code, see “Chapter 5. Error Code to FRU Index” on page 95. These actions can refer to “Chapter 10. Parts Information” on page 257, “Chapter 3. Maintenance Analysis Procedures (MAPs)” on page 31, or provide informational message and directions. If a replacement part is indicated, direct reference is made to the part name. The respective AIX and physical location codes are listed for each occurrence as required. For a list of locations codes, see “AIX and Physical Location Code Reference Table” on page 16.

To look up part numbers and view component diagrams, see “Chapter 10. Parts Information” on page 257. The beginning of the chapter provides a parts index with the predominant field replaceable units (FRUs) listed by name. The remainder of the chapter provides illustrations of the various assemblies and components which make up 44P Model 170 systems.

Electronic Service Agent for the RS/6000

Service support for the 44P Model 170 can be enhanced through the use of the application program, Electronic Service Agent for the RS/6000. This application provides a number of advantages for the 44P Model 170 customer, including automatic error reporting and analysis without customer intervention. The Electronic Service Agent kit ships with the 44P Model 170 server and includes the following:

- Electronic Service Agent for the RS/6000 program on CD-ROM
- The manual *Electronic Service Agent for the RS/6000 User’s Guide*.

If the manual is not included, it can be downloaded from the following website: ftp://ftp.software.ibm.com/aix/.

Using the Service Processor and Electronic Service Agent Features

The service processor and Electronic Service Agent features protect users against unnecessary system downtime by advising support personnel (both internal and external) of any unexpected changes in the system environment. In combination, the two features provide a flexible solution to automated system maintenance.

Service Processor

The service processor runs on its own power boundary and continually monitors hardware attributes, the AIX operating system, and the environmental conditions within the system. Any system failure which prevents the system from coming back to an operational state (a fully functional AIX operating system) is reported by the service processor. The service processor is controlled by firmware and does not require the AIX operating system to be operational to perform its tasks. If any system failures are detected, the service processor can take predetermined corrective actions. The methods of corrective actions are:

- Surveillance
- Call home
- AIX operating system monitoring

Surveillance is a function in which the service processor monitors the system through heartbeat communication with the system firmware. The *heartbeat* is a periodic signal that the firmware can monitor. During system startup, the firmware surveillance monitor is automatically enabled to check for heartbeats from the firmware. If a heartbeat is not detected within a default period, the service processor cycles the system power and attempts to restart until the system either restarts successfully, or a predetermined retry threshold is reached. In the event the service processor is unsuccessful in bringing the system online (or in the event that the user asked to be alerted to any service processor-assisted restarts), the system can call home to report the error.

The call home function can be initialized to call either a service center telephone number, a customer administration center, or a digital pager telephone number. The service processor can be configured to stop at the first successful call to any of the numbers listed, or can be configured to call every number provided. If connected to the service center, the service processor transmits the relevant system information (the system's serial number and model type) and service request number (SRN). If connected to a digital pager service, the service processor inputs a customer voice telephone number defined by the customer. An established sequence of digits or the telephone number to a phone near the failed system could be used to signal a system administrator to a potential system failure.

During normal operations, the service processor can also be configured to monitor the AIX operating system. If AIX does not respond to the service processor heartbeat, the service processor assumes the operating system is hung. The service processor can automatically initiate a restart and, if enabled, initiate the call home function to alert the appropriate people to the system hang. Enabling operating system surveillance also enables AIX to detect any service processor failures and report those failures to the Electronic Service Agent application.

Unlike the Electronic Service Agent, the service processor cannot be configured in a client/server environment where one system can be used to manage all dial-out functionally for a set of systems.

Prior to installing the Electronic Service Agent feature, ensure that you have the latest levels of system and service processor firmware. You also need a properly configured modem. For more information on configuring a modem, see “Appendix C. Modem Configurations” on page 271.

Electronic Service Agent

The Electronic Service Agent is a software extension to the AIX operating system that monitors the system while the AIX operating system is running. The Electronic Service Agent monitors and analyzes all recoverable system failures, and, if needed, can automatically place a service call to a service center (without user intervention).

The service center receives the machine type/serial number, host name, SRN, and a problem description. The service center analyzes the problem report and, if warranted, dispatches a service person to the customer site. The service center also determines if any hardware components need to be ordered prior to the service person’s arrival.

The Electronic Service Agent code also gives the user the option to establish a single system as the problem reporting server. A single system, accessible over the user network, can be used as the central server for all the other systems on the local area network (LAN) that are running the Electronic Service Agent application. If the Electronic Service Agent application on a remote client decides a service request needs to be placed, the client forwards the information to the Electronic Service Agent server, which dials the service center telephone number from its locally attached modem. In this scenario, the user only needs to maintain a single analog line for providing call-out capabilities for a large set of servers.

When used in a Scalable Parallel (SP) environment, a client/server type implementation is configured. The Electronic Service Agent client code runs on each of the SP nodes. The server component runs on the control workstation. In the event of any system failures, the relevant information is transmitted to the control workstation through the integrated Ethernet. Once alerted to the system failure, the control workstation initiates actions to prepare and send the service request.

A modem is required for enabling automated problem reporting to the IBM service center. Configuration files for several types of modems are included as part of the Electronic Service Agent package. Refer to “Appendix C. Modem Configurations” on page 271 for more information on configuring your modem.

Chapter 3. Maintenance Analysis Procedures (MAPs)

This chapter contains Maintenance Analysis Procedures (MAPs) for the 44P Model 170.

Notes:

1. 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 nonvolatile random access memory (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.
2. 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 12.
3. Licensed programs frequently rely on network configuration and system information stored on the vital product data (VPD) on the operator panel control assembly. If the MAPs indicate that the operator panel control assembly should be replaced, contact the support center and obtain the instructions and password which allow entry of the correct machine type, model number and serial number into the VPD storage module. If the existing VPD module must be replaced, call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys for licensed programs might be required.
4. If a network adapter or the system 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 might 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.

Quick Entry MAP

Use the following table to determine your starting point.

Quick Entry MAP Table of Contents

Problem Description	Page No.
Service Actions	32
System Stops With an 8-Digit Number Displayed	32
System Stops With a 4-Digit Number Displayed	32
System Stops With a 3-Digit Number Displayed	32
System Stops or Hangs With Alternating Numbers Displayed in the Operator Display Panel.	33
There Appears to be a Display Problem (Distortion, Blurring,Etc.)	33
Power and Cooling Problems	33
Flashing 888 in Operator Panel Display	35
Other Symptoms or Problems	35

Problem Description	Page No.
You Cannot Find the Symptom in this Table	38

Symptom	Action
Service Actions	
You have parts to exchange or a corrective action to perform.	1. Go to the “Chapter 9. Removal and Replacement Procedures” on page 209. 2. Go to "MAP 410: Repair Checkout" in the *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 *Diagnostic Information for Multiple Bus Systems*.
You need to verify correct system operation.	Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.
System Stops With An 8-Digit Number Displayed	
The system stops with an 8-digit error code displayed in the operator panel display or on the console.	Record the error code. Go to “Chapter 5. Error Code to FRU Index” on page 95.
System Stops With A 4-Digit Number Displayed	
The system stops and a 4-digit number is displayed in the operator panel display or on the console.	If the number displayed has the format ″E0xx″ then go to “Service Processor Checkpoints” on page 67. If the number displayed is in the range ″E1xx-EFFF″, make note of any location code that is displayed on the second line of the operator panel. If the location code indicates a card slot (e.g. P2-I3), replace the card in the indicated slot. If this does not correct the problem, then go to “Firmware Checkpoints” on page 71. 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 *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.
System Stops With A 3-Digit Number Displayed	

Symptom	Action
The system stops and a 3-digit number is displayed in the operator panel display or on the console.	Record SRN 101-xxx, where **xxx** is the three-digit number displayed in the operator panel, then go to the ″Fast Path MAP″ in the *Diagnostic Information for Multiple Bus Systems*.
System Stops or Hangs With Alternating Numbers Displayed in the Operator Display Panel	
The operator panel display alternates between the code ″E1FD″ and another ″Exxx″ code.	Record both codes. Go to ″E1FD″ in “Firmware Checkpoints” on page 71.
The operator panel display alternates between the codes ″E1DE″ and ″E1AD″.	Record both codes. Go to ″E1DE″ in “Firmware Checkpoints” on page 71.
Display Problem (Blank, Distortion, Blurring, Etc.).	
All display problems.	• If using a graphics display: 1. Go to the *Problem Determination Procedures* for the display. 2. If you do not find a problem, replace the display adapter. 3. If you do not find a problem, suspect the system board. Go to “MAP 1540: Minimum Configuration” on page 52. • If the problem is with the ASCII terminal: 1. Make sure that the ASCII terminal is connected to S1. 2. If problems persist, go to the *Problem Determination Procedures* for the terminal. 3. If you do not find a problem, suspect the system board. Go to “MAP 1540: Minimum Configuration” on page 52.
Power and Cooling Problems	
The power LEDs on the operator panel and power supply do not start blinking within 30 seconds of ac power application and the operator panel display is blank.	Go to ″MAP 1520: Power″“Step 1520-2” on page 48.
The power LEDs on the operator panel and power supply are blinking and the operator panel display is blank.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48

Symptom	Action
The power LED on the operator panel is on solid, the power LED on the power supply is blinking and the operator panel display is blank. When the power on switch on the operator panel is pressed, there is no indication of activity. The power LED on the power supply does not change from blinking to solid and none of the fans, including the fan in the power supply, start to turn.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48
The power LEDs on the operator panel and power supply are blinking and OK, STBY or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, there is no indication of activity. None of the power LEDs change from blinking to solid and none of the fans, including the fan in the power supply, start to turn.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48
The power LEDs on the operator panel and power supply are blinking and OK, STBY or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, the power LEDs change from blinking to solid and the system begins to power on, but the power LEDs on the operator panel and power supply do not stay on and the system powers off.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48
The power LED on the operator panel is on solid, the power LED on the power supply is blinking and OK, STBY or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, there is no indication of activity. The power LED on the power supply does not change from blinking to solid and none of the fans, including the fan in the power supply, start to turn.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48
The power LEDs on the operator panel and power supply are blinking and OK, STBY or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, the power LEDs change from blinking to solid, the fans come on and stay on but the system does not power on.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48

Symptom	Action
The power LED on the operator panel is on solid, the power LED on the power supply is blinking and OK, STBY or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, the power LED on the operator panel changes from blinking to solid, the fans come on and stay on but the system does not power on.	Go to ″MAP 1520: Power″ “Step 1520-3” on page 48
Flashing 888 in Operator Panel Display	
888 is displayed in the operator panel.	Go to the ″Fast Path MAP″ in the *Diagnostic Information for Multiple Bus Systems*.
Other Symptoms or Problems	
You have OK displayed.	The service processor is ready. Go to ″MAP 0020: Problem Determination Procedure″ in the *Diagnostic Information for Multiple Bus Systems*.
You have STBY displayed.	The service processor is ready. The system was shut down by the operating system and is still powered on. This condition can be requested by a privileged system user with no faults. See the service processor error log for possible operating system fault indications.
The system POST indicators are displayed on the system console, the system pauses and then restarts. The term ″POST indicators″ refers to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	Go to “Boot Problems/Concerns” on page 90.
The system stops and POST indicators are displayed on the system console. The term ″POST indicators″ refers to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	Go to “MAP 1540: Minimum Configuration” on page 52 to isolate the problem.
The system stops and the message ″STARTING SOFTWARE PLEASE WAIT...″ is displayed on the ASCII terminal, or the boot indicator  is displayed on a graphics terminal.	Go to “Chapter 4. Checkpoints” on page 67.

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. • 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 system board. (See notes on 31.) • If entering the password from a keyboard which is attached to an ASCII terminal, use the *Problem Determination Procedures* for the ASCII terminal. Make sure the ASCII terminal is connected to S1. Replace the system board if these procedures do not reveal a problem. • If the problem is fixed, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*. If the problem persists, go to “MAP 1540: Minimum Configuration” on page 52 to isolate the problem.
No codes are displayed on the operator panel within a few seconds of turning on the system. The operator panel is blank before the system is powered on.	Reseat the operator panel cable. If the problem is not resolved, replace these parts in the following order: 1. Operator panel assembly. Update the VPD information in the new operator panel. 2. System board (See notes on page 31.) If the problem is fixed, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*. If the problem persists, go to “MAP 1540: Minimum Configuration” on page 52 to isolate the problem.

Symptom	Action
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 system board if connected to one of the two integrated SCSI controllers on the system board). (See notes on 31 if the system board 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.
The System Management Services menu is displayed.	The device or media you are attempting to boot from may be faulty. 1. Check the SMS error log for any errors. To check the error log: a. Choose error log from the utilities menu. b. If an error is logged, check the time stamp. c. If the error was logged during the current boot attempt, record it. d. Look up the error in “Chapter 4. Checkpoints” on page 67 and perform the listed action. e. If no recent error is logged in the error log, continue to the next step below. 2. Try to boot from an alternate boot device connected to the same controller as the original boot device. If the boot succeeds, replace the original boot device. For removable media devices, try the media first. 3. Go to “MAP 1540: Minimum Configuration” on page 52.
You have a problem that does not prevent the system from booting.	Go to the ″Fast Path MAP″ in the *Diagnostic Information for Multiple Bus Systems*.
You have an SRN.	Go to the ″Fast Path MAP″ in the *Diagnostic Information for Multiple Bus Systems*.

Symptom	Action
You suspect a cable problem.	See the *Adapters, Devices, and Cable Information for Multiple Bus Systems*.
You do not have a symptom.	Go to ″MAP 0020: Problem Determination Procedure″ in the *Diagnostic Information for Multiple Bus Systems*.
You have not determined a symptom.	Go to “MAP 1020: Problem Determination”.
You Cannot Find the Symptom in this Table	
All other problems.	Go to “MAP 1020: Problem Determination”.

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 *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).

Be prepared to record code numbers and use those numbers in the course of analyzing a problem. Go to “Step 1020-1” on page 39.

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 the system was set up according to the recommendations of the User’s Guide, all the settings of the service processor (except language) were saved by using the SAVE/RESTORE HARDWARE MAINTENANCE POLICIES service aid. You can use that same service aid to restore the settings at the end of your service action.

In case the service processor settings were not saved by the user, if you disable them, make notes of their current settings so that you can restore them before you leave.

In addition to the parameters in the table below, you might want to disconnect the modem to prevent incoming signals that could cause the system to power on.

The following service processor settings may be of interest to you. The service processor menus are described in “Service Processor Menus” on page 144.

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.

Step 1020-1

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

Note: Before doing the following procedure be aware that:

- You are asked questions regarding the operator panel display.
- You are also asked to perform certain actions based on displayed POST indicators.

1. Insert the diagnostic CD-ROM into the CD-ROM drive.
2. Turn off the power.
3. Turn on the power.
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 a password, if requested.
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. Run the recovery procedure for the flash EPROM. See “Firmware Recovery” on page 195.
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 diagnostic operating instructions are displayed.	Go to ″MAP 0020: Problem Determination Procedure″ in the *Diagnostic Information for Multiple Bus Systems*.

Symptom	Action
The system login prompt is displayed.	You may not have pressed the correct key or you may not have pressed the key soon enough when you were to indicate a service mode IPL of the diagnostic programs. If this was the case, start over at the beginning of this step. **Note:** Perform the system 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".
The system does not respond when the password is entered.	Go to "Step 1020-2".
The system stopped and a POST indicator is displayed on the system console and an 8-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 41.
The system stops and a 4-digit number is displayed in the operator panel display.	If the number displayed has the format ″E0xx″, then go to "Service Processor Checkpoints" on page 67. If the number is in the range of ″E1xx-EFFF″ then go to "Firmware Checkpoints" on page 71. 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 *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 System Management Services is displayed.	Go to "Step 1020-4" on page 41.
All other symptoms.	If you were directed here from the Entry MAP, go to "MAP 1540: Minimum Configuration" on page 52. Otherwise, find the symptom in the "Quick Entry MAP" on page 31.

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 World Trade (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 8-digit error code in "Chapter 5. Error Code to FRU Index" on page 95.

   Note: If the 8-digit error code is not listed in "Chapter 5. Error Code to FRU Index" on page 95, look for it in the following:

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

     Note: Service aids can be found in *Diagnostic Information for Multiple Bus Systems*.

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 Error Log from the utilities menu
   - 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 5. Error Code to FRU Index" on page 95 and perform the listed action.
   - If no recent error is logged in the error log, go to "MAP 1540: Minimum Configuration" on page 52.

MAP 1240: Memory Problem Resolution

Note: The firmware checkpoint that sent you here could be one of the following: E122, E213, E214, E218, E220 or E3xx. These checkpoints are referred to as ″a memory checkpoint″ in this MAP.

Purpose of This MAP

This MAP is used to troubleshoot a problem during the memory test when the system stops at a memory checkpoint and no error code is displayed on the operator panel.

Notes:

1. If the symptom changes while you are using this MAP, check for loose cards, cables, and obvious problems. If you do not find a problem, go to “MAP 1540: Minimum Configuration” on page 52.
2. 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).
3. The service processor may have been set by the user to monitor service operations and to attempt recoveries. You might want to disable these actions while you diagnose and service the system. If you disable them, make notes of their current settings so that you can restore them before you leave. The following settings may be of interest to you.

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.

General Memory Information

Be sure to unplug the power cable before removing or installing the memory DIMMs to avoid damage to them.

Refer to “Memory Modules” on page 223 for locations of the memory DIMMs and instructions on removing and installing memory DIMMs.

Memory DIMMs must be installed in matched (size and speed) pairs. The memory connector pairs are J1, J2 and J9, J10. There is no requirement that memory DIMM connectors J1 and J2 be populated before J9 and J10 are populated.

Note: The memory connectors are located on the system board for this machine type and model. The connector J numbers are printed on the board next to each connector.

Step 1240-1

1. Ensure that the diagnostics and the operating system are shut down.
2. Turn off the power.
3. Remove and reinstall any installed memory DIMMs.
4. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Re-seating the memory DIMMs has corrected the problem.

Go to ″Map 0410: Repair Checkout″ in the *Diagnostic Information for Multiple Bus Systems*.

YES If there is only one pair of memory DIMMs installed, go to “Step 1240-6” on page 44.

If there is a second pair of memory DIMMs installed, go to “Step 1240-2”.

Step 1240-2

1. Turn off the power.
2. Remove the memory DIMMs from connectors J9 and J10.
3. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to “Step 1240-3”.

YES Go to “Step 1240-6” on page 44.

Step 1240-3

1. Turn off the power.
2. Remove the memory DIMMs from connectors J1 and J2.
3. Install the memory DIMMs removed from connectors J9 and J10 in their original locations.
4. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to “Step 1240-4” on page 44.

YES Go to “Step 1240-6” on page 44.

Step 1240-4

1. Turn off the power.
2. Install the memory DIMMs removed from connectors J1 and J2 in their original locations.
3. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Re-seating the memory DIMMs has corrected the problem.

Go to ″MAP 0410: Repair Checkout″ in the *Diagnostic Information for Multiple Bus Systems*.

YES Go to “Step 1240-5”.

Step 1240-5

1. Turn off the power.
2. Exchange the following FRUs in the order listed.
   - System board
   - Processor card
3. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to ″MAP 0410: Repair Checkout″ in the *Diagnostic Information for Multiple Bus Systems*.

YES 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 FRUs have been exchanged, go to “MAP 1540: Minimum Configuration” on page 52.

Step 1240-6

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

1. Turn off the power.
2. Exchange the last pair of memory DIMMs installed.
3. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to “Step 1240-8” on page 45.

YES Go to “Step 1240-7” on page 45.

Step 1240-7

One of the FRUs remaining in the system is defective.

1. Turn off the power.
2. Exchange the following FRUs in the order listed.
   - System board
   - Processor card
3. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to ″MAP 0410: Repair Checkout″ in the *Diagnostic Information for Multiple Bus Systems*.

YES Reinstall the original FRU.

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

If the symptom did not change and all FRUs have been exchanged, go to “MAP 1540: Minimum Configuration” on page 52.

Step 1240-8

Memory DIMMs you exchanged in the previous step might be defective. To isolate the failing memory DIMM, do the following:

1. Turn off the power.
2. Re-install one of the memory DIMMs you exchanged in the previous step.
3. Turn on the power.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Repeat this step with the second memory DIMM you exchanged in the previous step.

If both memory DIMMs have been tested, go to ″MAP 0410: Repair Checkout″ in the *Diagnostic Information for Multiple Bus Systems*.

YES Replace the memory DIMM.

If you have not tested both memory DIMMs, repeat this step with the second memory DIMM you exchanged in the previous step.

If the symptom did not change and both memory DIMMs have been exchanged, go to “Step 1240-7”.

MAP 1520: Power

Notes:

1. This is not a start of call MAP. Use this Power MAP only if you have been directed here from another MAP, an SRN in the *Diagnostic Information for Multiple Bus Systems*, or an error code.
2. The 44P Model 170 has power LEDs located on the operator panel and the power supply. When the system is powered off, both LEDs should be blinking. When the system is powered on, both LEDs should be on solid.

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 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 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 might have been directed to this MAP for several reasons:

- The power LEDs on the operator panel and power supply do not start blinking within 30 seconds of AC power application and the operator panel is blank.

  Go to “Step 1520-2” on page 48.
- The power LEDs on the operator panel and power supply are blinking and the operator panel is blank.

  Go to “Step 1520-3” on page 48.
- The power LED on the operator panel is on solid, the LED on the power supply is blinking and the operator panel is blank. When the power on switch on the operator panel is pressed there is no indication of activity, the power LED on the power supply does not change from blinking to solid and none of the fans, including the power supply fan, start to turn.

  Go to “Step 1520-3” on page 48.
- The power LEDs on the operator panel and power supply are blinking, and OK, STBY, or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, there is no indication of activity, none of the power LEDs change from blinking to solid, and none of the fans, including the fan in the power supply, start to turn.

  Go to “Step 1520-3” on page 48.
- The power LEDs on the operator panel and power supply are blinking, and OK, STBY, or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, the power LEDs change from blinking to solid and the system begins to power on, but the power LEDs on the operator panel and power supply do not stay on and the system powers off.

  Go to “Step 1520-3” on page 48.
- The power LED on the operator panel is on solid, the power LED on the power supply is blinking, and OK, STBY, or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed there is no indication of activity, the power LED on the power supply does not change from blinking to solid and none of the fans, including the fan on the power supply, start to turn.

  Go to “Step 1520-3” on page 48.
- The power LEDs on the operator panel and power supply are blinking, and OK, STBY, or DIAG STBY is displayed on the operator panel display. When the power on switch on the operator panel is pressed, the power LEDs change from blinking to solid, the fans come on and stay on but the system does not power on.

  Go to “Step 1520-3” on page 48.
- The power LEDs on the operator panel is on solid, the power LED on the power supply is blinking, and OK, STBY, or DIAG STBY is displayed on the operator panel

display. When the power on switch on the operator panel is pressed, the power LED on the operator panel changes from blinking to solid, the fans come on and stay on, but the system does not power on.

Go to “Step 1520-3”.

- An SRN in *Diagnostic Information for Multiple Bus Systems* listed “MAP 1520: Power” on page 46 in the ″Action/Description″ column for a voltage sensor out of range.
- An error code listed “MAP 1520: Power” on page 46 in the ″Action/Possible Failing FRU″ column for an overcurrent condition.

  Go to “Step 1520-3”.

Step 1520-2

1. Unplug the power cord from the system unit and the power outlet.
2. Check that the external power cord to the system unit has continuity.
3. Check that the power outlet has been wired correctly with the correct voltage.
4. Plug the power cord into the system unit and the power outlet.

Did you find a problem?

NO Go to “Step 1520-3”.

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

Step 1520-3

1. Unplug the power cord from the system unit.
2. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
3. Press and hold the power on switch on the operator panel for a few seconds to discharge the power supply.
4. Unplug the power connectors in the following order: P1, P2, P11, P5/P8, P6, P7/P10.
5. Plug the power cord into the system unit.

Does the power LED on the power supply start blinking within 30 seconds after applying AC power?

NO Replace the power supply. Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Go to “Step 1520-4” on page 49.

Step 1520-4

1. Unplug the power cord from the system unit.
2. Press and hold the power on switch on the operator panel for a few seconds to discharge the power supply.
3. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
4. Remove the power supply as described in “Power Supply” on page 248.
5. Refer to “Power Supply Test Switch Procedure” on page 249, then return to this step and answer the following question.

Does the fan in the power supply turn on and the power LED on the power supply change from blinking to solid while you hold the switch? (When you release the switch, the power supply turns off)

NO Replace the power supply. Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Go to “Step 1520-5”.

Step 1520-5

The power supply is working normally.

1. Unplug the power cord from the power supply.
2. Reinstall the power supply.
3. Reconnect the power connectors (P1, P2, P11).
4. Plug the power cord into the power supply.

If a cooling fan does not turn, the system attempts to power up and then off when the power on switch on the operator panel is pressed (but not when the switch on the power supply is pressed and held).

While holding the power supply switch, do all the cooling fans turn?

NO Replace the faulty cooling fan. Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Exchange the operator panel electronics assembly. Go to “Step 1520-6”.

Step 1520-6

Press the power on switch on the operator panel to turn on the power.

Does the power LED on the operator panel come on and stay on?

NO Reinstall the original operator panel electronics assembly if it was exchanged in “Step 1520-5”. Go to “Step 1520-7” on page 50.

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

Step 1520-7

1. Unplug the power cord from the system unit.
2. Record the slot numbers of the PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
3. Remove all the memory DIMMs.
4. Unplug the power cables from all the SCSI devices.
5. Unplug the fan power connectors (J1, J32, J33 and J34).

   Note: If the system has the optional DASD fan installed, the DASD fan will be plugged into J32 and the top front fan will be plugged into the extension on the DASD fan power connector. Unplug the top front fan from the extension.
6. Plug the power cord into the system unit.
7. Press the power on switch on the operator panel to turn on the power.

Does the power LED on the operator panel come on and stay on?

NO Go to "Step 1520-8".

YES Go to "Step 1520-9" on page 51.

Step 1520-8

The processor card, system board, or power supply is defective.

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

1. Processor card
2. System board
3. Power supply

Press the power-on switch on the operator panel to turn on the power after each FRU is exchanged. If the power stays on, the most recently exchanged FRU was causing the failure.

1. Unplug the power cord from the system unit.
2. Exchange one of the FRUs in the list.
3. Plug the power cord into the system unit.
4. Press the power on switch on the operator panel to turn on the power.

Does the power LED on the operator panel 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, call service support 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 47 in this MAP and follow the instructions for the new symptom.

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

Step 1520-9

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

1. Memory DIMM pair J1 and J2
2. Memory DIMM pair J9 and J10
3. Optional DASD fan (if installed)
4. Top front fan

   Note: Plugs into the extension on the DASD fan power connector, if the DASD fan is present, otherwise plugs into J32.
5. Bottom front fan
6. Rear fan
7. Processor fan
8. SCSI power cable(s), lowest bay to highest bay
9. Adapter cards, lowest slot to highest slot.

Press the power-on switch on the operator panel to turn on the power after each part is installed or connected. If the system does not power on or the power does not stay on, the most recently installed or connected part is causing the failure.

1. Turn off the power.
2. Unplug the power cord from the system unit.
3. Install or connect one of the parts in the list.
4. Plug the power cord into the system unit.
5. Press the power on switch on the operator panel to turn on the power.

Does the power LED on the operator panel come on and stay on?

NO Replace the last part you installed.

Repeat these steps until all the parts have been installed or connected.

If the symptom did not change and all the parts have been installed or connected, call service support 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 47 in this MAP and follow the instructions for the new symptom.

YES Repeat these steps until all the parts have been installed or connected.

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

MAP 1540: Minimum Configuration

Notes:

1. Be sure to unplug the power cable before removing or installing processor card(s), memory DIMM(s), or the system board 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 might have recorded one or more symptoms in its error log. It is a good idea to examine that error log before proceeding (see “System Information Menu” on page 155).
6. The service processor might have been set by the user to monitor server operations and to attempt recoveries. You might want to disable these actions while you diagnose and service the system. If you disable them, make notes of their current settings so that you can restore them before you leave. The following settings may be of interest to you.

Surveillance	From the Service Processor Setup Menu, go to the Surveillance Setup Menu and disable surveillance.
Unattended Start Mode	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: a. Number of reboot attempts to **0** (zero) b. Use OS-Defined restart policy to **No** c. 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. Insert the diagnostic CD-ROM into the CD-ROM drive.

   Note: If you cannot insert the diagnostic CD-ROM, go to “Step 1540-2” on page 53.
2. Ensure that the diagnostics and the operating system are shut down.

3. Turn off the power.
4. Turn on the power.
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 if you are prompted to do so.

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

NO Go to "Step 1540-2".

YES Go to "Step 1540-15" on page 61.

Step 1540-2

1. Turn off the power.
2. If you have not already done so, configure the service processor with the instructions in note 6 on page 52 and then return here and continue.
3. Exit the service processor menus and remove the power cable.
4. Disconnect all external cables (parallel, serial port 1, serial port 2, keyboard, mouse, tablet, AUI Ethernet, RJ-45 Ethernet, SCSI, and so on) from the system board.
5. Remove the side cover.
6. Record the slot numbers of the PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
7. Record the slot numbers of the memory DIMMs. Remove all memory DIMMs except for one pair.

   Note: Memory DIMMs must be installed in pairs and in the correct connectors. For example, install the memory DIMM pair in connectors J1 and J2 (pair B) on the system board.
8. Disconnect the SCSI cable from the internal SCSI connector (J30) on the system board.
9. Disconnect the signal and power connectors from all the SCSI devices except the CD-ROM drive.
10. Disconnect the diskette drive cable from the diskette drive connector (J13) on the system board.
11. Plug in the power cable and wait for the OK on the operator panel display.
12. Turn on the power.

Does the system stop with code E1F2, E1F3, STBY or 4BA00830 displayed on the operator panel?

NO Go to "Step 1540-3" on page 54.

YES If a second pair of memory DIMMs was removed, go to "Step 1540-4" on page 54.

If the system has only one pair of memory DIMMs, go to “Step 1540-8” on page 56.

Step 1540-3

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

Note: If a memory DIMM is exchanged, ensure that the new module is the same size and speed as the original module.

1. Turn off the power, remove the power cable, and exchange the following FRUs in the order listed:
   a. Processor card
   b. Memory DIMMs in odd-numbered slot (J1, J9)
   c. Memory DIMMs in even-numbered slot (J2, J10)
   d. System board (see notes on page 31)
   e. Power supply.
2. Plug in the power cable and wait for the OK on the operator panel display.
3. Turn on the power.

Does the system stop with code E1F2, E1F3, STBY or 4BA00830 displayed on the operator panel?

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 service support 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 52 in this MAP and follow the instructions for the new symptom.

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

Step 1540-4

No failure was detected with this configuration.

1. Turn off the power and remove the power cable.
2. Install the second pair of memory DIMMs.
3. Plug in the power cable and wait for the OK on the operator panel display.
4. Turn on the power.

Does the system stop with code E1F2, E1F3, STBY or 4BA00830 displayed on the operator panel?

NO Go to “Step 1540-5” on page 55.

YES Go to “Step 1540-9” on page 57.

Step 1540-5

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

1. Turn off the power and remove the power cable.
2. Exchange the last pair of memory DIMMs installed.

   Note: Ensure that the new memory DIMMs are the same size and speed as the original memory DIMMs.
3. Plug in the power cable and wait for the OK on the operator panel display.
4. Turn on the power.

Does the system stop with code E1F2, E1F3, STBY or 4BA00830 displayed on the operator panel?

NO Go to “Step 1540-7”.

YES Go to “Step 1540-6”.

Step 1540-6

One or both of the memory DIMMs you exchanged in the previous step might be defective. To isolate the failing memory DIMM, do the following:

1. Turn off the power and remove the power cable.
2. Reinstall one of the memory DIMMs you exchanged in the previous step.
3. Plug in the power cable and wait for the OK on the operator panel display.
4. Turn on the power.

Does the system stop with code E1F2, E1F3, STBY or 4BA00830 displayed on the operator panel?

NO Replace the memory DIMM.

If you have not tested both memory DIMMs, repeat this step with the second memory DIMM you exchanged in the previous step.

If the symptom did not change and both memory DIMMs have been exchanged, go to “Step 1540-7”.

YES Repeat this step with the second memory DIMM you exchanged in the previous step.

If both memory DIMMs have been tested, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Step 1540-7

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

1. Turn off the power and remove the power cable.
2. Exchange the following FRUs in the order listed:
   - System board (See notes on page 31)
   - Power supply

3. Plug in the power cable and wait for the OK on the operator panel display.
4. Turn on the power.

Does the system stop with code E1F2, E1F3, STBY or 4BA00830 displayed on the operator panel?

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 service support 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 52 in this MAP, and follow the instructions for the new symptom.

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

Step 1540-8

1. Turn off the power.
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 S1 connector on the rear of the system unit.

   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 on the power.
4. If the ASCII terminal or graphics display (including display adapter) is 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 to start SMS.
6. Enter the appropriate password if you are prompted to do so.

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 that device. 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)

4. System board (See notes on page 31)

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

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

If the symptom has changed, check for loose cards, cables, and obvious problems, return to "Step 1540-1" on page 52 in this MAP, and follow the instructions for the new symptom.

YES Go to "Step 1540-9".

Step 1540-9

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
2. Turn off the power and remove the power cable.
3. Plug the SCSI cable into the SCSI connector on the system board.
4. Plug in the power cable and wait for the OK on the operator panel display.
5. Turn on the power.
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.
7. Enter the appropriate password if you are 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. CD-ROM drive
3. System board (see notes on page 31)
4. Processor card
5. 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 service support for assistance.

If the symptom changed, check for loose cards, cables and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 52 and follow the instructions for the new symptom.

YES Go to "Step 1540-10".

Step 1540-10

The system is working correctly for this configuration. One of the SCSI devices that you disconnected might be defective.

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.

2. Turn off the power and remove the power cable.
3. Connect the signal and power connectors to one of the SCSI devices (CD-ROM drive, tape drive, disk drive, and so on).
4. Plug in the power cable and wait for the OK on the operator panel display.
5. Turn on the power.
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 if you are 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, and so on)
3. System board (see notes on page 31)
4. Processor card
5. 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 service support 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 52 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 1540-11”.

Step 1540-11

The system is working correctly with this configuration. The diskette drive might be defective.

1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
2. Turn off the power and remove the power cable.
3. Plug the diskette drive cable into the diskette drive connector on the system board.
4. Plug in the power cable and wait for OK on the operator panel display.
5. Turn on the power.
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 if you are 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. Diskette drive
2. Diskette drive cable
3. System board (see notes on page 31)
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 service support 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 52 in this MAP and follow the instructions for the new symptom.

YES Go to “Step 1540-12”.

Step 1540-12

The system is working correctly with this configuration. One of the devices that you disconnected from the system board might be defective.

1. Turn off the power and remove the power cable.
2. Attach a system board device cable (parallel, serial port 1, serial port 2, AUI/RJ45 Ethernet, Ultra-2 SCSI, tablet, keyboard or mouse) that had been removed.
3. Plug in the power cable and wait for OK on the operator panel display.
4. Turn on the power.
5. If the Console Selection screen is displayed, choose the system console.
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 if you are prompted to do so.

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

NO The last device or cable that you attached is defective.

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

1. Device and cable (the last one attached)
2. System board (see the note on page 31)

If the symptom did not change and all the FRUs have been exchanged, call service support 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 52 in this MAP and follow the instructions for the new symptom.

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

YES Repeat this step until all of the devices are attached.

Go to “Step 1540-13”.

Step 1540-13

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

1. Turn off the power and remove the power cable.
2. Install a FRU (adapter) and connect any cables and devices that were attached to it.
3. Plug in the power cable and wait for OK on the operator panel display.
4. Turn on the power.
5. If the Console Selection screen is displayed, choose the system console.
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 if you are prompted to do so.

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

NO Go to “Step 1540-14”.

YES Repeat this step until all of the FRUs (adapters) are installed.

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

Step 1540-14

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 off the power and remove the power cable.
3. Starting with the last installed adapter, disconnect one attached device and cable.
4. Plug in the power cable and wait for OK on the operator panel display.
5. Turn on the power.
6. If the Console Selection screen is displayed, choose the system console.
7. After the keyboard indicator displays, press the F5 key on the directly attached keyboard or the number 5 key on an ASCII terminal keyboard.
8. Enter the appropriate password if you are 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 exchanged.

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

1. Adapter (last one installed)
2. System board (see notes on page 31)
3. Power supply

If the symptom did not change and all the FRUs have been exchanged, call service support 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 52 in this MAP and follow the instructions for the new symptom.

YES The last device or cable that you disconnected is defective.

Exchange the defective device or cable.

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

Step 1540-15

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 Initialize 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 from selecting the console display.
4. Select Advanced Diagnostics Routines.
5. If 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 supplemental media, select option 1.
6. When the DIAGNOSTIC MODE SELECTION screen is displayed, press Enter.
7. Select All Resources (if you were sent here from “Step 1540-19” on page 62 select the adapter/device you loaded from the supplemental media).

Did you get an SRN?

NO Go to “Step 1540-17” on page 62.

YES Go to “Step 1540-16”.

Step 1540-16

Look at the FRU part numbers associated with the SRN.

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

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 system board or a network adapter is removed, see notes on page 31.

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

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

Step 1540-17

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

NO Go to “Step 1540-18”.

YES Go to “Step 1540-19”.

Step 1540-18

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

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

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

Step 1540-19

Select Task Selection.

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

Supplemental media must be loaded and processed one at a time.

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

NO Go to “Step 1540-20”.

YES Press F3 to return to the FUNCTION SELECTION screen.

Go to “Step 1540-15” on page 61, substep 4.

Step 1540-20

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. System board (see notes on page 31)

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

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

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 service support 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 52 in this MAP and follow the instructions for the new symptom.

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

Step 1540-21

1. Ensure that the diagnostics and the operating system are shut down.
2. Turn off the power.
3. If you have not already done so, configure the service processor with the instructions in note 6 on page 52 and then return here and continue.
4. Exit the service processor menus and remove the power cable.
5. Remove the side cover.
6. Record the slot numbers of the PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
7. Plug in the power cable and wait for OK on the operator panel display.
8. Turn on the power.

Does the system stop with the same error code displayed on the operator panel that directed you to this MAP step?

NO Go to “Step 1540-23” on page 64.

YES Go to “Step 1540-22”.

Step 1540-22

One of the FRUs remaining in the system unit is defective. Do the following:

1. Turn off the power.
2. Remove the power cable.
3. Replace the following FRUs in the order listed:
   a. Processor card
   b. System board (see notes on page 31).
4. Plug in the power cable and wait for OK on the operator panel display.
5. Turn on the power.

Does the system stop with the same error code displayed on the operator panel that directed you to this MAP step?

NO Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Reinstall the original FRU. Then go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*

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, return to “Step 1540-2” on page 53 in this MAP.

Step 1540-23

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

1. Turn off the power.
2. Remove the power cable.
3. Install a FRU (adapter) and connect any cables and devices that were attached to it.
4. Plug in the power cable and wait for OK on the operator panel display.
5. Turn on the power.
6. If the Console Selection screen is displayed, choose the system console.
7. Enter the appropriate password if you are prompted to do so.

Does the system stop with the same error code displayed on the operator panel that directed you to this MAP step?

NO Repeat this step until all of the FRUs (adapters) are installed, then go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Go to “Step 1540-24”.

Step 1540-24

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

1. Turn off the power.
2. Remove the power cable.
3. Starting with the last installed adapter, disconnect one attached device and cable.
4. Plug in the power cable and wait for OK on the operator panel display.
5. Turn on the power.
6. If the Console Selection screen is displayed, choose the system console.
7. Enter the appropriate password if you are prompted to do so.

Does the system stop with the same error code displayed on the operator panel that directed you to this MAP step?

NO The last device or cable that you disconnected is defective.

Exchange the defective device or cable.

Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*

YES Repeat this step until the defective device or cable is identified or all of the devices and cables have been disconnected.

If all of 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. System board (see notes on page 31)

If the problem is fixed after changing the above FRUs, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*

If the symptom did not change and all the FRUs have been exchanged, return to “Step 1540-2” on page 53 in this MAP.

Chapter 4. Checkpoints

Checkpoints let users and service personnel know what the server is doing, with some detail, while 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 regarding 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 more appropriate symptoms in the service processor error log. See “System Information Menu” on page 155. To access the System Information Menu, refer to “Privileged User Menus” on page 146.

Unresolved Checkpoint Problems

Go to “MAP 1540: Minimum Configuration” on page 52 for any of the following problems:

- A 4-digit code in the range of E000 through EFFF is displayed on the operator panel display but is not listed in “Service Processor Checkpoints” or “Firmware Checkpoints” on page 71.
- A 4-digit code is displayed and is listed in “Service Processor Checkpoints” or “Firmware Checkpoints” on page 71, but there are no repair actions or FRUs listed for the code.
- All of the FRUs listed in the repair actions have been replaced, and the problem has not been resolved.

Service Processor 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 71.

If you replace FRUs or perform an action, and the problem is still unresolved, go to “MAP 1540: Minimum Configuration” on page 52 unless otherwise indicated in the tables.

If you replace FRUs or perform an action, and the problem is corrected, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Table 1. Service Processor Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
DIAG STBY	Service processor is ready. The system unit was shutdown in service mode by the operating system; however, the system unit 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.

Table 1. Service Processor Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E000	System support controller begins operation. This is an informational checkpoint.	Call support.
E010	Starting service processor self-tests	Replace the system board. (See note 3 on page 95.)
E011	Service processor self-tests completed successfully	Not Applicable
E012	Begin to set up service processor helps	Replace the system board. (See note 3 on page 95.)
E020	Configuring CMOS	Replace the system board. (See note 3 on page 95.)
E021	Configuring NVRAM	1. Manually drain the NVRAM by removing the battery. Short circuit the battery leads for at least 30 seconds. Use a conductive object such as the battery for this purpose. 2. Replace the system board. (See note 3 on page 95.)
E022	Accessing system board VPD	Replace the system board. (See note 3 on page 95.)
E025	Service processor accessing VPD.	Replace the system board. (See note 3 on page 95.)
E026	Service processor accessing VPD.	Replace the system board. (See note 3 on page 95.)
E030	Beginning to build I^2C resources	1. Replace the processor card. 2. Replace the system board. (See note 3 on page 95.)
E031	Finished building I^2C resources	Replace the system board. (See note 3 on page 95.)
E032	JTAG self-test	Replace the system board. (See note 3 on page 95.)
E040	Starting serial port tests	Replace the system board. (See note 3 on page 95.)
E042	Configuring serial port 1	Replace the system board. (See note 3 on page 95.)
E043	Configuring serial port 2	Replace the system board. (See note 3 on page 95.)
E044	Preparing to set serial port line speed	Replace the system board. (See note 3 on page 95.)
E045	Preparing to disconnect serial port	Replace the system board. (See note 3 on page 95.)
E050	Reading system VPD	Operator panel. (See note 2 on page 95.)
E051	Reading processor card VPD	Replace the processor card.

Table 1. Service Processor Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E053	Reading system VPD	Replace the system board. (See note 3 on page 95.)
E054	Reading system board VPD	Replace the system board. (See note 3 on page 95.)
E055	Reading power supply VPD	Power supply
E060	Preparing to auto power-on (AC restored)	1. Replace the system board. (See note 3 on page 95.) 2. Replace the processor card.
E061	Preparing to auto power-on (Timer)	1. Replace the system board. (See note 3 on page 95.) 2. Replace the processor card.
E070	Configuring modem	1. Try a different modem configuration from the service processor menus. 2. Check the cabling between the modem and the system unit. 3. Replace the modem. 4. Replace the system board. (See note 3 on page 95.)
E072	Preparing to call home	1. Try a different modem configuration from the service processor menus. 2. Check the cabling between the modem and the system unit. 3. Replace the modem. 4. Replace the system board. (See note 3 on page 95.)
E075	Entering service processor menus	1. Check the cable that connects the display to the serial port. 2. Unplug the power cable. 3. Plug in the power cable. 4. Clear NVRAM, then unplug the power cable. 5. Plug in the power cable. 6. Verify that the display is functional. 7. Replace the system board. (See note 3 on page 95.)
E076	Leaving service processor menus; attempting to disconnect modems	1. Try a different modem configuration from the service processor menus. 2. Check the cabling between the modem and the system unit. 3. Replace the modem. 4. Replace the system board. (See note 3 on page 95.)

Table 1. Service Processor Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E080	Entering service processor recovery flash update process.	1. Do the following flash recovery procedure: a. Insert a newly formatted DOS diskette loaded with service processor firmware into the diskette drive. The file name must be *spflash.img*. **Note:** Insert the diskette after checkpoint E080 is displayed on the operator panel. b. Shutdown the system unit and unplug the power cable. c. Plug in the power cable, power-on the system unit. 2. Retry item 1 with a newly formatted DOS diskette. 3. Replace the system board. (See note 3 on page 95.)
E081	Flash update completed - system reboot in progress	1. Unplug the power cable. 2. Plug in the power cable, power-on the system unit. 3. Do the following flash recovery procedure: a. Insert a newly formatted DOS diskette loaded with service processor firmware into the diskette drive. The file name must be *spflash.img*. **Note:** Insert the diskette after checkpoint E080 is displayed on the operator panel. b. Shutdown the system unit and unplug the power cable. c. Plug in the power cable, power-on the system unit. 4. Retry the flash recovery procedure with a newly formatted DOS diskette. 5. Replace the system board.
E0A0	Beginning bring-up phase	1. Replace the processor card. 2. Replace the system board. (See note 3 on page 95.)
E0B0	Starting processor BIST	1. Check the service processor error logs for failing FRUs. 2. Replace the processor card. 3. Replace the system board. (See note 3 on page 95.)

Table 1. Service Processor Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E0C0	Starting X5 BIST	1. Replace the processor card. 2. Replace the system board. (See note 3 on page 95.)
E0D0	Creating JTAG scanlog (This procedure could take several minutes.)	Not Applicable
E0E0	Pulling processor card out of the reset state.	1. Replace the processor card. 2. Replace the system board. (See note 3 on page 95.)
E0E1	Pull processor card out of reset: okay	See “Error Codes E0E1 and 40A00000 Recovery Procedure” on page 136
OK	Servie Processor Ready. Waiting for power-on normal operation	Press the system units power button to power-on the system unit.
STBY	Servie Processor Ready. System was shut down 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 can be useful in diagnosing certain problems. Service processor checkpoints are listed in “Service Processor Checkpoints” on page 67.

If you replace FRUs or perform an action, and the problem is still unresolved, go to “MAP 1540: Minimum Configuration” on page 52 unless otherwise indicated in the tables.

If you replace FRUs or perform an action, and the problem is corrected, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Table 2. Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E100	Reserved/Unused	See “Unresolved Checkpoint Problems” on page 67.
E101	Video enabled, extended memory test	See “Unresolved Checkpoint Problems” on page 67.
E102	Firmware restart	See “Unresolved Checkpoint Problems” on page 67.
E103	Set memory refresh (composite img)	See “Unresolved Checkpoint Problems” on page 67.
E104	Set memory refresh (recovery block)	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E105	Transfer control to operating system (normal boot).	See “Boot Problems/Concerns” on page 90.
E108	Run recovery block base memory (test 2K), set stack	See “Unresolved Checkpoint Problems” on page 67.
E109	Copy CRC verification code to RAM	See “Unresolved Checkpoint Problems” on page 67.
E10A	Turn on cache	See “Unresolved Checkpoint Problems” on page 67.
E10B	Flush cache	See “Unresolved Checkpoint Problems” on page 67.
E10C	Jump to CRC verification code in RAM	See “Unresolved Checkpoint Problems” on page 67.
E10D	Compute composite image CRC	See “Unresolved Checkpoint Problems” on page 67.
E10E	Jump back to ROM	See “Unresolved Checkpoint Problems” on page 67.
E10F	Transfer control to open firmware	See “Unresolved Checkpoint Problems” on page 67.
E110	Turn off cache, check if composite image CRC is valid	See “Unresolved Checkpoint Problems” on page 67.
E111	Good CRC - jump to composite image	See “Unresolved Checkpoint Problems” on page 67.
E112	Bad CRC - initialize base memory, stack	See “Unresolved Checkpoint Problems” on page 67.
E113	Bad CRC - copy uncompressed recovery block code to RAM	See “Unresolved Checkpoint Problems” on page 67.
E114	Bad CRC - jump to code in RAM	See “Unresolved Checkpoint Problems” on page 67.
E115	Bad CRC - turn on cache	See “Unresolved Checkpoint Problems” on page 67.
E116	Bad CRC - copy recovery block data section to RAM	See “Unresolved Checkpoint Problems” on page 67.
E117	Bad CRC - Invalidate and flush cache, set TOC	See “Unresolved Checkpoint Problems” on page 67.
E118	Bad CRC - branch to high level recovery control routine.	See “Unresolved Checkpoint Problems” on page 67.
E119	Initialize base memory, stack	See “Unresolved Checkpoint Problems” on page 67.
E11A	Copy uncompressed recovery block code to RAM	See “Unresolved Checkpoint Problems” on page 67.
E11B	Jump to code in RAM	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E11C	Turn on cache	See “Unresolved Checkpoint Problems” on page 67.
E11D	Copy recovery block data section to RAM	See “Unresolved Checkpoint Problems” on page 67.
E11E	Invalidate and flush cache, set TOC	See “Unresolved Checkpoint Problems” on page 67.
E11F	Branch to high level control routine.	See “Unresolved Checkpoint Problems” on page 67.
E120	Initialize I/O and early memory block	See “Unresolved Checkpoint Problems” on page 67.
E121	Initialize service processor	See “Unresolved Checkpoint Problems” on page 67.
E122	No memory detected (system lockup) **Note:** Disk drive light is on continuously.	Go to “MAP 1240: Memory Problem Resolution” on page 42.
E123	No memory module found in socket.	See “Unresolved Checkpoint Problems” on page 67.
E124	Disable defective memory bank	See “Unresolved Checkpoint Problems” on page 67.
E125	Clear PCI devices command	See “Unresolved Checkpoint Problems” on page 67.
E126	Check valid image - start	See “Unresolved Checkpoint Problems” on page 67.
E127	Check valid image - successful	See “Unresolved Checkpoint Problems” on page 67.
E128	Disable interrupts, set initial vectors for open firmware.	See “Unresolved Checkpoint Problems” on page 67.
E129	Validate target RAM address	See “Unresolved Checkpoint Problems” on page 67.
E12A	Copy ROM to RAM, flush cache	See “Unresolved Checkpoint Problems” on page 67.
E12B	Set MP operational parameters	See “Unresolved Checkpoint Problems” on page 67.
E12C	Set MP CPU node characteristics	See “Unresolved Checkpoint Problems” on page 67.
E12D	Park secondary processors in parking lot	See “Unresolved Checkpoint Problems” on page 67.
E12E	Primary processor sync	See “Unresolved Checkpoint Problems” on page 67.
E12F	Unexpected return from open firmware (system lockup)	See “Unresolved Checkpoint Problems” on page 67.
E130	Build device tree	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E131	Create root node	See “Unresolved Checkpoint Problems” on page 67.
E132	Create CPUs node	See “Unresolved Checkpoint Problems” on page 67.
E133	Create L2 cache node	See “Unresolved Checkpoint Problems” on page 67.
E134	Create memory node	See “Unresolved Checkpoint Problems” on page 67.
E135	Create memory module node	See “Unresolved Checkpoint Problems” on page 67.
E136	Test memory	See “Unresolved Checkpoint Problems” on page 67.
E137	Create openprom node	See “Unresolved Checkpoint Problems” on page 67.
E138	Create options node	See “Unresolved Checkpoint Problems” on page 67.
E139	Create aliases node and system aliases	See “Unresolved Checkpoint Problems” on page 67.
E13A	Create packages node	See “Unresolved Checkpoint Problems” on page 67.
E140	Loading boot image	See “Unresolved Checkpoint Problems” on page 67.
E149	Create boot manager node	See “Unresolved Checkpoint Problems” on page 67.
E14C	Create terminal-emulator node	See “Unresolved Checkpoint Problems” on page 67.
E14D	Initiate boot image loading	See “Boot Problems/Concerns” on page 90.
E14E	Create client interface node/directory	See “Unresolved Checkpoint Problems” on page 67.
E14F	NVRAM validation, configure variable token generation	See “Unresolved Checkpoint Problems” on page 67.
E150	Create host (primary) PCI controller node	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E151	Probing PCI bus	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See "Bus SRN to FRU Reference Table" on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See "Unresolved Checkpoint Problems" on page 67.
E152	Probing for the adapter FCODE; evaluate if present.	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See "Bus SRN to FRU Reference Table" on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See "Unresolved Checkpoint Problems" on page 67.
E153	End adapter FCODE probe/evaluation	Go to MAP 1540: Minimum Configuration, "Step 1540-22" on page 63.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E154	Create PCI bridge node	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See “Bus SRN to FRU Reference Table” on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See “Unresolved Checkpoint Problems” on page 67.
E155	Probing PCI bridge secondary bus	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See “Bus SRN to FRU Reference Table” on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E156	Create PCI Ethernet node	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See "Bus SRN to FRU Reference Table" on page 137. • Replace the system board. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See "Unresolved Checkpoint Problems" on page 67.
E15A	Create 64 bit host (primary) PCI controller node	See "Unresolved Checkpoint Problems" on page 67.
E15B	Transferring control to operating system (service mode boot)	See "Boot Problems/Concerns" on page 90.
E15C	Probe primary 64 bit PCI bus	See "Unresolved Checkpoint Problems" on page 67.
E15D	Create host PCI controller node	See "Unresolved Checkpoint Problems" on page 67.
E15E	Create MPIC node	See "Unresolved Checkpoint Problems" on page 67.
E15F	Adapter VPD probe	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See "Bus SRN to FRU Reference Table" on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See "Unresolved Checkpoint Problems" on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E160	CPU node VPD creation	See “Unresolved Checkpoint Problems” on page 67.
E161	Root node VPD creation	See “Unresolved Checkpoint Problems” on page 67.
E162	Service processor node VPD creation	See “Unresolved Checkpoint Problems” on page 67.
E164	Create PCI graphics node (P9)	See “Unresolved Checkpoint Problems” on page 67.
E168	Create PCI graphics node (S3)	See “Unresolved Checkpoint Problems” on page 67.
E170	Start of PCI bus probe	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See “Bus SRN to FRU Reference Table” on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See “Unresolved Checkpoint Problems” on page 67.
E171	Executing PCI-Delay function	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E172	First pass PCI device probe	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See “Bus SRN to FRU Reference Table” on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See “Unresolved Checkpoint Problems” on page 67.
E174	Establish host connection	Refer to “Boot Problems/Concerns” on page 90 for general considerations.
E175	BootP request	Refer to “Boot Problems/Concerns” on page 90 for general considerations. 1. Turn off then on, and retry the boot operation. 2. Verify boot list by using the firmware SMS Multiboot menus. 3. Verify the network connection (network could be down). 4. Have network administrator verify the server configuration for this client.
E176	TFTP file transfer	Refer to “Boot Problems/Concerns” on page 90 for general considerations. 1. Turn off then on, and retry the boot operation. 2. Verify boot list by using the firmware SMS Multiboot menus. 3. Verify the network connection (network could be down). 4. Have network administrator verify the server configuration for this client.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E177	Transfer failure due to TFTP error condition	Refer to "Boot Problems/Concerns" on page 90 for general considerations. 1. Turn off then on, and retry the boot operation. 2. Verify boot list by using the firmware SMS Multiboot menus. 3. Verify the network connection (network could be down). 4. Have network administrator verify the server configuration for this client.
E178	Create PCI token ring node	See "Unresolved Checkpoint Problems" on page 67.
E17B	Processor frequency measurement	1. Replace battery, restore NVRAM data (passwords, startup data) 2. Replace the system board. See note 3 on page 95.
E180	Service processor command setup	See "Unresolved Checkpoint Problems" on page 67.
E183	Service Processor POST	See "Unresolved Checkpoint Problems" on page 67.
E190	Create ISA node	See "Unresolved Checkpoint Problems" on page 67.
E193	Initialize Super I/O.	See "Unresolved Checkpoint Problems" on page 67.
E196	Probe ISA bus.	See "Unresolved Checkpoint Problems" on page 67.
E19B	Create service processor node.	See "Unresolved Checkpoint Problems" on page 67.
E19C	Create tablet node.	See "Unresolved Checkpoint Problems" on page 67.
E19D	Create NVRAM node.	See "Unresolved Checkpoint Problems" on page 67.
E19E	Real time clock (RTC) creation and initialization.	Refer to error code 28030xxx in "Firmware/POST Error Codes" on page 96.
E19F	Create EEPROM node.	See "Unresolved Checkpoint Problems" on page 67.
E1AD	Alternating pattern of E1AD and E1DE is used to indicate a default catch condition before the firmware ″checkpoint″ word is available	1. Replace the system board. (See note 3 on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E1B0	Create LPT node.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67/
E1B1	Create serial node.	See “Unresolved Checkpoint Problems” on page 67.
E1B2	Create audio node.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E1B3	Create 8042 node.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E1B6	Probe for (ISA) keyboard.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E1BA	Enable L2 cache.	See “Unresolved Checkpoint Problems” on page 67.
E1BB	Set cache parameters for burst.	See “Unresolved Checkpoint Problems” on page 67.
E1BC	Set cache parameters for 512KB.	See “Unresolved Checkpoint Problems” on page 67.
E1BD	Probe for (ISA) mouse.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E1BE	Create operator panel node.	See “Unresolved Checkpoint Problems” on page 67.
E1BF	Create power management node.	See “Unresolved Checkpoint Problems” on page 67.
E1C5	Create ISA interrupt controller (PIC) node.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E1C6	Create DMA node.	1. Replace the system board. (See note 3 on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E1D0	Create PCI SCSI node.	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See “Bus SRN to FRU Reference Table” on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See “Unresolved Checkpoint Problems” on page 67.
E1D3	Create SCSI block device node.	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See “Bus SRN to FRU Reference Table” on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E1D4	Create SCSI byte device node (ST).	1. If a location code is associated with the checkpoint: • Replace the FRU identified by the location code. • Replace, one at a time, the other PCI adapter cards on the same PCI bus. See "Bus SRN to FRU Reference Table" on page 137. • Replace the system board. See note 3 on page 95. If a network adapter or system board is replaced, see note 3 on page 95. 2. Replace the system board. See note 3 on page 95. 3. See "Unresolved Checkpoint Problems" on page 67.
E1DB	Create a (floppy) diskette controller (FDC) node.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
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 desired 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 system board. (See notes on page 95.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the system 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
E1DD	Early processor exception	Replace the system board. (See notes on page 95.) See “Unresolved Checkpoint Problems” on page 67.
E1DE	Alternating pattern of E1DE and E1AD is used to indicate a default catch condition before the firmware ″checkpoint″ word is available.	Replace the system board. (See notes on page 95.) See “Unresolved Checkpoint Problems” on page 67.
E1DF	Create diskette drive (disk) node	See “Unresolved Checkpoint Problems” on page 67.
E1E0	Program flash	See “Unresolved Checkpoint Problems” on page 67.
E1E1	Flash update complete	See “Unresolved Checkpoint Problems” on page 67.
E1E2	Initialize system I/O	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E1E3	PReP boot image initialization.	See “Unresolved Checkpoint Problems” on page 67.
E1E4	Initialize Super I/O with default values.	See “Unresolved Checkpoint Problems” on page 67.
E1E5	XCOFF boot image initialization.	See “Unresolved Checkpoint Problems” on page 67.
E1E6	Set up early memory allocation heap.	See “Unresolved Checkpoint Problems” on page 67.
E1E7	PE boot image initialization.	See “Unresolved Checkpoint Problems” on page 67.
E1E8	Initialize primary diskette drive (polled mode).	See “Unresolved Checkpoint Problems” on page 67.
E1E9	ELF boot image initialization.	See “Unresolved Checkpoint Problems” on page 67.
E1EA	Firmware flash corrupted, load from diskette.	1. Ensure that the diskette installed contains recovery image appropriate for this system unit. Refer to “Checking the Current Firmware Levels” on page 291. 2. If the diskette is installed with the correct recovery image, then suspect: a. Diskette b. Diskette drive c. Diskette cable d. Replace the system board. (See notes on page 95.) 3. See “Unresolved Checkpoint Problems” on page 67
E1EB	Verify flash EPROM recovery image.	1. Ensure that the diskette installed contains recovery image appropriate for this system unit. Refer to “Checking the Current Firmware Levels” on page 291. 2. If the diskette is installed with the correct recovery image, then suspect: a. Diskette b. Diskette drive c. Diskette cable d. Replace the system board. (See notes on page 95.) 3. See “Unresolved Checkpoint Problems” on page 67

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E1EC	Get recovery image entry point	See “Unresolved Checkpoint Problems” on page 67.
E1ED	Invalidate instruction cache	See “Unresolved Checkpoint Problems” on page 67.
E1EE	Jump to composite image	See “Unresolved Checkpoint Problems” on page 67.
E1EF	Erase flash	See “Unresolved Checkpoint Problems” on page 67.
E1F0	Start OBE	See “Unresolved Checkpoint Problems” on page 67.
E1F1	Begin self-test sequence on boot device(s)	See “Unresolved Checkpoint Problems” on page 67.
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 “Quick Entry MAP” on page 31 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 “Quick Entry MAP” on page 31 with the symptom ″All display problems.″
E1F5	Build boot device list.	See “Unresolved Checkpoint Problems” on page 67.
E1F6	Determine boot device sequence.	See “Unresolved Checkpoint Problems” on page 67.
E1F7	No boot image located.	Use the System Management Services menus to modify the boot Sequence (also known as boot list) to include devices that are known to contain a copy of the operating system. 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.
E1FB	Scan SCSI bus for attached devices.	See “Unresolved Checkpoint Problems” on page 67.

Table 2. Firmware Checkpoints. (continued)

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 52.
E201	Setup PHB BARC addresses.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E202	Initialize PHB registers and PHB's PCI configuration registers.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E203	Look for PCI to ISA bridge.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E204	Setup ISA bridge, PCI config. registers, and initialize	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E206	Check for 50 MHz device on PCI bus in slot 1P or 2P.	1. Replace the system board. (See notes on page 95.) 2. I/O adapter in PCI slot 1P or 2P. 3. See "Unresolved Checkpoint Problems" on page 67.
E207	Setup data gather mode and 64/32-bit mode on PCG.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E208	Assign bus number on PCG.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E209	Assign PCI I/O addresses on PCI.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.
E20A	Assign PCI I/O addresses on PCG.	1. Replace the system board. (See notes on page 95.) 2. See "Unresolved Checkpoint Problems" on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E20B	Check MCERs stuck at fault.	1. Replace the system board. (See notes on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E20C	Testing L2 cache.	1. Replace the processor card. 2. See “Unresolved Checkpoint Problems” on page 67.
E210	Processors L1 data cache array test fails. System hangs.	Replace the system board. (See note 3 on page 95.)
E211	IPL ROS CRC checking.	1. Replace the system board. (See notes on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E212	Processor POST.	1. Replace the processor card. (See notes on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E213	Initial memory configuration.	Go to “MAP 1240: Memory Problem Resolution” on page 42.
E214	Memory test.	Go to “MAP 1240: Memory Problem Resolution” on page 42.
E216	Copy ROS into RAM. Setup translation and C environment.	1. Replace the memory card. (See notes on page 95.) 2. See “Unresolved Checkpoint Problems” on page 67.
E218	Memory test.	Go to “MAP 1240: Memory Problem Resolution” on page 42.
E21A	System has good memory	See note on page “Unresolved Checkpoint Problems” on page 67.
E220	Final memory configuration.	Go to “MAP 1240: Memory Problem Resolution” on page 42.
E240	Setup Winbond ISA bridge.	Replace the system board. (See note 3 on page 95.)
E241	Reset PCI Bus.	Replace the system board. (See note 3 on page 95.)
E242	Initialize ISA DMA channel.	Replace the system board. (See note 3 on page 95.)
E243	Setup configuration registers.	Replace the system board. (See note 3 on page 95.)
E244	Enable system speaker and send a beep.	Replace the system board. (See note 3 on page 95.)

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E246	System firmware corrupted, take recovery path.	Replace the system board. (See note 3 on page 95.)
E247	Capture memory module SPDs into NVRAM.	Replace the system board. (See note 3 on page 95.)
E249	Enter recover path's main code.	Replace the system board. (See note 3 on page 95.)
E297	Start firmware softload path execution.	See "Unresolved Checkpoint Problems" on page 67.
E298	Start firmware recovery path execution.	See "Unresolved Checkpoint Problems" on page 67.
E299	Start C code execution.	See "Unresolved Checkpoint Problems" on page 67.
E3xx	Memory test	See "MAP 1240: Memory Problem Resolution" on page 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 system board (See notes on page 95.) 3. See "Unresolved Checkpoint Problems" on page 67.
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 system board (See notes on page 95.) 3. See "Unresolved Checkpoint Problems" on page 67.
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 system board (See notes on page 95.) 3. See "Unresolved Checkpoint Problems" on page 67.
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 "Unresolved Checkpoint Problems" on page 67.
E600	SSA PCI adapter open firmware has run successfully.	1. Replace the SSA adapter. 2. See "Unresolved Checkpoint Problems" on page 67.

Table 2. Firmware Checkpoints. (continued)

Checkpoint	Description	Action/ Possible Failing FRU
E601	SSA PCI adapter BIST has been started but failed to complete after 4 seconds.	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E602	SSA PCI adapter open firmware has started.	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E603	SSA PCI adapter BIST has completed with an error.	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E604	SSA PCI adapter BIST and subsequent POSTs have completed successfully	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E605	SSA PCI adapter BIST has completed successfully, but the subsequent POSTs have failed.	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E60E	SSA PCI adapter open firmware about to exit (no stack corruption).	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E60F	SSA PCI adapter open firmware has run unsuccessfully.	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.
E6FF	SSA PCI adapter open firmware about to exit (with stack corruption)	1. Replace the SSA adapter. 2. See “Unresolved Checkpoint Problems” on page 67.

Boot Problems/Concerns

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 booting from CD-ROM or tape, watch for activity on the drive’s LED indicator. A blinking LED indicates that the loading of either the boot image or additional information required by the operating system being booted is still in progress. If the checkpoint is displayed for an extended period of time and the drive LED is not indicating any activity, there might be a problem loading the boot image from the device.

Note: 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 will still attempt to boot. Because time-out durations are necessarily long to accommodate retries, the system may appear to be hung.

This procedure assumes that a CD-ROM drive is connected to internal SCSI connector J30 and a diagnostics CD-ROM is available.

Step 1

Restart the system and access the firmware SMS Main Menu. Select **Multiboot**.

1. Check if the intended boot device is correctly specified in the boot sequence.
2. If the intended boot device is not correctly identified in the boot sequence, add it to the boot sequence using the SMS menus. If the intended boot device cannot be added to the boot sequence, go to step “Step 3” on page 92.
3. If attempting to boot from the network, go to step “Step 2”.
4. If attempting to boot from a disk drive or CD-ROM, go to step “Step 3” on page 92.

Step 2

If attempting to boot from the network:

1. Verify that IP parameters are correct.
2. Attempt to ″ping″ the target server using the SMS Ping utility. If the ping is not successful, have the network administrator verify the server configuration for this client.
3. Check with the network administrator to ensure that the network is up.
4. Check the network cabling to the adapter.
5. Turn the power Off, then On and retry the boot operation.

Step 3

Try to boot and run standalone diagnostics against the system, particularly against the intended boot device.

1. If the intended boot device is not listed in the ″NEW RESOURCE″ list, go to ″MAP 0290: Missing Resource Problem Resolution″ in the *Diagnostic Information for Multiple Bus Systems*.
2. If an SRN, not an 8-digit error code, is reported, go to the *Diagnostic Information for Multiple Bus Systems* manual.
3. If the diagnostics are successful, it may be necessary to perform an operating system-specific recovery process, or reinstall the operating system.
4. If unable to load standalone diagnostics, do the following:
   a. Verify proper SCSI bus termination
   b. Check SCSI cabling
   c. It is possible that another attached SCSI device is causing the problem. Do the following:
      1) Disconnect the signal and power cables from the disk drive cage backplane.
      2) Disconnect the disk drive(s) in the disk drive cage from the backplane.
      3) Disconnect the signal and power cables from any other SCSI devices attached to the SCSI adapter that the CD-ROM drive is attached to.
      4) Try to boot the standalone diagnostics again.
      5) If you are still unable to load standalone diagnostics go to step “Step 4”.
      6) If standalone diagnostics load, one of the disconnected devices is causing the problem. Reconnect the devices one at a time and retry the boot operation until the problem recurs and replace the device that caused the problem. (If the problem appears to be one of the disk drives in the disk drive cage, be aware it could be either the disk drive or the backplane.) Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Step 4

It is possible that another installed adapter is causing the problem. Do the following:

1. Remove all installed adapters except the one the CD-ROM drive is attached to and the one used for the console.
2. Try to boot the standalone diagnostics again.
3. If unable to load standalone diagnostics go to step 5.
4. If standalone diagnostics load, reinstall adapters (and attached devices as applicable) one at a time and retry the boot operation until the problem recurs. Then replace the adapter or device that caused the problem. (The system board can also cause the device or adapter to fail.) Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Step 5

The CD-ROM drive, SCSI cable, SCSI adapter, graphics adapter, or the system board is most likely defective. A TTY terminal attached to the serial port also can be used to determine if the graphics adapter is causing the problem. This is done by removing the graphics adapter, attaching a TTY to the serial port, and retrying standalone diagnostics. If the standalone diagnostics load, replace the graphics adapter.

1. Replace the CD-ROM drive.
2. Replace the SCSI cable.
3. If the CD-ROM drive is attached to a SCSI adapter rather than the integrated SCSI on the system board, replace the SCSI adapter.
4. Replace the system board.
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” on page 52.
6. Go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*

Chapter 5. 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 you are servicing the 44P Model 170.

Considerations for Using this Chapter

If you replace FRUs or perform an action and the problem is still not corrected, go to “MAP 1540: Minimum Configuration” on page 52, unless otherwise indicated in the tables.

If you replace FRUs or perform an action and the problem is corrected, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

General Considerations

If the codes in the following tables indicate a device that 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 41 to display the System Management Services error log and obtain a location code. Location code descriptions can be found under “Location Codes” on page 12.

After you have obtained the location code, see “Chapter 10. Parts Information” on page 257 for the part number.

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 12.
2. Licensed programs frequently rely on network configuration and system information stored on the VPD on the operator panel control assembly. 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 existing VPD module must 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 system 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 might 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.
4. For service processor menus, see “Chapter 7. Using the Service Processor” on page 143.

Performing Slow Boot

To fully analyze all of the available information, perform the following steps before doing a hardware repair or replacement, especially if the error is related to the CPU or memory:

1. Record the 8-character error code (and location code if present) displayed in the operator panel, or that was reported by the customer.
2. Do a slow-mode boot in service mode. This can be specified using the System Power Control Menu on the service processor main menu. (A fast-mode boot skips much of the built-in diagnostic testing.) A slow-mode boot may yield a new 8-character error code on the operator panel and new errors in the service processor error log. If a new error code is reported, use it in subsequent steps to continue problem analysis.

Firmware/POST Error Codes

If you replace FRUs or perform an action and the problem is still unresolved, go to “MAP 1540: Minimum Configuration” on page 52 unless otherwise indicated in the tables.

If you replace FRUs or perform an action, and the problem has been resolved, go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*, unless otherwise indicated in the tables.

The error codes listed in Table 3, in most cases, identify the failing device/FRU. Refer to “Appendix E. Interpreting Firmware Error Codes” on page 293 for information on interpreting 8-digit error codes. A physical location code may be displayed with the error code. If so, use the physical location code to identify the suspected FRU.

Table 3. Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
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 “Firmware Checkpoints” on page 71 table using code **E174**.
20A80003	Cannot get server hardware address.	Refer to “Firmware Checkpoints” on page 71 table using code **E174**.
20A80004	Bootp failed.	Refer to “Firmware Checkpoints” on page 71 table using code **E175**.
20A80005	File transmission (TFTP) failed.	Check network connection, try again.
20A80006	Image too large. Ran out of available firmware memory resources loading boot image.	1. Verify boot server configuration. 2. Contact your service support representative for assistance.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
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 41) for this error code. The location code (if present) in the error log entry should identify the location of the failing device.
20D00010	Self-test failed on device, cannot locate package.	Contact your service support representative for assistance.
20D00011	Instantiate RTAS failed.	Contact your service support person for assistance.
20E00000	Power-on password entry error.	The password has been entered incorrectly. Re-enter the password.
20E00001	Privileged-access password entry error.	The password has been entered incorrectly. Re-enter 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 the system board. (See notes on page 95.)
20E00008	CMOS corrupted or tampering evident, CMOS initialized.	1. Replace battery, restore NVRAM data (passwords, startup data). 2. Replace the system board. (See note 3 on page 95.)
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.
20E0000C	Failed to open RTC device tree node.	1. Turn off, turn on system unit. 2. Replace the system board. (See note 3 on page 95.)
20E00017	Cold boot needed for password entry.	Turn off, turn on system unit.
20EE0003	IP parameter requires 3 dots ″.″	Enter valid IP parameter. Example: 000.000.000.000

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
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 system board should always have (at least) 2 integrated PCI SCSI controllers; one internal and one external. Replace the system board. (See note 3 on page 95.)
20EE0007	Keyboard not found	1. Plug in keyboard. 2. Replace the system board. (See note 3 on page 95.)
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 the system board. (See note 3 on page 95.)
20EE0009	Unable to communicate with service processor	Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
20EE000A	Pointer to the operating system found in nonvolatile storage.	Values normally found in nonvolatile storage that point to the location of an operating system were not found. This can happen for either of two reasons: • Your installed operating system does not support storing the values. • Some event occurred that caused the system to lose nonvolatile 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. Refer to your AIX documentation for the exact syntax and usage of the **bootlist** command. To boot the operating system so that the above mentioned values can be reconstructed, power down the system 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, use the System Management Services menus to modify the boot sequence (also known as boot list) to include devices that are known to contain a copy of the operating system. 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 unable to find an operating system on the device list that was attempted.	Use the System Management Services menus to modify the boot sequence (also known as boot list) to include devices that are known to contain a copy of the operating system. 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. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
21A00xxx	SCSI DASD device errors	**Notes:** 1. Before replacing any system components, ensure that the: a. Controller and each device on the SCSI bus is assigned a unique SCSI ID. b. SCSI bus is properly terminated. c. 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. 3. Check below for the xxx value. The xxx can stand for anything like 001, 002, 003 and so on. Ensure that all components associated with the suspected SCSI device are thoroughly checked.
21A00001	Test Unit Ready Failed - hardware error.	Refer to the notes in error code 21A00xxx. 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 21A00xxx. 1. Replace the media (in removable media devices). 2. Replace the SCSI device.
21A00003	Send diagnostic failed.	Refer to the notes in error code 21A00xxx. Replace the SCSI device.
21A00004	Send diagnostic failed - DevOfl command.	Refer to the notes in error code 21A00xxx. 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.
22000001	Internal wrap test failed.	Replace adapter.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
22001001	Internal wrap test failed.	Replace adapter.
22002001	Adapter failed to complete hardware initialization.	Replace adapter.
22010001	Adapter failed to complete hardware initialization.	Replace adapter.
22011001	Adapter failed to complete hardware initialization.	Replace adapter.
25000000	Memory controller failed.	Replace the system board.
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 the system board. (See note 3 on page 95.)
25010002	Diskette in drive does not contain an *.IMG file.	Insert diskette with firmware update file.
25010003	Cannot open OPENPROM package.	Replace the system board. (See note 3 on page 95.)
25010004	Cannot find OPENPROM node.	Replace the system board. (See note 3 on page 95.)
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.	1. Power-on the system unit. 2. Do the following flash recovery procedure: a. Insert a newly formatted DOS diskette loaded with service processor firmware into the diskette drive. The file name must be *spflash.img*. b. Shutdown the system unit and unplug the power cable. c. Plug in the power cable, power-on the system unit. 3. Retry item 2 with a newly formatted DOS diskette. 4. Go to “MAP 1540: Minimum Configuration” on page 52.
25010008	Flash is write-protected, update cancelled.	1. Turn off, turn on system unit and retry. 2. Replace system board. (See note 3 on page 95.)
25010009	Flash module is unsupported or not recognized.	Make sure correct firmware update diskette is being used with this system.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2501000A	Flash write-protected.	1. Turn off, turn on system unit, retry. 2. Replace system board. (See note 3 on page 95.)
2501000C	Failed write to flash memory	1. Turn off, turn on system unit, retry. 2. Replace system board. (See note 3 on page 95.)
25A0xxx0	L2 cache controller problem.	1. Replace the processor card. 2. Replace the system board. See error code 2B2xxx22 for xxx definitions.
25A0xxx1	L2 cache controller problem.	1. Replace the processor card. 2. Replace the system board. See error code 2B2xxx22 for xxx definitions.
25A1xxx1	L2 SRAM failure	Replace the processor card. See error code 2B2xxx22 for xxx definitions.
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 (for example boot device list) information has been lost, and the system might need to be reconfigured. 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 system board. (See note 3 on page 95.)
25A80000	Initialization failed, device test failed.	Refer to NVRAM error notes on page 102.
25A80001	Init-NVRAM invoked, all of NVRAM initialized.	Refer to NVRAM error notes on page 102.
25A80002	Init-NVRAM invoked, some data partitions may have been preserved.	Refer to NVRAM error notes on page 102.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
25A80011	Data corruption detected, all of NVRAM initialized.	Refer to NVRAM error notes on page 102.
25A80012	Data corruption detected, some data partitions may have been preserved.	Refer to NVRAM error notes on page 102.
25A80100	NVRAM data validation check failed.	Turn off, turn on system unit and retry the operation before replacing any system component. Refer to NVRAM error notes on page 102.
25A80201	Unable to expand target partition while saving configuration variable.	Refer to NVRAM error notes on page 102.
25A80202	Unable to expand target partition while writing error log entry.	Refer to NVRAM error notes on page 102.
25A80203	Unable to expand target partition while writing VPD data.	Refer to NVRAM error notes on page 102.
25A80210	Setenv/$Setenv parameter error - name contains a null character.	Refer to NVRAM error notes on page 102.
25A80211	Setenv/$Setenv parameter error - value contains a null character.	Refer to NVRAM error notes on page 102.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
25A80998	NVRAMRC script evaluation error - command line execution error	Execution of a command line within the NVRAM configuration variable "NVRAMRC" (script) resulted in a "throw" being executed. This script can be modified by the system firmware SMS utilities, the operating system, PCI adapter ROM code or utility, or an operator (through the open firmware script editing command **nvedit**). It may not be possible to resolve the problem without a detailed analysis of the NVRAM script, the current system configuration, and device tree contents. 1. The problem can be caused by a SCSI controller/adapter, whose SCSI bus ID has been changed from the default setting, no longer appearing in the system. This can be caused either by removing a SCSI controller/adapter, or a problem with a SCSI controller/adapter. • Select the SCSI ID utility from the SMS menus. a. Verify the list of SCSI controllers/adapters. If the list is not correct, suspect a problem with the controller/adapter that is installed but not listed. b. Select the option to save the configuration information. c. Restart the system. • If the problem persists, boot the operating system and verify the SCSI bus IDs of any installed/available SCSI controllers/adapters (change as necessary), and restart the system. 2. Contact your service support representative for further assistance.
25A80999	NVRAMRC script evaluation error - stack unbalanced on completion	This is a firmware debug environment error. There is no user action or FRU replacement.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
Memory Error Notes Use the location code obtained from the SMS Error Log utility (described in "Step 1020-4" on page 41) to identify which memory DIMM (or memory DIMM pair) the error is reported against. Memory error codes are in the form **25Cyyxxx** where **yy** indicates memory DIMM present detect-bits (PD-bits) and **xxx** indicates the last 3 digits of the error code. See Table 4 on page 135 for information on how to interpret PD bits.		
25B00001	No memory DIMMs detected.	1. Reseat any installed memory DIMMs and retry. 2. Replace the system board. (See note 3 on page 95.)
25B00002	Multiple memory DIMMs failed a memory test.	1. Reseat all memory DIMMs, power-on the system unit. 2. If problem persists, replace the system board.
25Cyy001	Memory DIMM is not supported.	Replace unsupported memory DIMM. **Note:** Memory DIMM must be replaced with a supported type of memory DIMM. If an unsupported memory DIMM is replaced with the same unsupported type, the error persists. There might be two memory module-related memory errors reported to indicate a memory DIMM pair. One of the two indicated memory DIMMs may be good. When replacing memory replace one memory DIMM at a time, not both. See Memory Error Notes on page 105 for more information.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
25Cyy002	Memory DIMM fails memory test.	1. Record the location code of the suspected memory DIMM. 2. Power-off and unplug the system unit. 3. Swap the faulty memory DIMM with the other half of the memory pair. Refer to "Memory DIMM Locations" on page 5. 4. Plug-in and power-on the system unit. 5. Load diagnostics, run *sysplanar0* diagnostics in system verification mode and obtain the location code of the suspected memory DIMM. If you are unable to load the diagnostics, use the location code reported on the operator panel. If the same location code recorded in step one is returned, replace the system board; otherwise, replace the memory DIMM indicated by the location code.
25Cyy003	PD bits are mismatched or missing one memory DIMM.	1. Make sure both memory DIMMs in the pair are present and are the same type. 2. Replace the partner of the memory DIMM that was indicated by the location code. 3. Replace the system board. (See note 3 on page 95.) See Memory Error Notes on page 105 for more information.
25Cyy004	Memory DIMMs are disabled.	Remove this unused memory DIMM. See Memory Error Notes on page 105 for more information.
25Cyy005	Memory DIMM failed address test.	1. Replace memory DIMM. 2. Replace the system board. (See note 3 on page 95.) 3. Replace processor card. See Memory Error Notes on page 105 for more information.
25Cyy006	Memory DIMM failed inter-extent test.	1. Replace the system board. (See note 3 on page 95.) 2. Replace processor card. See Memory Error Notes on page 105 for more information.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
25Cyy007	Memory DIMM failed extent access test.	1. Replace the system board. (See note 3 on page 95.) 2. Replace processor card. See Memory Error Notes on page 105 for more information.
25Cyy008	Memory DIMM has been deconfigured.	1. Replace memory DIMM. 2. Replace the partner memory DIMM See Memory Error Notes on page 105 for more information.
26020001	Invalid PCI adapter vendor ID.	1. Move adapter to another slot (behind a different PCI bridge). 2. Check for available firmware updates for adapter. Apply update if available. 3. Run AIX diagnostics on adapter. Replace if indicated. 4. Replace adapter. 5. Check for system firmware updates. Apply if update available. 6. Replace power supply. 7. Replace system board. (See note 3 on page 95.)
26020002	Invalid PCI adapter device ID.	1. Move adapter to another slot (behind a different PCI bridge). 2. Check for available firmware updates for adapter. Apply update if available. 3. Run AIX diagnostics on adapter. Replace if indicated. 4. Replace adapter. 5. Check for system firmware updates. Apply if update available. 6. Replace power supply. 7. Replace system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
26020003	Invalid or unrecognized PCI adapter class code.	1. Move adapter to another slot (behind a different PCI bridge). 2. Check for available firmware updates for adapter. Apply update if available. 3. Run AIX diagnostics on adapter. Replace if indicated. 4. Replace adapter. 5. Check for system firmware updates. Apply if update available. 6. Replace power supply. 7. Replace system board. (See note 3 on page 95.)
26020007	Unable to allocate bus resources to PCI adapter. (Partial allocation may have succeeded)	1. Move adapter to another slot (behind a different PCI bridge). 2. Check for available firmware updates for adapter. Apply update if available. 3. Run AIX diagnostics on adapter. Replace if indicated. 4. Replace adapter. 5. Check for system firmware updates. Apply if update available. 6. Replace power supply. 7. Replace system board. (See note 3 on page 95.)
26800Cxx	Machine check occurred.	If the location code shown on the operator panel identifies a card slot: 1. Replace the adapter in the slot identified. 2. Replace system board (See note 3 on page 95.) If the location code shown does not identify a card slot, or if there is no location code, replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
26800Dxx	Machine check occurred, unable to isolate to single device	″xx″indicates the PCI bus number with the error 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 failure. Otherwise continue. 2. Refer to the “Bus SRN to FRU Reference Table” on page 137 using PCI bus ″xx″ for isolation of the failing device.
28030xxx	RTC errors	**RTC Error Notes** 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 on the system board. 3. If the error is persistent after battery replacement, replace the system board. (See note 3 on page 95.)
28030001	RTC initialization required. RTC not updating, corrected.	1. Set the time and date 2. Refer to error code 28030xxx on page 109.
28030002	Bad time/date values	1. Set the time and date. 2. Refer to error code 28030xxx on page 109
28030003	RTC initalization required. RTC not updating, corrected	Replace system board. (See note 3 on page 95.)
28030004	Operating mode parameters changed (for example data format).	1. Set the time and date. 2. Refer to error code 28030xxx on page 109

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
28030005	Battery error	1. Replace the battery. **Note:** Password, time and date need to be set. 2. Refer to error code 28030xxx on page 109 if the problem persists.
28030006	Processor frequency measurement error	1. Verify that the current level of the system firmware is installed. 2. Replace the processor card 3. Replace system board Replacing the battery does not correct this error condition.
28A00040	Power supply/fan errors	Check the following: • Ensure the I/O and media fans are properly connected to the system board. • Ensure the processor fan is properly connected to the processor card. • Reseat all suspected fans connectors. • Look for obstructions that may prevent the fans from normal operations. (For example, a cable caught in the fan, preventing it from spinning.) • Replace any suspected fans that may cause this error. • If after replacing the suspected fans, the problem still exists: – Replace the processor card for a failing processor fan. – Replace the system board for a failing I/O or media fan. (See note 3 on page 95.)
28A00050	Power supply failure	Replace the power supply
29000002	Keyboard/mouse controller failed self-test.	Replace the system board. (See note 3 on page 95.)
29A00003	Keyboard not present/detected.	1. Keyboard 2. Replace the system board. (See note 3 on page 95.)
29A00004	Keyboard stuck key test failed.	1. Keyboard 2. Replace the system board. (See note 3 on page 95.)
29B00004	Mouse not present/detected.	1. Mouse 2. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2B2xxx11	Processor is manually disabled	Use service processor menus to re-enable the processor, reboot the system. (See error code on page 111.)
2B2xxx22	Processor disabled.	Replace processor card. **Note:** Where xxx indicates the processor type as follows: **711** 333Mhz processor with 1 MB of L2 cache. **7D4** 400Mhz processor with 4 MB of L2 cache. **758** 450 MHz processor with 8 MB of L2 cache
2B2xxx31	Processor failed.	Replace processor card. See error code on page 111 for xxx definition.
2B2xxx42	Unsupported processor type.	Replace processor card. See error code on page 111 for xxx definition.
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 in the system power cable and retry the operation. 3. Replace the system board. (See note 3 on page 95.)
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 system board. (See note 3 on page 95.)
2BA00013	Service processor reports bad NVRAM CRC.	1. If problem persists, replace battery. 2. Replace the system board. (See note 3 on page 95.)
2BA00014	Service processor reports bad service processor firmware.	Use service processor firmware diskette to reprogram firmware.
2BA00017	Service processor reports bad or low battery.	1. Replace the battery. 2. Replace the system board. (See note 3 on page 95.)
2BA00018	EPOW test failure.	Replace the system board. (See notes on page 95.)
2BA00019	IRQ13 test failure.	Replace the system board. (See note 3 on page 95.)
2BA00024	Service processor reports bad power controller firmware.	Use the system firmware diskette to reprogram the system firmware.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2BA00040	Service processor reports service processor VPD module not present.	1. Use the service processor firmware diskette to reprogram the service processor firmware. 2. Replace system board. (See note 3 on page 95.)
2BA00041	Service processor VPD is corrupted.	1. Use the service processor firmware diskette to reprogram the service processor firmware. 2. Replace system board. (See note 3 on page 95.)
2BA00050	Service processor reports system operator panel VPD module not present or not recognizable.	Replace the operator panel control assembly. (See note 3 on page 95.) **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 note 3 on page 95.) **Note:** Swap the old VPD module from the old operator panel control assembly to the new one.
2BA00060	Service processor reports system board VPD module not present.	Replace the system board. (See note 3 on page 95.)
2BA00061	Service processor reports system board VPD data corrupted.	Replace system board. (See note 3 on page 95.)
2BA00062	Service processor reports system board VPD module not present.	Replace system board. (See note 3 on page 95.)
2BA00063	Service processor reports system board VPD data corrupted.	Replace system board. (See note 3 on page 95.)
2BA00070	Service processor reports processor card VPD module not present.	Replace the processor card.
2BA00071	VPD data corrupted for processor card.	Replace the processor card.
2BA00073	VPD data corrupted for processor card.	Replace the processor card.
2BA00100	Service processor firmware recovery information could not be written to diskette.	1. Check diskette media write-protect tab. 2. Replace the diskette drive.
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.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
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 off the system. 2. Unplug power cable and then plug power cable back in. 3. Turn on the system. 4. Retry operation. If problem persists, replace the system board. (See note 3 on page 95.)
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 firmware CRC.	See error code 2BA00200 for recovery procedure.
2BA00203	Service processor firmware update error occurred, update not completed. Error occurred while reading new service processor firmware 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 calculating firmware CRC.	See error code 2BA00200 for recovery procedure.
2BA00300	Service processor reports slow fan number 1.	1. Replace processor card fan. 2. If problem persists, replace power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00301	Service processor reports slow fan number 2.	1. Replace fan 2. 2. If problem persists, replace power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00302	Service processor reports slow fan number 3.	1. Replace fan 3. 2. If problem persists, replace power supply. 3. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2BA00303	Service processor reports slow fan number 4.	1. Replace fan 4. 2. If problem persists, replace power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00309	Service processor reports generic cooling alert.	1. Check for cool air flow obstructions to the system. 2. Replace the system board. (See note 3 on page 95.)
2BA00310	Service processor reports processor card over temperature alert.	1. Check for cool air flow obstructions to the system. 2. If the problem persists, replace processor card.
2BA00311	Service processor reports system board over temperature alert.	1. Check for cool air flow obstructions to the system. 2. Replace the system board. (See note 3 on page 95.)
2BA00312	Service processor reports memory over temperature alert.	1. Check for cool air flow obstructions to the system. 2. Replace the memory DIMM(s).
2BA00313	Service processor reports generic power alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00314	Service processor reports 5 V over voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00315	Service processor reports 5 V under voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00316	Service processor reports 3.3V over voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00317	Service processor reports 3.3V under voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2BA00318	Service processor reports 2.5 V over voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00319	Service processor reports 2.5 V under voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00324	Service processor reports 5 V standby over voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00325	Service processor reports 5 V standby under voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00326	Service processor reports PCI expansion card 5 V over voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00327	Service processor reports PCI expansion card 5 V under voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00328	Service processor reports PCI expansion card 3.3V over voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00329	Service processor reports PCI expansion card 3.3V under voltage alert.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)
2BA00334	Service processor reports generic slow shutdown request.	1. Check, and reseat if necessary, power connectors P1 and P2. 2. Replace the power supply. 3. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2BA00335	Service processor reports processor card 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 (for example: a cable caught in the fan, preventing it from spinning). 3. If problem persists, replace the processor card.
2BA00336	Service processor reports I/O 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 the system board. (See note 3 on page 95.)
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 the memory DIMM.
2BA00338	Service processor reports generic fast shutdown request.	1. Replace the power supply. 2. Replace the system board. (See note 3 on page 95.)
2BA00340	Service processor reports locked fan - fast shutdown request fan number 1.	1. Replace fan 1. 2. Replace the system board. (See note 3 on page 95.)
2BA00341	Service processor reports locked fan - fast shutdown request fan number 2.	1. Replace fan 2. 2. Replace the system board. (See note 3 on page 95.)
2BA00342	Service processor reports locked fan - fast shutdown request fan number 3.	1. Replace fan 3. 2. Replace the system board. (See note 3 on page 95.)
2BA00343	Service processor reports locked fan - fast shutdown request fan number 4.	1. Replace fan 4. 2. Replace the system board. (See note 3 on page 95.)
2BA00350	Service processor reports generic immediate shutdown request.	1. Replace the power supply. 2. Replace the system board. (See note 3 on page 95.)
2BA00351	Service processor reports generic AC power loss EPOW.	1. Replace the power supply. 2. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
2BA00352	Service processor reports loss of AC power (outlet).	1. Replace the power supply. 2. Replace the system board. (See note 3 on page 95.)
2BA00353	Service processor reports loss of AC power (power button).	1. Replace the power supply. 2. Replace the system board. (See note 3 on page 95.)
2BA00399	Service processor reports unsupported value in EPOW.	1. Check EPOW cabling on SCSI or SSA backplanes. 2. Replace the system board. (See note 3 on page 95.)
40100005	Loss of system power detected.	Possible main power loss. If not, replace the power supply.
40100006	Loss of ac power to system detected.	Possible main power loss. If not, replace the power supply.
40100007	Immediate shutdown.	Possible main power loss. If not, replace power supply.
40110001	Power supply failed.	1. Look at the service processor error log for more error information. 2. Check the power cable to connector on the system board. 3. Power supply 4. System board (See note 3 on page 95.)
40110002	Voltage not detected on the processor card.	Power supply
40110003	Voltage not detected on the processor card.	Processor card
40110004	Low voltage detected in power supply main enclosure.	1. Check the connection between the power supply connector (P2) and the system board connector (J44). 2. Power supply
40110005	Fan warning detected in power supply main enclosure.	1. Check the connection between the power supply connector (P2) and the system board connector (J44). 2. Power supply
40110006	Fan failure detected in power supply main enclosure.	1. Check the connection between the power supply connector (P2) and the system board connector (J44). 2. Power supply
40110007	Thermal warning detected in power supply main enclosure.	1. Check the connection between the power supply connector (P2) and the system board connector (J44). 2. Power supply

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
40110008	Thermal failure detected in power supply main enclosure.	1. Check the connection between the power supply connector (P2) and the system board connector (J44). 2. Power supply
40110009	Overcurrent on the main 5.0 V was detected by the power supply.	1. Possible PCI card or disk drive problem. 2. Go to ″MAP 1520: Power″, “Step 1520-3” on page 48. 3. System board 4. Power supply
4011000A	Overcurrent on the processor card 5.0 V output was detected by the power supply.	1. Possible processor card problem. 2. Go to ″MAP 1520: Power″, “Step 1520-3” on page 48. 3. Processor card 4. Power supply
4011000D	Overcurrent on the 3.3 V output was detected by the power supply.	1. Possible PCI card or memory DIMM problem. 2. Go to ″MAP 1520: Power″, “Step 1520-3” on page 48. 3. System board 4. Power supply
4011000E	Overcurrent on the +12.0 V output was detected by the power supply.	1. Possible processor card, PCI card, or disk drive problem. 2. Go to ″MAP 1520: Power″, “Step 1520-3” on page 48. 3. System board 4. Power supply
4011000F	Overcurrent on the -12.0 V output was detected by the power supply.	1. Possible PCI card problem. 2. Go to ″MAP 1520: Power″,“Step 1520-3” on page 48. 3. System board 4. Power supply
40111002	Unknown power problem detected.	Power supply.
40111022	A high 5.0 V reading detected.	1. Power supply. 2. System board (See note 3 on page 95.)
40111032	A high 3.3 V reading detected.	1. System board (See note 3 on page 95.) 2. Power supply
40111072	A high +5 V standby voltage reading detected.	1. System board (See note 3 on page 95.) 2. Power supply
40111082	A low 5.0 V reading detected.	1. Power supply 2. System board (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
40111092	A low 3.3 V reading detected.	1. System board (See note 3 on page 95.) 2. Power supply
401110D2	A low +5 standby V reading detected.	1. System board (See note 3 on page 95.) 2. Power supply
40111101	Power good signal low on the processor card.	Replace the processor card.
40111102	Wrong processor card plugged into the system.	1. Remove processor card 2. Verify part number 3. Install valid card
40111122	High PCI +5.0 volt reading detected	1. Power supply 2. System board (See note 3 on page 95.)
40112022	High 5.0 volt reading detected	1. Power supply 2. Processor card
40112023	High 1.8 V reading detected	1. Power supply 2. Processor card
40112032	High 3.3 V reading detected	1. Power supply 2. System board (See note 3 on page 95.)
40112033	High 2.5 V reading detected	1. Power supply 2. Processor card
40112062	Low 1.8 V reading detected.	1. Power supply 2. Processor card
40112063	Critically low 1.8 V reading detected	1. Power supply 2. Processor card
40112064	Critically high 1.8 V reading detected	1. Power supply 2. Processor card
40112065	Critically low 2.5 V reading detected	1. Power supply 2. Processor card
40112066	Critically high 2.5 V reading detected	1. Power supply 2. Processor card
40112082	Low 5.0 volt reading detected	1. Power supply 2. Processor card
40112092	Low 3.3 V reading detected	1. Power supply 2. System board (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
40112093	Low 2.5 V reading detected	1. Power supply 2. Processor card
40200001	An unknown cooling problem detected.	Check system unit fans.
40200021	A processor card temperature warning detected.	1. Check system unit fans. 2. Processor card
40200023	A critical processor card temperature condition detected.	1. Check system unit fans. 2. Processor card
40200031	A system board temperature warning detected.	1. Check system unit fans. 2. System board (See note 3 on page 95.)
40200033	A critical system board temperature condition detected.	1. Check system unit fans. 2. System board (See note 3 on page 95.)
40200051	An inlet temperature warning detected. (High temperature sensed at the air flow inlet.)	1. Check system unit fans. 2. System board (See note 3 on page 95.)
40200053	An inlet memory temperature condition detected. (Critically high temperature sensed at the air flow inlet.)	1. Check system unit fans. 2. System board (See note 3 on page 95.)
40210011	A slow fan detected.	Check: 1. Room operating temperature. 2. System fans.
40210014	A stopped fan detected.	1. Check fan connectors 2. Replace failing fan
40A00000	System firmware IPL failure.	1. Press Enter on an attached ASCII terminal keyboard to go into the service processor menus. 2. Select the **System Information** option. 3. Select **Read Progress Indicators from Last System Boot** and perform the action of the posted code indicated by the arrow or, if no arrow is present, use the 4 or 8 digit code that appears immediately below the 40A00000.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
40B00000	The operating system surveillance interval exceeded.	1. Surveillance mode control is from the service processor 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. System board. (See note 3 on page 95.) 5. If the problem persists, call the support center for assistance.
40D00003	An unknown slow shutdown commanded.	Critical cooling problem. Check to ensure the temperature is in the ambient range.
40D00004	An unknown fast shutdown occurred.	Critical cooling problem. Ensure the temperature is in the ambient range.
40D00101	BIST on the system board failed.	Replace the system board. (See note 3 on page 95.)
40D00102	BIST on the system board failed.	Replace system board. (See note 3 on page 95.)
40D00200	Processor initialization failed.	Location code will point to failing FRU.
40D00201	JTAG chip ID miscompare.	Replace the failing FRU pointed to by the location code.
450000C0	Uncorrectable memory error. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000C1	Memory ECC correctable error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000C2	Memory ECC correctable error threshold exceeded. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000C3	Memory controller subsystem internal error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
450000C4	Memory address error (invalid address or access attempt) (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000C5	Memory data error (bad data going to memory). (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000C6	Memory bus/switch internal error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000C7	Memory time-out error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000D0	System bus time-out error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000D1	System bus parity error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000D2	System bus protocol/transfer error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000D3	I/O host bridge time-out error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000D4	I/O host bridge address/data bus parity error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
450000D6	System support function error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000D7	System bus internal hardware/switch error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
450000DA	The processor was found deconfigured. The service processor reconfigured the available processor.	1. Note that this SRN just indicates that the corresponding FRU has been reconfigured. It is not indicating that the FRU is defective. 2. Replace the processor card.
450000DB	All memory DIMM pairs were found deconfigured. The service processor reconfigured the best available pair.	1. Note that this SRN just indicates that the corresponding FRU has been reconfigured. It is not indicating that the FRU is defective. 2. Replace all memory DIMM pairs.
45C00000	Memory checkstop. (Uncorrectable memory error.)	1. Attempt to reboot the system in service mode to preserve the AIX error log. If the reboot fails, attempt to boot from the CD-ROM. If the reboot is successful, run diagnostics in problem determination mode to determine the cause of the failure. 2. Replace the system board. (See note 3 on page 95.)
460000C0	I/O bus address parity error (checkstop)	1. If a physical location code is displayed in the operator panel or by AIX diagnostics, replace the FRU as indicated by the location code. If a physical location code is not available, continue. 2. In the service processor menus, go to ″Read Progress Indicators from last System Boot″. If an arrow is pointing to a location code replace the FRU at that location code. If there is no arrow pointing to a location code, continue. 3. Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
460000C1	I/O bus data parity error (checkstop)	1. If a physical location code is displayed in the operator panel or by AIX diagnostics, replace the FRU as indicated by the location code. If a physical location code is not available, continue. 2. In the service processor menus, go to ″Read Progress Indicators from last System Boot″. If an arrow is pointing to a location code replace the FRU at that location code. If there is no arrow pointing to a location code, continue. 3. Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.
460000C2	I/O bus time-out, access or other error (checkstop)	1. If a physical location code is displayed in the operator panel or by AIX diagnostics, replace the FRU as indicated by the location code. If a physical location code is not available, continue. 2. In the service processor menus, go to ″Read Progress Indicators from last System Boot″. If an arrow is pointing to a location code replace the FRU at that location code. If there is no arrow pointing to a location code, continue. 3. Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.
460000C3	I/O bridge/device internal error (checkstop)	1. If a physical location code is displayed in the operator panel or by AIX diagnostics, replace the FRU as indicated by the location code. If a physical location code is not available, continue. 2. In the service processor menus, go to ″Read Progress Indicators from last System Boot″. If an arrow is pointing to a location code replace the FRU at that location code. If there is no arrow pointing to a location code, continue. 3. Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
460000C4	Error from a PCI to non-PCI bridge chip, indicating an error on the secondary bus. (checkstop)	1. If a physical location code is displayed in the operator panel or by AIX diagnostics, replace the FRU as indicated by the location code. If a physical location code is not available, continue. 2. In the service processor menus, go to ″Read Progress Indicators from last System Boot″. If an arrow is pointing to a location code replace the FRU at that location code. If there is no arrow pointing to a location code, continue. 3. Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.
460000C5	Mezzanine/system bus address parity error. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
460000C6	Mezzanine/system bus data parity error. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
460000C7	Mezzanine/system bus time-out, transfer or protocol error. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
460000D4	I/O expansion bus data parity or CRC error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
460000D5	I/O expansion bus data time-out, access or other error. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
460000D6	I/O expansion bus connection failure. (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
460000D7	I/O expansion bus unit is not in an operating state (power down, off-line). (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRUs.
460000D8	A generic memory controller detected-checkstop has occurred.	1. Try to reboot the system in service mode to preserve the AIX error log. Run diagnostics in problem determination mode to determine the cause of the failure. If a new SRN or error code is generated, follow the actions for that code 2. Try to boot AIX diagnostics from CD-ROM. a. If the boot is successful, run advanced diagnostics and follow the actions for any SRN or error code that is generated. If the same error code is generated, go to “MAP 1540: Minimum Configuration” on page 52 b. If AIX standalone diagnostics do not boot, follow the actions for any new SRN or error code that is generated. If the same error code is generated, go to “MAP 1540: Minimum Configuration” on page 52

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
460000D9	A generic I/O memory controller-detected checkstop has occurred.	1. Try to reboot the system in service mode to preserve the AIX error log. Run diagnostics in problem determination mode to determine the cause of the failure. If a new SRN or error code is generated, follow the actions for that code 2. Try to boot AIX diagnostics from CD-ROM. a. If the boot is successful, run advanced diagnostics and follow the actions for any SRN or error code that is generated. If the same error code is generated, go to “MAP 1540: Minimum Configuration” on page 52 b. If AIX standalone diagnostics do not boot, follow the actions for any new SRN or error code that is generated. If the same error code is generated, go to “MAP 1540: Minimum Configuration” on page 52
48800909	System VPD error.	1. Check cable to operator panel. 2. Replace the operator panel control assembly. (See note 3 on page 95.) **Note:** Swap the old VPD module from the old operator panel control assembly to the new one. 3. Replace the system board. (See notes on page 95.) 4. Go to “MAP 1540: Minimum Configuration” on page 52
4880090A	System board VPD read failed.	Replace the system board. (See notes on page 95.)
4880090B	Error identifying system type using VPD. I^2C bus error.	1. Check the power supply cable connections 2. Call for support.
4880090C	JTAG unable to confirm system type using system VPD.	1. Remove cards. 2. Verify part numbers. 3. Install valid cards. 4. Call for support.
4B20000A	The processor has been deconfigured.	1. Replace the processor card. 2. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4B200043	Service processor reports JTAG fail	1. Reseat the processor card. 2. Replace the system board. (See note 3 on page 95.) 3. Replace the processor card.
4B200055	No processor found.	1. Replace the processor card. 2. Replace system board. (See note 3 on page 95.)
4B200056	No processor card.	1. Replace the processor card. 2. Replace system board. (See note 3 on page 95.)
4B201010	A machine check has occurred.	1. Attempt to reboot the system unit in service mode. If the reboot fails, attempt to boot from a CD-ROM. If the reboot is successful, run diagnostics in problem determination mode to determine the cause of the problem. 2. Replace the processor card. 3. Go to “MAP 1540: Minimum Configuration” on page 52.
4B201020	TEA Error	Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.
4B276851	Processor BIST failed	Replace the processor card.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4B2xxx00	Checkstop	1. Press Enter on an attached ASCII terminal keyboard to go into the service processor menus. 2. Select **System Information Menu**. 3. Select **Read Progress Indicators from Last System Boot** and use the posted code indicated by the arrow. Refer to "Service Processor Menus" on page 144 for assistance. If the code is *E105, E14D, E15B, E174, E175* or *0xxx*, where xxx is any three digits, continue to step 4 instead of the listed action. Otherwise, find the code in the "Service Processor Checkpoints" on page 67 or "Firmware Checkpoints" on page 71 and perform the action indicated. 4. Attempt to reboot the system in service mode to preserve the AIX error log. If the reboot fails, attempt to boot from the CD-ROM. If the reboot is successful, run diagnostics in problem determination mode to determine the cause of the failure. Otherwise, continue. 5. Replace the processor card. 6. Go to MAP 1540: Minimum Configuration, "Step 1540-21" on page 63.
4B2xxx01	Checkstop	1. Attempt to reboot the system in service mode to preserve the AIX error log. If the reboot fails, attempt to boot 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. Replace the processor card. 3. Replace the system board. (See note 3 on page 95.)

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4B2xxx02	Checkstop = Slot 2 Fail	1. Attempt to reboot the system in service mode to preserve the AIX error log. If the reboot fails, attempt to boot 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. Replace the processor card. 3. System board (See notes on page 95.)
4B2xxx10	Machine check - 0	1. Attempt to reboot the system in service mode to preserve the AIX error log. If the reboot fails, attempt to boot 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. Go to MAP 1540: Minimum Configuration, “Step 1540-21” on page 63.
4B2xxx11	Machine check - 1 (Stuck Active)	1. Replace the processor card. 2. Replace the system board. (See note 3 on page 95.)
4B2xxx41	ABIST fail	1. Replace the processor card. 2. System board. (See note 3 on page 95.)
4B2xxx42	ABIST fail	1. Replace the processor card. 2. System board. (See note 3 on page 95.)
4B2xxx51	LBIST fail	1. Replace the processor card. 2. System board. (See note 3 on page 95.)
4B2xxx52	LBIST fail	1. Replace the processor card. 2. System board. (See note 3 on page 95.)
4B2xxxC0	Processor card internal error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for any additional FRUs with probability.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4B2xxxC1	Processor card internal cache controller error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for any additional FRUs with probability.
4B2xxxC2	External cache parity or multi-bit ECC error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for any additional FRUs with probability.
4B2xxxC3	External cache ECC single-bit ECC error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for any additional FRUs with probability.
4B2xxxC4	System bus time-out error (checkstop)	1. Replace the FRU indicated by the physical location code displayed on the operator panel. 2. If this error occurs while booting, go to ″MAP 1540 Minimum Configuration″, “Step 1540-21” on page 63. Otherwise go to the next step. 3. Check the service processor error log for any additional probable FRUs.
4B2xxxC5	System bus time-out error, waiting for I/O (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for any additional FRUs with probability.
4B2xxxC6	System bus parity error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRU with probability
4B2xxxC7	System bus protocol/transfer error (checkstop)	1. Replace the FRU as indicated by the physical location code displayed on the operator panel. 2. Check the service processor error log for additional FRU with probability

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4B2xxxC8	A generic processor-detected checkstop has occurred.	1. Try to reboot the system in service mode to preserve the AIX error log. Run diagnostics in problem determination mode to determine the cause of the failure. If a new SRN or error code is generated, follow the actions for that code 2. Try to boot AIX diagnostics from CD-ROM. a. If the boot is successful, run advanced diagnostics and follow the actions for any SRN or error code that is generated. If the same error code is generated, go to “MAP 1540: Minimum Configuration” on page 52 b. If AIX standalone diagnostics do not boot, follow the actions for any new SRN or error code that is generated. If the same error code is generated, go to “MAP 1540: Minimum Configuration” on page 52
4BA00000	The system support controller detects the service processor, but cannot establish communication. The system halts.	1. Power down the system unit: a. Unplug the power cord. b. Plug in the power cord and power up the system unit. 2. Replace system board. (See note 3 on page 95.)
4BA00001	The system support controller cannot detect the service processor.	Replace system board. (See note 3 on page 95.)
4BA0000A	Processor card deconfigured	1. Possible BIST failure: a. Power down the system unit. b. Unplug the power cord. c. Plug in the power cord and power up the system unit. 2. Replace the processor card.
4BA00800	Unknown error.	1. Check level of service processor firmware. If not the latest, apply update. 2. Call service support.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4BA00826	Service processor cannot call home.	1. Check the modem configuration in the service processor menus. 2. Check the modem physical connection to the system unit. 3. Verify (with a conventional telephone) that the telephone line is an active analog line. 4. Replace the modem. 5. Replace the system board. (See note 3 on page 95.)
4BA00827	Flash update diskette fail.	1. Copy the flash update image onto a new, formatted diskette and retry. 2. Verify that the flash update image is correct for this system unit. 3. Replace the diskette drive.
4BA00828	Flash update (CRC) checksum fail.	Copy the flash update image onto a new, formatted diskette and retry.
4BA00829	Bad system firmware.	Replace system board. (See note 3 on page 95.)
4BA00830	Boot fail.	Go to “Boot Problems/Concerns” on page 90.
4BA00831	Bad service processor firmware image.	1. Unplug the power cable, wait a few minutes, plug in the power cable and reboot the system unit. Check for progress codes in the operator panel. If there are any progress codes refer to their description. 2. Replace system board. (See note 3 on page 95.)
4BA00832	Error while doing flash update.	1. Power off the system, then power on the system; retry the flash programming a few times. 2. Replace system board. (See note 3 on page 95.)
4BA10001	SSC SRAM fail	Go to “MAP 1540: Minimum Configuration” on page 52.
4BA10002	SSC SRAM fail	Go to “MAP 1540: Minimum Configuration” on page 52.
4BA10003	The service processor hardware self-test failed.	Replace the system board. (See note 3 on page 95.)
4BA10004	The service processor firmware failed.	1. Restore or update the service processor firmware. 2. Replace the system board.
4BA10005	I²C path fail.	1. Replace the system board. (See note 3 on page 95.) 2. Replace the processor card.

Table 3. Firmware Error Codes. (continued)

Error Code	Description	Action / Possible Failing FRU
4BA10832	Error while attempting a flash update.	1. Power-on the system unit. 2. Do the following flash recovery procedure: a. Insert a newly formatted DOS diskette loaded with service processor firmware into the diskette drive. The file name must be *spflash.img*. b. Shutdown the system unit and unplug the power cable. c. Plug in the power cable, power-on the system unit. 3. Retry item 2 with a newly formatted DOS diskette. 4. Go to “MAP 1540: Minimum Configuration” on page 52.
4BA80013	NVRAM access failure.	1. Unplug the system unit. Manually clear NVRAM. Remove the battery and use it to short the battery leads for at least 30 seconds. Power-up the system unit. 2. Go to “MAP 1540: Minimum Configuration” on page 52.
4BA80014	NVRAM (CRC) checksum fail.	1. Recoverable temporary condition, unless succeeded by 4BA80015. 2. Replace the system board. (See note 3 on page 95.)
4BA80015	NVRAM reintialization fail.	1. Unplug the system unit. Manually clear NVRAM. Remove the battery and use it to short the battery leads for at least 30 seconds. Power-up the system unit. 2. Go to “MAP 1540: Minimum Configuration” on page 52.

Memory DIMM Present Detect Bits (PD-Bits)

The following table expands on the Memory Error Notes found on page 105, where *yy* is the PD value in the table below and *xxx* are the last three digits of the error code. Use these values to identify the type of memory that generated the error.

If you replace FRUs or perform an action, and the problem is still not corrected, go to "MAP 1540: Minimum Configuration" on page 52 unless otherwise indicated in the tables.

Table 4. Memory DIMM PD bits

PD value	Size	Clock Cycle (nsecs)	Parity/ ECC
28	512 MB	10	ECC
2A	512 MB	8	ECC
38	128 MB	10	ECC
3A	128 MB	8	ECC
48	64 MB	10	ECC
4A	64 MB	8	ECC
58	32 MB	10	ECC
5A	32 MB	8	ECC
68	256 MB	10	ECC
6A	256 MB	8	ECC

Note: Memory DIMMs must be installed in pairs.

Error Codes E0E1 and 40A00000 Recovery Procedure

If checkpoint E0E1 or error code 40A00000 is displayed on the operator panel, do the following:

1. Ensure that the diagnostics and the operating system are shut down.
2. Turn off the power.
3. If you have not already done so, configure the service processor with the instructions in note 6 on page 52 and then return here and continue.
4. Exit the service processor menus and remove the power cable.
5. Remove the side cover.
6. Record the slot numbers of the PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
7. Plug in the power cable and wait for OK on the operator panel display.
8. Turn on the power.

Does the system stop with code E0E1 or 40A00000 displayed on the operator panel?

NO One of the PCI cards has failed and is preventing startup.

1. Remove all of the PCI cards.
2. Reinstall one of the PCI cards.
3. Power on the system unit.
4. If the system unit powers on, continue to add PCI cards one a at time until the faulty card is found.
5. Replace the failing FRU, then go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*.

Note: Always power off the system unit before adding an additional card.

YES Replace the processor card. If this does not resolve the problem, replace the system board and reinstall the original processor card.

Bus SRN to FRU Reference Table

This table is used to locate defective FRUs within the system 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 system 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 system 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 technical service support for assistance.

Table 5. 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 (10-60)	System board. (See notes on page 95.)
		Internal/external SCSI port (10-61)	System board. (See notes on page 95.)
		Internal Ethernet port (10-80)	System board. (See notes on page 95.)
		Device installed in I/O slot 3 (10-68 to 10-6F)	Adapter
		Device installed in I/O slot 4 (10-70 to 10-77)	Adapter
		Device installed in I/O slot 5 (10-78 to 10-7F)	Adapter
		Device installed in I/O slot 6 (10-88 to10-8F)	Adapter
9CC-101	PCI Bus 40	Device installed in I/O slot 1 (20-58 to 20-5F)	Adapter
		Device installed in I/O slot 2 (20-60 to 20-67)	Adapter
651-730	ISA Bus	Diskette drive port/device (01-D1-00-00)	System board. (See notes on page 95.)
		Parallel port/device (01-R1)	System board. (See notes on page 95.)
		Serial ports (1-2)/device (01-S1 to 01-S2)	System board. (See notes on page 95.)
		Mouse port/device (01-K1-01-00)	System board. (See notes on page 95.)

Table 5. Bus SRN to FRU Reference Table (continued)

SRN	Bus Identification	Possible Failing Device and AIX Location Code	Associated FRU
		Keyboard port/device (01-K1-00-00)	System board. (See notes on page 95.)
		Audio port/device (01-Q2)	System board. (See notes on page 95.)
		Tablet port/device (01-Q1)	System board. (See notes on page 95.)

Typical Boot Sequence for 44P Model 170

After the ac power is turned on, the system support sontroller (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.

A typical boot sequence is as follows:

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) when the power button is pressed.
   - The VPD data are read and the CRC is checked.
   - The processor 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 DIMM locations.
   - LCD code range is E3XX.
6. Device Configuration and Test

- System firmware checks to see which 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 pressing 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 standalone diagnostics (CD).
  - 6 or F6 to start the online 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
   - After a boot image is located on a device in the boot list, the system firmware code passes control to either of the following AIX boot codes:
     - LCD code E105 for normal boot
     - LCD code E15B for service mode boot.
   - The AIX boot code displays LCD progress codes in the format 0xxx.
9. AIX Boot Complete
   - The AIX login prompt displays on the AIX console.

Chapter 6. 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.)

Performing Slow Boot

To fully analyze all of the available information, perform the following steps before doing a hardware repair or replacement, especially if the error is related to the CPU or memory:

1. Record the 8-character error code (and location code if present) displayed in the operator panel, or that was reported by the customer.
2. Do a slow-mode boot in service mode. This can be specified using the System Power Control Menu on the service processor main menu. (A fast-mode boot skips much of the built-in diagnostic testing.) A slow-mode boot may yield a new 8-character error code on the operator panel and new errors in the service processor error log. If a new error code is reported, use it in subsequent steps to continue problem analysis.

Loading Standalone Diagnostics

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. After the keyboard indicator appears during startup, and before the tone sounds, press the F5 key on a directly attached keyboard (or the number 5 key on an ASCII terminal).
6. Enter any requested passwords.

Loading Online Diagnostics

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. After the keyboard indicator appears during startup, and before the tone sounds, 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 drive
2. CD-ROM drive
3. Tape drive
4. Disk drive
5. Network adapter
   - 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** provided 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 because **Online Diagnostics** are 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 and 6 keys work like the F5 and 5 keys, with the following exceptions:

- The system searches 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 7. Using the Service Processor

The service processor menus enable you to configure service processor options and to enable and disable functions.

Service processor menus are available using an ASCII terminal when the server is turned 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 (that is, the 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 below.

Service Processor Functions	Service Processor Menus (ASCII terminals)	AIX Service Aids (ASCII or graphics terminals)	SMS (ASCII or graphics terminals)
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]

Service Processor Functions	Service Processor Menus (ASCII terminals)	AIX Service Aids (ASCII or graphics terminals)	SMS (ASCII or graphics terminals)
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 can be accessed locally or remotely.

Service Processor Menu Inactivity

To prevent loss of control in unstable power environments, the service processor leaves the menu mode after five minutes of inactivity. Return to the menus by pressing any key on the local or remote terminal.

Accessing Service Processor Menus Locally

Service processor menus can 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. After ″OK″ displays on the operator panel the service processor prompts you for a password (if set), and when verified, displays the service processor menus.

Accessing Service Processor Menus Remotely

Service processor menus can be accessed remotely by connecting a modem to serial port 1 or serial port 2, as follows:

1. Turn off the server, unplug the power cord, and press the Power button to drain capacitance while power is disconnected.
2. Connect the modem to the appropriate serial port and turn on the modem.
3. Plug in the server.

Note:

If your modem has not been configured, go to “Call-In/Call-Out Setup Menu” on page 158. 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 Menu

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

```
        GENERAL USER MENU

   1. Power-On System
   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. View System Environmental Conditions
  99. Exit from Menus

1>
```

Note: The service processor prompt displays either 1> or 2> to indicate which serial port on the system unit is being used to communicate with the service processor.

- **Power-On System**

  Allows the user to power-on the system.

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

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

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

  Displays the boot progress indicators (checkpoints), up to a maximum of 100, from the system boot prior to the one in progress. This historical information can be useful to help diagnose system faults.

  The progress indicators are displayed in two sections. Above the dashed line are the progress indicators (latest) from the boot that produced the current sessions. Below the dashed line are progress indicators (oldest) from the boot preceding the one that produced the current sessions.

  The progress indicator codes are listed from top (latest) to bottom (oldest). The dashed line represents the point where the latest boot started.

  If the <-- arrow occurs, use the 4-digit checkpoint or 8-digit error code being pointed to as the starting point for your service actions.

- **Read Service Processor Error Logs**

  Displays the service processor error logs.

  The time stamp in this error log is coordinated universal time (CUT), also known as Greenwich Mean Time (GMT). AIX error logs have additional information available and are able to time stamp the errors with local time. See page “Service Processor Error Log” on page 170 for an example of the error log.

- **Read System POST Errors**

Select this item to 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 are sufficient working system resources. If POST errors occur during startup, this error log, when used with the diagnostics, helps to isolate faults. See page “System POST Errors” on page 171 for an example of the POST error screen.

- **View System Environmental Conditions**

  With this menu option, the service processor reads all environmental sensors and reports the results to the user. This option can be useful when surveillance fails, because it allows the user to determine the environmental conditions that may be related to the failure.

Privileged User Menus

The following menus are available to privileged users only. The user must know the privileged-access password, if set, 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 (optional)

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

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

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

```
                Service Processor Firmware
                 Firmware Level: sh991029
               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

1>
```

Service Processor Setup Menu

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

```
     SERVICE PROCESSOR SETUP MENU

   1. Change Privileged-access Password
   2. Change General-Access Password
   3. Enable/Disable Console Mirroring:
        Currently Disabled

   4. Start Talk Mode
   5. OS Surveillance Setup Menu
   6. Reset Service Processor
   7. Reprogram Service Processor Flash EPROM
   8. Serial Port Snoop Setup Menu
  98. Return to Previous Menu
  99. Exit from Menus

1>
```

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

Passwords

Passwords can be any combination of up to eight alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first eight characters. Passwords can be set from the service processor menu or from the System Management Services menus.

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

If the error threshold is reached by someone entering passwords at the server, the service processor 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 table 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 displays
None	Set	MAIN MENU displays
Set	None	Users with password see the MAIN MENU. Other 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, which can be enabled by local or remote users, provides local users with the capability to monitor remote sessions. Console mirroring can be enabled for the current session only. For more information, see “Console Mirroring” on page 169.
- **Start Talk Mode**

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

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

```
       OS Surveillance Setup Menu

 1. Surveillance:
    Currently Enabled

 2. Surveillance Time Interval:
    5 Minutes

 3. Surveillance Delay:
     10 Minutes


98. Return to Previous Menu
```

- **Surveillance**

  Can be set to enabled or disabled.
- **Surveillance Time Interval**

  Can be set to any number from 1 to 255 minutes. The default value is 5 minutes.
- **Surveillance Delay**

  Can be set to any number from 0 to 255 minutes. The default value is 10 minutes.

Surveillance time interval and surveillance delay can only be changed after surveillance is enabled. Refer to “Service Processor System Monitoring - Surveillance” on page 167 for more information about surveillance.

- **Reset Service Processor**

  Allows the user to reinitialize the service processor.
- **Reprogram Service Processor Flash EPROM**

  Attention: Only the service processor firmware can be updated from the service processor menus; the system firmware cannot be updated from the service processor menus. A service processor firmware update always requires a companion system firmware update which must be applied first. For this reason, updating only the service processor firmware using the service processor menus is not recommended. Go to the RS/6000 support web site at http://www.rs6000.ibm.com/support/micro to download the latest firmware levels and update instructions.

  The service processor firmware update image must be written onto a DOS-formatted diskette. The update image can be obtained from the RS/6000 support web site: http://www.rs6000.ibm.com/support/micro.

  After the update diskette has been made, from the service processor main menu, select ″Service Processor Setup″. Then select ″Reprogram Service Processor Flash EPROM″. The program requests the update diskette(s) as they are needed. The service processor will automatically reboot after the firmware update is complete.

Serial Port Snoop Setup Menu

This menu can be used to setup serial port snooping, in which the user can configure serial port 1 as a ″catch-all″ reset device.

From the main service processor menu, select option 1, Service Processor Setup, then select option 8 (Serial Port Snoop Setup Menu).

```
        SERIAL PORT SNOOP SETUP MENU

   1. System reset string:
        Currently Unassigned

   2. Snoop Serial Port:
       Currently Unassigned

  98. Return to Previous Menu

1>
```

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

Use the snoop serial port option to select the serial port to snoop.

Note: Only serial port 1 is supported.

After serial port snooping is correctly configured, at any point after the system unit is booted to AIX, whenever the reset string is typed on the main console, the system unit uses the service processor reboot policy to restart. This action causes an early power off warning (EPOW) to be logged, and also an AIX dump to be created if the machine is at an AIX prompt, with AIX in such a state that it can respond. If AIX cannot respond, the EPOW record is created, rather than the AIX dump.

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

System Power Control Menu

The menu is used to set power control options.

```
        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
  6. Enable/Disable Fast System Boot:
       Currently Disabled
  7. Boot Mode Menu
 98. Return to Previous Menu
 99. Exit from Menus

1>
```

- **Enable/Disable Unattended Start Mode**

  Use this option to instruct the service processor to immediately power-on the server after a power failure, bypassing power-on password verification. Unattended start mode can also be set using SMS menus. Unattended start mode can be used on servers that require automatic power-on after a power failure.

- **Ring Indicate 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 and 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 is powered on. The **Ring Indicate Power-On Menu** and defaults are shown below:

  ```
         Ring Indicate Power-On Menu

    1. Ring indicate power-on:
         Currently Disabled

    2. Number of rings:
         Currently 6

   98. Return to Previous Menu
  ```

  The number of rings can be set to any number greater than zero. The default value is six rings.

- **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 reboot process ends when control passes to the operating system loading (or initialization) 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

1>
```

- **Number of reboot attempts** If the server fails to successfully complete the boot process, it attempts to reboot the number of times specified. Values equal to or greater than 0 are valid. Only successive failed reboot attempts count, not reboots that occur after a restart attempt. At restart, the counter is set to 0.
- **Use OS-Defined restart policy** lets the service processor react or not react the same way as the operating system to major system faults by reading the setting of the operating system parameter **Automatically Restart/Reboot After a System Crash**. This parameter may or may not be defined, depending on the operating system or its version and level. If the operating system automatic restart setting is defined, then it can be set to respond to a major fault by restarting or by not restarting. See your operating system documentation for details on setting up operating system automatic restarts. The default value is Yes.
- **Enable supplemental restart policy** - The default setting is No. If set to Yes, the service processor restarts the system when the system loses control as detected by the service processor surveillance, and either:

  - The **Use OS-Defined restart policy** is set to No

  OR

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

  Refer to “Service Processor Reboot/Restart Recovery” on page 166.
- **Call-out before restart** If a restart is necessary due to a system fault, you can enable the service processor to call out and report the event. This option can be valuable if the number of these events becomes excessive, signalling a bigger problem.

The following table describes the relationship among the operating system and service processor restart controls:

OS Automatic Reboot/Restart AfterCrash Setting	Service Processor to Use OS-Defined Restart Policy?	Service Processor Enable Supplemental Restart Policy?	System Response
None	No	No[1]	
None	No	Yes	Restarts

OS Automatic Reboot/Restart AfterCrash Setting	Service Processor to Use OS-Defined Restart Policy?	Service Processor Enable Supplemental Restart Policy?	System Response
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

- **Power-On System**

  Allows immediate power-on of the system. For other power-on methods, see “System Power-On Methods” on page 165.

- **Power-Off System**

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

- **Enable/Disable Fast System Boot**

  Allows the user to select a fast system boot.

  Attention: Enabling fast system boot results in several diagnostic tests being skipped and a shorter memory test being run.

- **Boot Mode Menu**

  Allows users to set the system to automatically start a specific function on the next system start. This setting applies to the next boot only and is reset to the default state of being disabled following a successful boot attempt.

```
        BOOT MODE MENU

  1. Boot to SMS Menu:
       Currently Disabled

  2. Service Mode Boot from Saved List:
     Currently Disabled

  3. Service Mode Boot from Default List:
     Currently Disabled

  4. Boot to Open Firmware Prompt:
       Currently Disabled

 98. Return to Previous Menu

1>
```

– **Enabling the Boot to SMS Menu option**

  Causes the system to automatically enter the System Management Services menu during the boot process. Enabling this option is equivalent to pressing 1 on the attached ASCII terminal (or F1 on a graphics terminal) while the system initialization indicators display on screen.

– **Enabling the Service Mode Boot from Saved list option**

  Causes the system to automatically enter the stand-alone diagnostics (see page 141 for more information about stand-alone diagnostics). Enabling this option is equivalent to pressing 5 on the attached ASCII terminal (or F5 on a graphics terminal) while the system initialization indicators display on screen.

– **Enabling the Service Mode Boot from Default List option**

  Causes the system to automatically enter the online diagnostics in service mode (see page 141 for more information about online diagnostics). Enabling this option is equivalent to pressing 6 on the attached ASCII terminal (or F6 on a graphics terminal) while the system initialization indicators display on screen.

– **Enabling the Boot to Open Firmware Prompt option**

  Causes the system to automatically enter open firmware prompt (also called the OK prompt). Enabling this option is equivalent to pressing 8 on the attached ASCII terminal (or F8 on a graphics terminal) while the system initialization indicators display on screen (see “Open Firmware” on page 207 for more information about the open firmware prompt).

If more than one option is enabled, the system recognizes only the option corresponding to the smallest menu number. For example, if options 4 and 2 were enabled, the system recognizes only Option 2: Service Mode Boot from Saved List. After a boot attempt, all enabled options are disabled. In effect, the system throws away any menu options that are enabled after the option with the highest priority (the option with the smallest menu number) is executed.

The user can also override the choices in the Boot Mode Menu while the system initialization indicators display on the screen. For example, if the user had enabled the system to enter the SMS menus (option 1) but pressed the 8 key while the system initialization indicators displayed on the screen, the system would enter the open firmware prompt and disregards the settings in the Boot Mode Menu.

System Information Menu

Use this menu to view the processor configuration information, error logs, system resources, and processor configuration.

```
        SYSTEM INFORMATION MENU

  1. Read VPD Image From Last System Boot
  2. Read Progress Indicators From Last System Boot
  3. Read Service Processor Error Logs
  4. Read System POST Errors
  5. Read NVRAM
  6. Read Service Processor Configuration
  7. View System Environmental Conditions
  8. Processor Configuration/Deconfiguration Menu
  9. Memory Configuration/Deconfiguration Menu
  10. Enable/Disable CPU Repeat Gard
      Currently Enabled

  11. Enable/Disable MEM Repeat Gard
      Currently Enabled

 98. Return to Previous Menu
 99. Exit from Menus

1>
```

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

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

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

  Displays the boot progress indicators (checkpoints), up to a maximum of 100, from the system boot prior to the one in progress. This historical information can help to diagnose system faults.

  The progress indicators are displayed in two sections. Above the dashed line are the progress indicators (latest) from the boot that produced the current sessions. Below the dashed line are progress indicators (oldest) from the boot preceding the one that produced the current sessions.

  The progress indicator codes are listed from top (latest) to bottom (oldest). If the <--- arrow occurs, use the 4-digit checkpoint or 8-character error code being pointed to as the beginning of your service actions.

- **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), also known as Greenwich Mean Time (GMT). AIX error logs have additional information available and are able to time stamp the errors with the local time. See page "Service Processor Error Log" on page 170 for an example of the error log.

- **Read System POST Errors**

  Select this option to review the results of the POST (power-on self-test). Your system unit may be able to start in the presence of POST errors if there are sufficient working system resources. If POST errors occur during start up, this error log, when

used with the diagnostics, helps to isolate faults. See page “System POST Errors” on page 171 for an example of the POST error screen.

- **Read NVRAM**

  Displays nonvolatile random access memory (NVRAM) contents.

- **Read Service Processor Configuration**

  Displays all service processor settings that can be changed by the user.

- **View System Environmental Conditions**

  The service processor reads all environmental sensors and reports the results to the user. Use this option when surveillance fails, because it allows the user to determine the environmental conditions that may be related to the failure.

- **Processor Configuration/Deconfiguration Menu**

  Use this option to view the processor configuration.

  The following is an example of the Processor Configuration/Deconfiguration Menu:

```
    Processor Configuration/Deconfiguration Menu

Processor number
 0. Configured by system (0x0)


(Press Enter to Continue)
```

  The processor can be in one of two states:

  – **Configured by system:** The system processor is present, and has not exceeded the failure threshold.

  – **Deconfigured by system:** The system processor has been taken off-line by the service processor due to an unrecoverable error, or recoverable errors exceeding the failure threshold.

  Attention: If the system processor has been deconfigured by the system, the service processor will prevent the system from booting.

- **Memory Configuration/Deconfiguration Menu**:

  Use this menu to view and modify the memory DIMM configuration. If it is necessary to take one of the memory DIMMs off-line, this menu allows you to deconfigure a DIMM and then reconfigure the DIMM at a later time.

  The configuration process takes place during system power-up. Therefore, the configuration displayed by this menu in standby mode reflects the configuration during the last boot.

  The following is an example of the Memory Configuration/Deconfiguration Menu.

```
    Memory Configuration/Deconfiguration Menu

DIMMs on memory card number 0:

 0. Configured by system (0x0)           1. Configured by system (0x0)
 2. Configured by system (0x0)           3. Configured by system (0x0)

98. Return to Previous Menu

Enter card number and DIMM number separated by a space
1>
```

  In the 44P Model 170, the memory card number is 0 by default, since all four memory DIMM (dual inline memory module) slots are on the system board.

  When the user selects a DIMM, its state toggles between configured and deconfigured. Memory DIMMs that are not present are not shown.

  Each memory DIMM can be in one of four states:

  – **Configured by system:** The memory DIMM is present, and has not exceeded the failure threshold. It has been configured by the system and is available.
  – **Deconfigured by system:** The memory DIMM is present, but has exceeded the failure threshold. It has been deconfigured by the system and is currently unavailable.
  – **Manually configured:** The memory DIMM is present and available. It has been configured by the user through this menu.
  – **Manually deconfigured:** The memory DIMM is present, but unavailable. It has been deconfigured by the user through this menu.

- **Enable/Disable CPU Repeat Gard Menu**

  This menu option is not supported on the 44P Model 170. However, CPU repeat gard is implemented. If the system processor experiences an uncorrectable error (such as a checkstop), or goes over the threshold for correctable errors, the system processor is deconfigured by the service processor at the next boot. The service processor then stops the system from booting until the system processor is replaced.

- **Enable/Disable Memory Repeat Gard Menu**

  Use this option to enable or disable memory repeat gard.

Language Selection Menu

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

```
        LANGUAGE SELECTION MENU

   1. English
   2. Francais
   3. Deutsch
   4. Italiano
   5. Espanol
   6. Svenska
  98. Return to Previous Menu
  99. Exit from Menus

1>
```

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

Call-In/Call-Out Setup Menu

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

```
        CALL-IN/CALL-OUT SETUP MENU

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

1>
```

- **Modem Configuration Menu**, see “Modem Configuration Menu” on page 159.
- **Serial Port Selection Menu**, see “Serial Port Selection Menu” on page 159.
- **Serial Port Speed Setup Menu**, see “Serial Port Selection Menu” on page 159.
- **Telephone Number Setup Menu**, see “Telephone Number Setup Menu” on page 160.
- **Call-Out Policy Setup Menu**, see “Call-Out Policy Setup Menu” on page 162.
- **Customer Account Setup Menu**, see “Customer Account Setup Menu” on page 163.
- **Call-out Test**, see “Call-Out Policy Setup Menu” on page 162.
- **Ring Indicate Power-On Menu**, see 151.

Modem Configuration Menu

Two entries at the top of the Modem Configuration Menu display the status of the current selections. Selections are made in the two sections labeled Modem Ports and Modem Configuration File Name. Select the serial port that you want to activate and then select the modem configuration file for the modem on the port. 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 271 and “Transfer of a Modem Session” on page 276.

```
        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. none                  9. modem_m0_sp
   4. modem_f_sp            10. modem_m1_sp
   5. modem_f0_sp
   6. modem_f1_sp
   7. modem_z_sp
   8. modem_z0_sp

   30. Save configuration to NVRAM and Configure modem
   98. Return to Previous Menu
```

Serial Port Selection Menu

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

```
     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
```

Serial Port Speed Setup Menu

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

```
       Serial Port Speed Setup Menu

  1. Serial port 1 speed:
       Currently 9600

  2. Serial port 2 speed:
       Currently 9600

 98. Return to Previous Menu
```

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

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

Telephone Number Setup Menu

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

```
       Telephone Number Setup Menu

  1. Service Center Telephone Number:
      Currently Unassigned

  2. Customer Administration Center Telephone Number:
      Currently Unassigned

  3. Digital Pager Telephone Number:
      Currently Unassigned

  4. Customer Voice Telephone Number:
      Currently Unassigned

  5. Customer System Telephone Number:
      Currently Unassigned

 98. Return to Previous Menu

1>
```

- **Service Center Telephone Number** is the number of the service center computer. The service center usually includes a computer that takes calls from servers with call-out capability. This computer is referred to as the *catcher*. The catcher expects messages in a specific format to which the service processor conforms. Contact your service provider for the correct service center telephone number to enter here. For

more information about the format and catcher computers, refer to the README file in the AIX `/usr/samples/syscatch` directory.

- **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.
- **Digital Pager Telephone Number** is the number for a pager carried by someone who responds to problem calls from your server. Contact your administration center representative for the correct telephone number to enter here. For test purposes, use a test number, which you can change later.

  Note: Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message causes the service processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out policy Setup Menu. These retries result in redundant pages.

  For digital pagers that require a personal identification number (PIN) for access, include the PIN in this field as shown in the following example:

  ```
  18001234567,,,,87654
  ```

  The commas create pauses for the voice response system, and the 87654 represents the PIN. The length of these pauses is set in modem register S8. The default is usually 1 or 2 seconds each.
- **Customer Voice Telephone Number** is the telephone number of a phone near the server or answered by someone responsible for the server. This is the telephone number left on the pager for callback. For test purposes, use a test number, which you can change later.
- **Customer System Telephone Number** is the telephone number to which your server's modem is connected. The service or 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

This menu allows you to set call-out policy.

```
        Call-Out Policy Setup Menu

  1. Call-Out policy (First/All):
      Currently First

  2. Remote timeout, (in seconds):
      Currently 120

  3. Remote latency, (in seconds):
      Currently 2

  4. Number of retries:
      Currently 2

 98. Return to Previous Menu

1>
```

- **Call-Out Policy**

  Can be set to 'First' or 'All'. If call-out policy is set to 'first', the service processor stops at the **first successful** call out to one of the following numbers:

  – Service center
  – Customer administration center
  – Pager

  If call-out policy is set to 'all', the service processor attempts a call out to the following numbers in the order listed:

  1. Service center
  2. Customer administration center
  3. Pager

- **Remote timeout** and **Remote latency** are functions of your service provider's catcher computer. Either use the defaults or contact your service provider for arecommended settings. The default values are:

  Remote timeout
  120 seconds

  Remote latency
  2 seconds

- **Number of retries** is the number of times you want the server to retry calls that resulted in busy signals or in other error messages.

Customer Account Setup Menu

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

```
        Customer Account Setup Menu

   1. Customer account number:
       Currently Unassigned

   2. Customer RETAIN login userid:
       Currently Unassigned

   3. Customer RETAIN login password:
       Currently Unassigned

  98. Return to Previous Menu

1>
```

- **Customer account number** is assigned by your service provider for record-keeping and billing. If you have an account number, enter it. 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.

Call-Out Test

The call-out test verifies if the call-out function is working properly. Before the test, call-out must be enabled and the system configured properly for call-out.

During the setup, the user should have entered the phone numbers for the digital pager and customer voice for test purposes. These numbers are used to determine whether call-out is working during the call-out test.

The call-out test should cause the user's phone to ring. If the test is successful, call-out is working properly. The user should now change the test digital pager and customers voice number to the correct numbers.

Service Processor Functions

This section provides detailed information about the service processor functions.

The 44P Model 170 supports the functions listed in the following table:

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
	Identify system by name	Call In
		Power-on via ring-indicate
		Password/security check
		Console mirroring/Quick disconnect

System Power-On Methods

This section discusses the following system power-on methods:

- Power-on switch
- Remote power-on via ring-indicate signal

  The server automatically powers on when it detects a ″ring indicate″ signal from a modem attached to one of the integrated serial ports.

  A remote user can call the server to activate ring detection by the modem. Listen for a few more rings than the threshold number for starting the system and then hang up. The default threshold is six rings.

  Wait 5 minutes for the server to initialize and then call again using an ASCII terminal. The server responds by requesting a password, if set, or presenting the service processor menus. The remote user now has control of the server.

  Note: For security, if the system is powered on by the remote power-on via ring indicate signal and the service processor detects a battery failure, the service processor causes the system to power off. See “Service Processor Call-In Security” on page 166 for more information.

- Unattended start mode - refer to **Enable/Disable Unattended Start Mode** on page 151.

  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” on page 151). When ac power is restored, the system returns to the power state at the time ac loss occurred. For example, if the system was powered-on when ac loss occurred, it reboots/restarts when power is restored. If the system was powered-off when ac loss occurred, it remains off when power is restored.

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

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

  Note: If an ac power loss is in progress when the timed power-on attempt occurs, the server cannot power on when ac power is restored.

- Follow-up to a failed boot attempt

  The service processor initiates a power-on sequence if a failed boot attempt is detected (due to a hardware or software failure).

- Fast/Slow Boot (IPL) Capabilities

  Using the service processor menus, you can select the IPL type, mode, and speed of your system. For more information, refer to “System Power Control Menu” on page 151.

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

Service Processor Call-In Security

If the service processor detects bad battery-powered storage (indicating that the battery on the system board has failed or has been removed), it maintains server security by disabling the call-in capability to both serial ports.

When call-in is disabled, the system can still be powered on by using the ring-indicator signal, but the service processor then causes the system to power down, preventing access to any system facilities or to AIX.

After battery power is restored, the password(s) must be reset and the call-in function(s) enabled. Both of these operations can be performed from service processor menus. See “Serial Port Selection Menu” on page 159.

Service Processor Reboot/Restart Recovery

Reboot describes bringing the system hardware back up; for example, from a system reset or power-on. The reboot process ends when control passes to the operating system loading (or initialization) process.

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

Boot (IPL) Speed

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

Failure During Boot Process

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

Failure During Normal System Operation

When the boot process completes and control transfers to the operating system (OS), the service processor can monitor operating system activity (see the Set Surveillance Parameters option in the “Service Processor Setup Menu” on page 147). If OS activity stops due to a hardware- or software-induced failure, the service processor can initiate a reboot/restart process based on the settings in the Service Processor Reboot/Restart Policy Setup Menu and the OS automatic restart settings (see the operating system documentation).

If you are using the AIX operating system, the menu item under SMIT for setting the restart policy is Automatically Reboot After Crash (True/False). The default is False. When the setting is True, and if the service processor parameter ″Use OS-Defined Restart Policy″ is Yes (the default), the service processor takes over for AIX to reboot/restart after a hardware or surveillance failure.

Service Processor Reboot/Restart Policy Controls

The operating system's automatic restart policy (see operating system documentation) defines the operating system's response to a system crash. The service processor can be instructed to refer to that policy by the Use OS-Defined Restart Policy setup menu.

Memory Boot-Time Deconfiguration (Memory Repeat Gard)

Memory boot time deconfiguration allows for the removal of a memory segment or DIMM from the system configuration at boot time. The objective is to minimize system failures or data integrity exposure due to faulty memory hardware. The hardware resource(s) to be removed are the ones that experienced the following failures:

- A boot-time test failure.
- Run-time recoverable errors over the error threshold prior to the current boot phase.
- Run-time irrecoverable errors prior to the current boot phase.

This function uses firmware power-on self-test (POST) to discover and isolate memory hardware failures during boot time. It also uses the hardware error detection logic in the memory controller to capture run-time recoverable and irrecoverable errors. The firmware uses the error signatures in the hardware to analyze and isolate the error to the specific memory segment or DIMM.

The memory segment or DIMM that is deconfigured remains off-line during subsequent reboots until the faulty memory hardware is replaced.

The function allows users to manually deconfigure or re-enable a previously deconfigured memory segment/DIMM through the service processor menu. The user can also enable or disable this function through the service processor menu.

Service Processor System Monitoring - Surveillance

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

Surveillance is available during two phases:

- System firmware bring-up (automatic)
- Operating system run time (optional)

System Firmware Surveillance

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 by the user.

If the service processor detects no heartbeats during system boot (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 failure condition repeats, the service processor

leaves the machine powered on, logs an error, and displays menus to the user. If call-out is enabled, the service processor calls to report the failure and displays the operating-system surveillance failure code on the operator panel.

Operating System Surveillance

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

Operating system surveillance is enabled by default, allowing the user to run operating systems that do not support this service processor option.

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

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

- Surveillance enable/disable
- Surveillance interval

  This is the maximum time (in minutes) the service processor should wait for a heartbeat from the operating system before timeout.
- 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 takes effect immediately after the parameters are set 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

The service processor can call out when it detects one of the following conditions:

- System firmware surveillance failure
- Operating system surveillance failure (if supported by the operating system)
- Critical environmental failures
- Restarts

To enable the call-out feature, do the following:

1. Have a modem connected to serial port 1 or 2
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 the serial port line speed.
- Enter the modem configuration filename.
- Set up site-specific parameters (such as phone numbers for call-in and call-out policy).
- 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 return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message causes the service processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out policy Setup Menu. These retries result in redundant pages.

Console Mirroring

Console mirroring allows a user 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 for Console Mirroring

The following describes the system configuration for console mirroring:

- Modem connected to one serial port and enabled for incoming calls
- Local ASCII terminal connected to the other serial port. This local terminal can be connected directly to your server or connected through another modem.

Remote console mirroring can be invoked in two ways:

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: To disconnect quickly, press Ctrl+D on either console, and both sessions will exit the service processor menus.

Service Processor Firmware Updates

Attention: Only the service processor firmware can be updated from the service processor menus; the system firmware cannot be updated from the service processor menus. A service processor firmware update always requires a companion system firmware update which must be applied first. For this reason, updating only the service processor firmware using the service processor menus is not recommended. Go to the RS/6000 support web site at http://www.rs6000.ibm.com/support/micro to download the latest firmware levels and update instructions.

The service processor firmware update image must be written onto a DOS-formatted diskette. The update image can be obtained from the RS/6000 support web site: http://www.rs6000.ibm.com/support/micro.

After the update diskette has been made, from the service processor main menu, select ″Service Processor Setup″. Then select ″Reprogram Service Processor Flash EPROM″. The program requests the update diskette(s) as they are needed. The service processor will automatically reboot after the firmware update is complete.

Service Processor Error Log

The service processor error log contains information about errors reported by the service processor.

```
                          Error Log

19991118165344  1. 4B276851 CPU BIST fail detected
FRUs to replace: P1-C1



   Press "C" to clear error log, any other key to continue.  >
```

The time stamp in this error log is Coordinated Universal Time (CUT), also known as Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time.

System POST Errors

If power-on self-test (POST) errors occur during startup, this error log helps isolate faults when used with the diagnostics.

```
                          Read System POST Errors



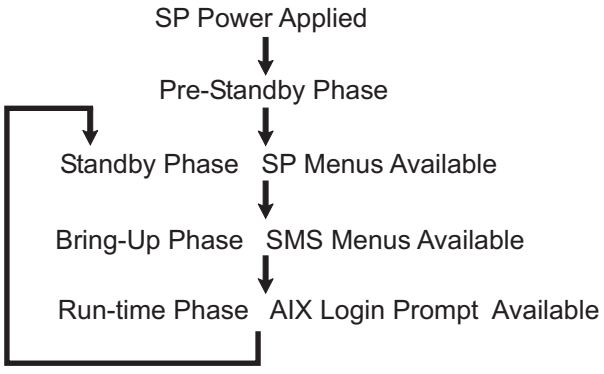
Version : 0
Severity : 0
Disposition : 0
Initiator : 0
Event being reported : 0

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)
```

Service Processor Operational Phases

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



Pre-Standby Phase

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

The pre-standby phase components are:

- Service processor initialization - Performs any necessary hardware and software initializations.
- Service processor POST - Conducts power-on self-tests on its various work and code areas.
- Service processor unattended start mode checks - To assist fault recovery. If unattended start mode is set, the service processor automatically reboots the server. The service processor does not wait for user input or power-on command, but moves through the phase and into the bring-up phase. Access SMS menus or service processor menus to reset the unattended start mode.

Standby Phase

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

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

OR

- 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 service processor takes care of some automatic duties and is available for menu operation. The service processor remains in the standby phase until a power-on request is detected.

The standby phase components are as follows:

- Modem configuration

The service processor configures the modem (if installed) so that incoming calls can be received or outgoing calls can be placed.

- Dial In

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

- Menus

  The service processor menus are password-protected. Before you can access them, you need either the general-access password (or GAP) or 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 service processor checks to see if the previous boot attempt failed. If two consecutive failures are detected, the service processor displays an error code and places an outgoing call to notify an external party if the user has enabled this option.

- Dial Out

  The service processor can dial a preprogrammed telephone number in the event of an IPL failure. The service processor issues an error report with the last reported IPL status indicated and any other available error information.

- Update Operator Panel

  The service processor displays operator panel data on the ASCII terminal if a terminal is connected either locally or remotely.

- Environmental Monitoring

  The service processor provides expanded error recording and reporting.

- System Firmware Surveillance (Heartbeat Monitoring)

  The service processor monitors and times the interval between system firmware heartbeats.

- Responding to system processor commands

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

Run-time Phase

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

- Environmental Monitoring

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

- Responding to System Processor Commands

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

- Run-Time Surveillance (Heartbeat Monitoring)

If the device driver is installed and surveillance enabled, the service processor monitors the system heartbeat. If the heartbeat times out, the service processor places an outgoing call. This is different from the bring-up phase scenario where two reboot attempts are made before placing an outgoing call.

Service Processor Procedures in Service Mode

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

- Unattended start mode
- Reboot/restart policy
- Call-Out
- Surveillance

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

Chapter 8. System Management Services

Use the System Management Services menus 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 197.

Graphical System Management Services

To start the graphical System Management Services, turn on or restart the computer.

The firmware version installed in your system unit is displayed at the bottom right corner of the initial logo screen. Note the version number; processor upgrades may require a specific version of firmware to be installed in your system unit. (Update System Firmware is an option under the Utilities menu in the System Management Services.)

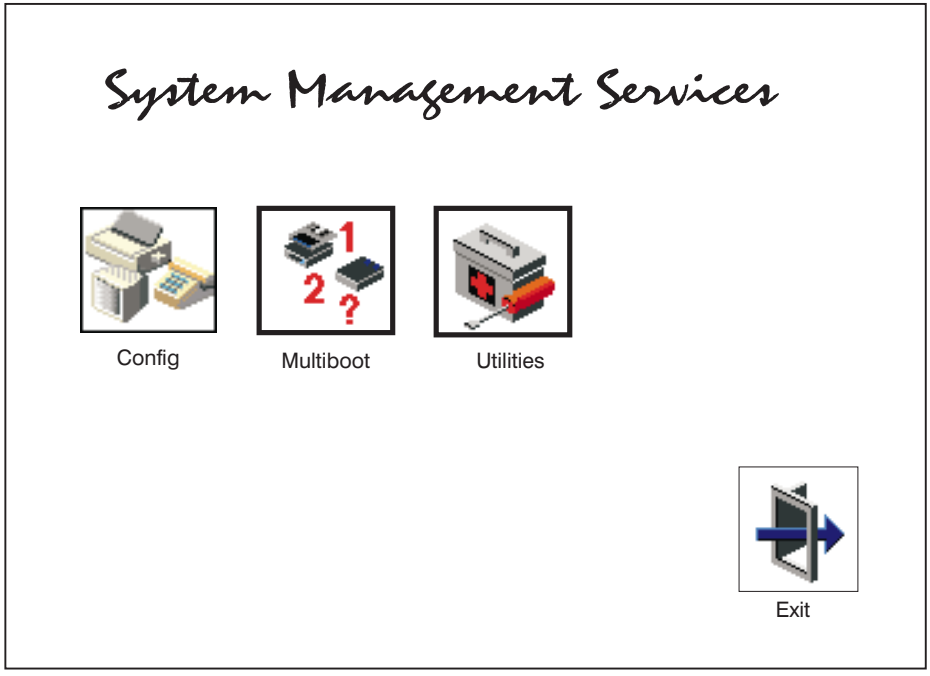
After the logo is displayed, initialization icons display across the bottom of the screen.

To enter the graphical System Management Services, you must press the F1 key *after the keyboard icon displays* during startup and before the tone.

If you have pressed the F1 key, the System Management Services menu displays after the initialization and power-on self-test (POST) are complete.

Note: If you have installed a privileged-access password, you are prompted for this password before you gain access to the System Management Services menu.

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



You can also press F8 here to enter the open firmware **OK>** prompt.

The System Management Services screen contains the following choices.



Config: Enables you to view your system configuration. Go to “Config” on page 178.



Multiboot: Enables you to set and view the default operating system, modify the boot sequence, access the open firmware command prompt, and work with other options. Go to “Multiboot” on page 179.



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 firmware error log, and update your system unit’s firmware. Go to “Utilities” on page 181.



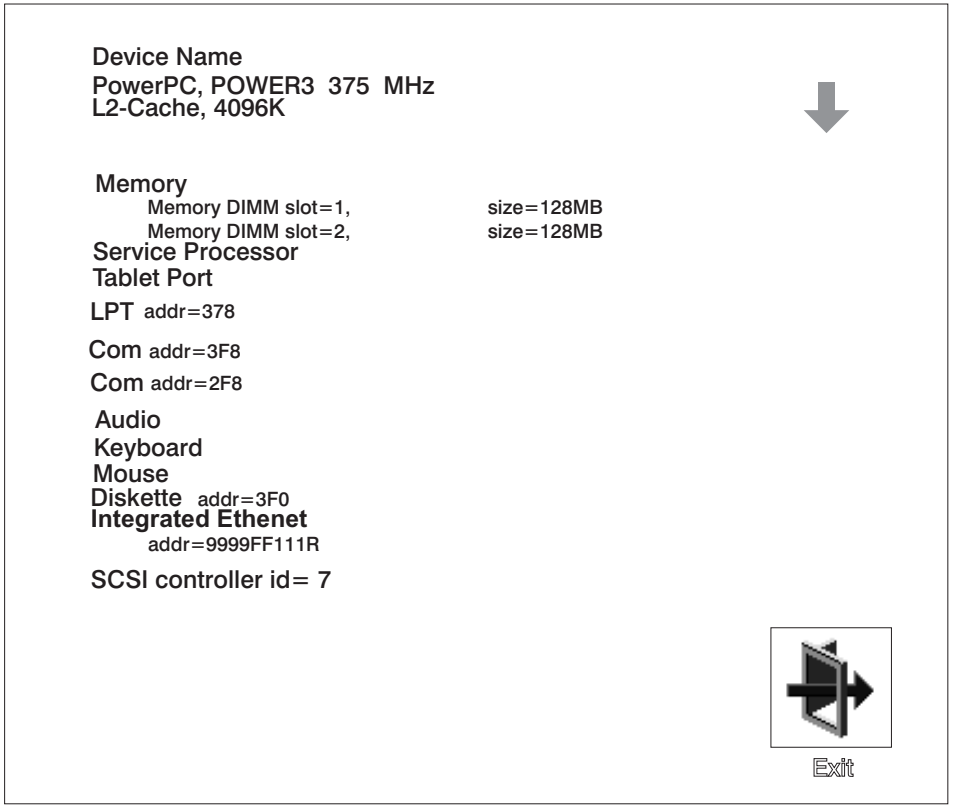
Exit: Returns you to the previous screen.

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



By selecting this icon, you can view information about the setup of your system unit. A list similar to the following appears when you select the **Config** icon.

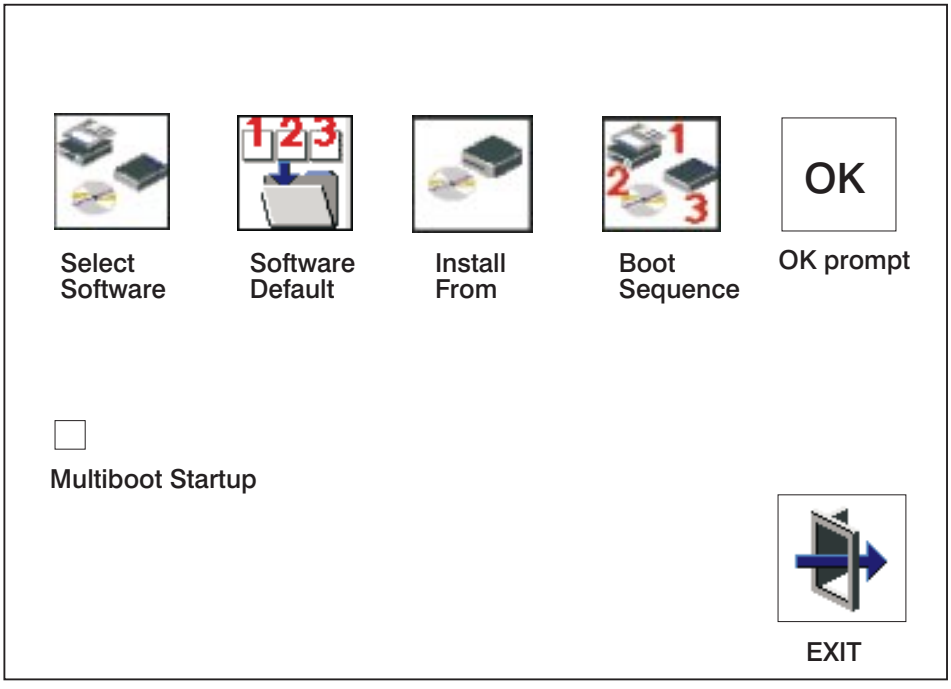


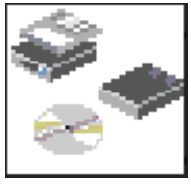
If more than one screen of information is available, a blue arrow displays in the top right corner of the screen. Use the page up and page down keys to scroll through the pages.

Multiboot



The options available from this screen allow you to view and set various options regarding the operating system and boot devices.





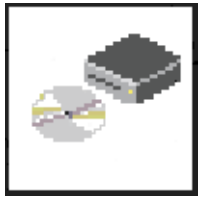
The following describes the choices available on this screen.

Select Software: This option, if supported by the operating system, allows you to choose which operating system to use. Choosing an operating system causes the system to start. This option is supported by AIX. However, not all operating systems support this option.

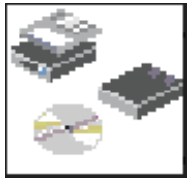
If you receive an informational message saying that no operating system is installed, then the system information in nonvolatile storage may have been lost. This situation can occur if the battery has been removed. To correct this situation, refer to the **bootlist** reference in your AIX operating system documentation.



Software Default: This option, if supported by the operating system, enables you to select a default operating system for your system unit.



Install From: Enables you to select a media drive from which to install an operating system. Selection of a device is done using the spacebar.

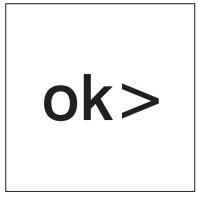


Boot Sequence: Enables you to view and change the custom boot list (the sequence in which devices are searched for operating system code). You may choose from 1 to 5 devices for the custom boot list.

The default boot sequence is:
1. Diskette drive
2. CD-ROM drive
3. Tape drive
4. Hard disk drive
5. Network adapter

To change the custom boot list, enter a new order in the **New** column, then click on the **Save** icon. The list of boot devices is updated to reflect the new order.

Attention: To change the custom boot list back to the default values, click on **Default**. 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.

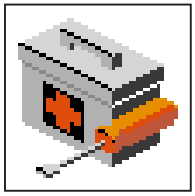


OK Prompt: Enables you to go directly to the open firmware command prompt. the open firmware command prompt is used for debugging and device driver development. For more information about the operation of the open firmware command prompt, refer to IEEE Standard 1275.

The **open firmware** command line can also 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. Do not invoke this feature if you are not familiar with open firmware. To exit from the command prompt, restart your system.

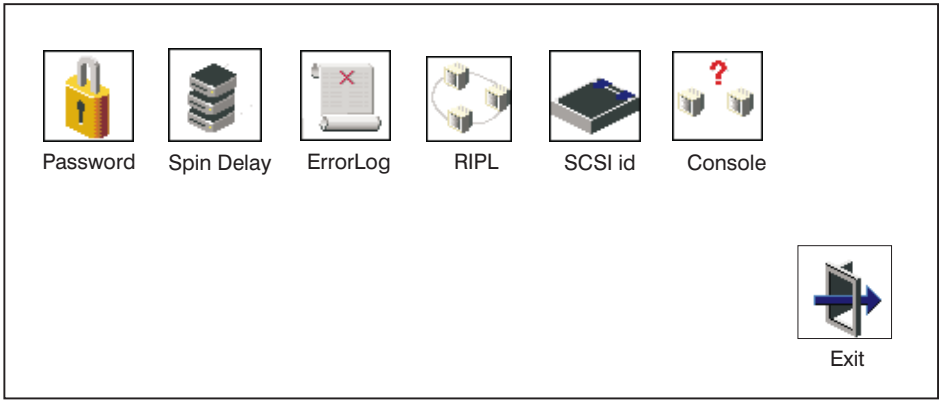
Multiboot Startup: Clicking on this button toggles whether the Multiboot menu displays automatically at startup.

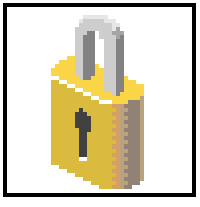
Utilities



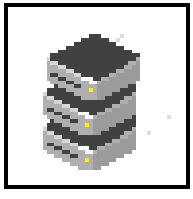
Selecting this icon enables you to perform various tasks and view additional information about your system unit.

The following describes the choices available on this screen.

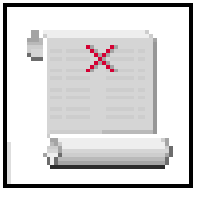




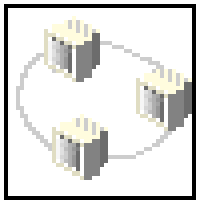
Password: Enables you to set password protection for turning on the system unit and for using system administration tools. Go to “Password” on page 183.



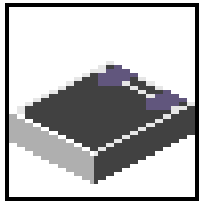
Spin Delay: Enables you to change the spin-up delay for SCSI hard disk drives attached to your system. Go to “Spin Delay” on page 187.



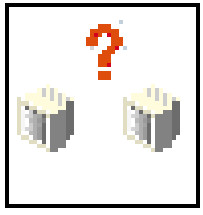
Error Log: Enables you to view and clear the firmware error log for your system unit. Go to “ErrorLog” on page 187.



RIPL (Remote Initial Program Load): Enables you to select a remote system from which to load programs through a network adapter when your system unit is first turned on. This option also allows you to configure network adapters, which is required for RIPL. Go to “RIPL” on page 189.



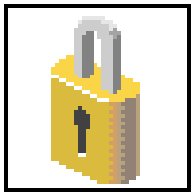
SCSI ID: Allows you to view and change the addresses (IDs) of the SCSI controllers attached to your system unit. Go to “SCSI ID” on page 194.



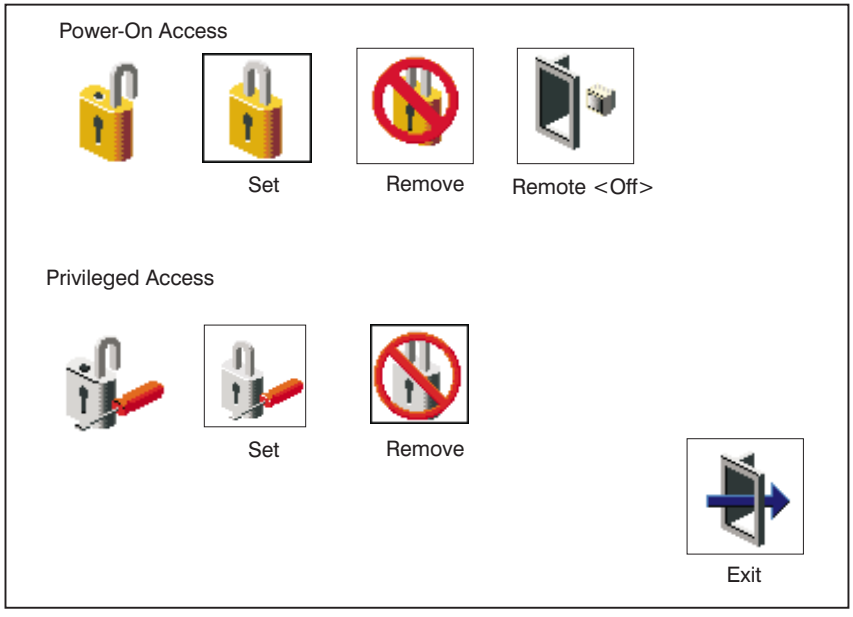
Console: Allows the user to select which console to use to display the SMS menus. This selection is only for the SMS menus. It does not affect the display used by the AIX operating system.

Follow the instructions that display on the screen. Pressing the number 1 key after the keyboard icon appears and before the tone returns you to SMS.

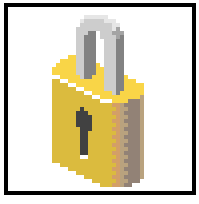
Password



Select this icon to perform password-related tasks.

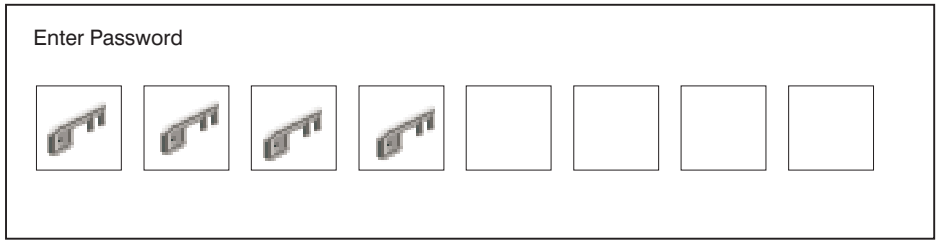


Power-On Access Password

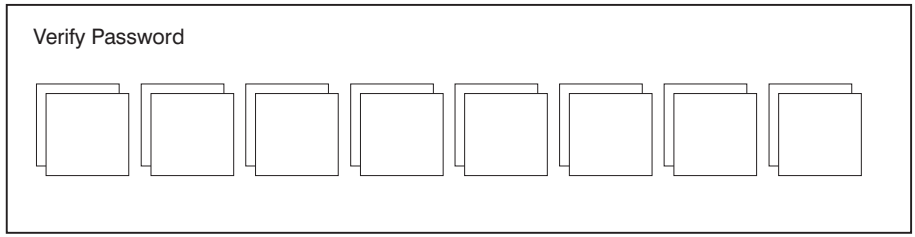


Setting a **Power-On Access** password helps protect information stored in your system unit. If a power-on access password is set for your system unit, the power-on access status icon is shown in the locked position. If a power-on access password is not set, then the power-on access status icon is shown in the unlocked position (as shown in the screen above).

When you select the **Set** icon, a screen with eight empty boxes displays. 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.



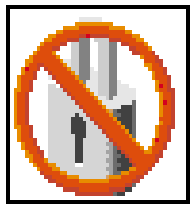
Press Enter when you are finished; you must type the password again for verification.



If you type the password incorrectly, press the Esc key and start again.

Note: After you have entered and verified the password, the power-on access password icon flashes and changes to the locked position to indicate that your system unit now requires the password you just entered during the power on process.

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



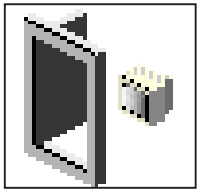
After you have selected the remove icon, the power-on-access status icon flashes and changes to the unlocked position to indicate that the power-on-access password is not set.

If the two password entries do not match, an error icon appears with an error code: `20E00000`.

Note: If you *forget* the power-on access password, you can erase the password by shutting down the system unit and removing the battery for at least 30 seconds. The system unit power cable *must* be disconnected before removing the battery.

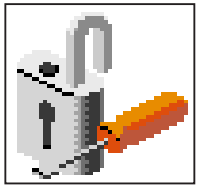
A password becomes effective only after the system is turned off and back on again.

Remote Mode

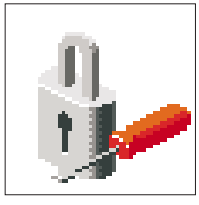


Remote Mode: The remote mode, when enabled, allows the system to start from the defined boot device. This mode is ideal for network servers and other system units that operate unattended. When the remote mode is set, the icon label changes to **Remote <On>**
Note: To use the remote mode feature for booting unattended devices, you must enable the unattended start mode. See the “System Power Control Menu” on page 151 for instructions on enabling the unattended start mode, which allows the system unit to turn on whenever ac power is applied to the system (instead of having the system unit wait for the power button to be pushed).

Privileged-Access Password

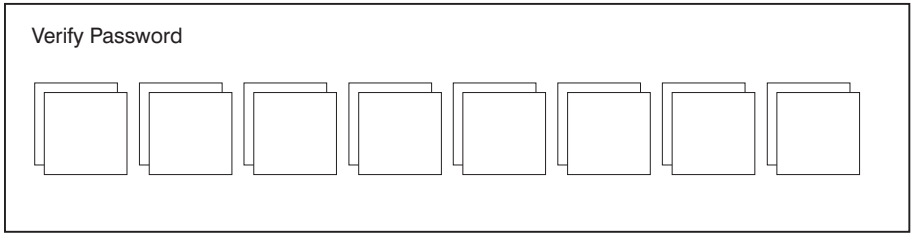


The privileged-access password protects against the unauthorized starting of the system programs. Select the **Set** icon to set and verify the privileged-access password.



When you select the **Set** icon, a screen with eight empty boxes displays. 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 displays in the box.

Press Enter when you are finished; you must type the password again for verification.

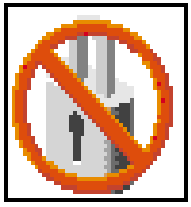


If you type the password incorrectly, press the Esc key and start again.

If the two password entries do not match, an error icon displays with the error code `20E00001`.

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

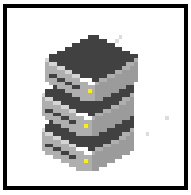
If you previously had set a privileged-access password and want to remove it, select the **Remove** icon.



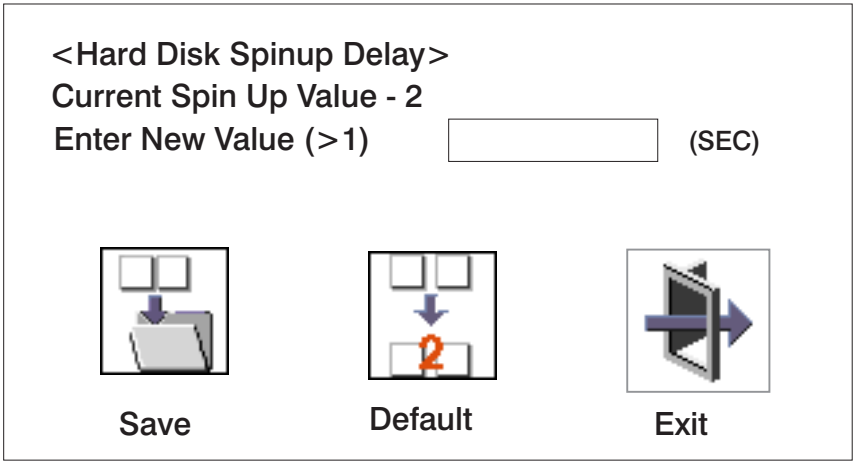
After you have selected the **Remove** icon, the privileged-access status icon flashes and changes to the unlocked position to indicate that the privileged-access password is not set.

Attention: If no user-defined bootlist exists and the privileged-access password has been enabled, you are asked for the privileged-access password at startup every time you boot your system.

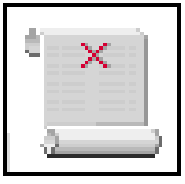
Spin Delay



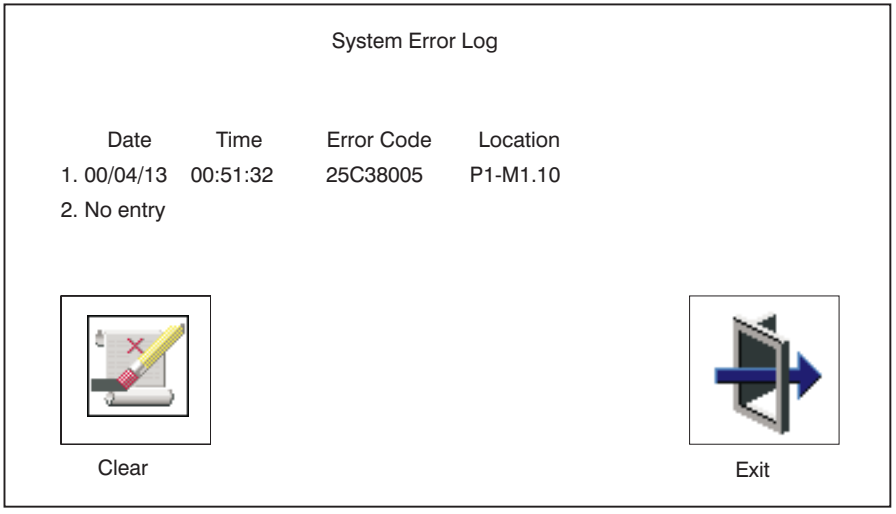
Select this icon to change the spin-up delay for SCSI hard disk drives attached to your system. Spin-up delay values can be entered manually or you can use a default setting. All values are measured in seconds. The default is two seconds. After you have entered the new spin-up delay values, use the arrow keys to highlight the **Save** icon and press Enter.



ErrorLog



Selecting this icon displays the log of errors that your system unit has recorded during operations.

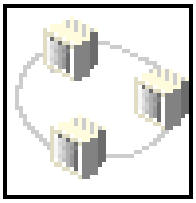


Selecting the **Clear** icon erases the entries in this log.

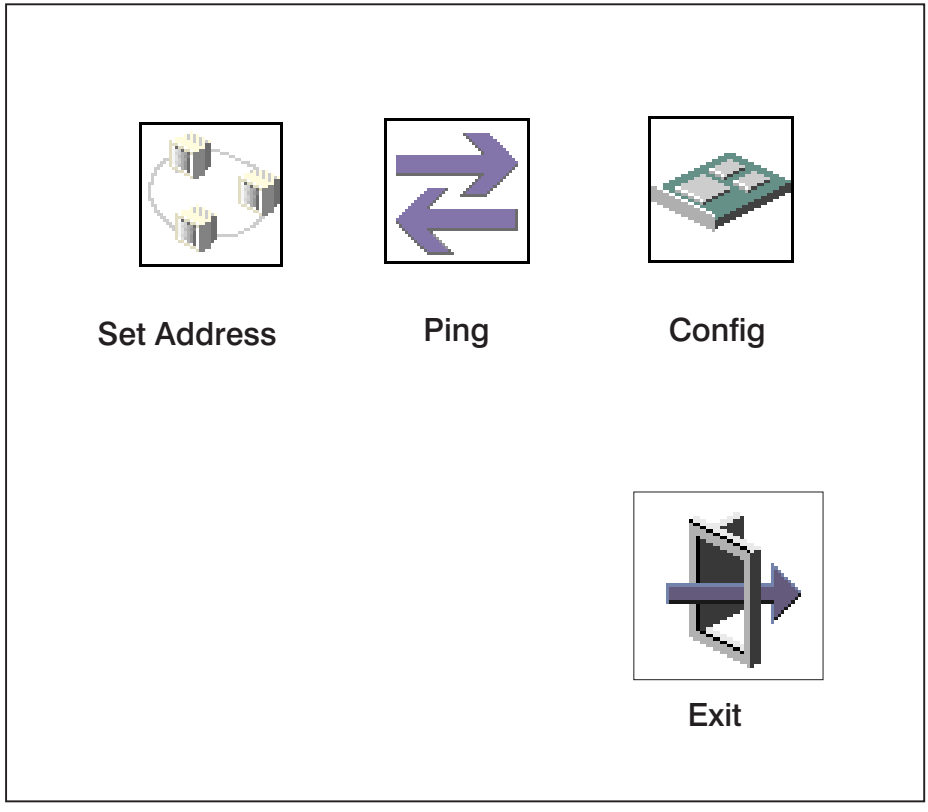
This error log only shows the first and last errors.

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

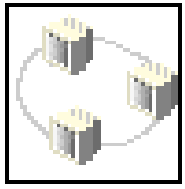
RIPL



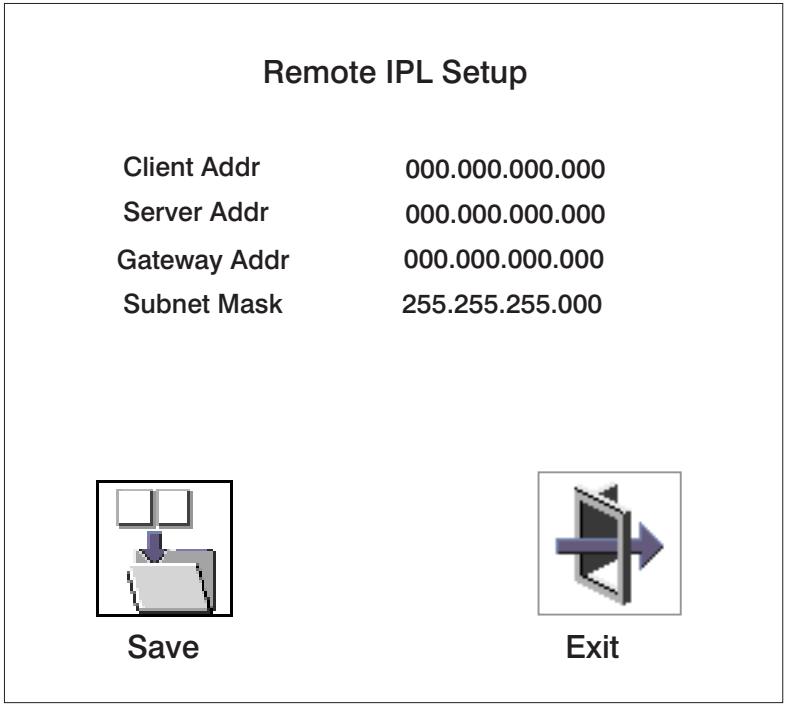
Selecting the **Remote Initial Program Load (RIPL)** icon gives you access to the following selections.



Set Address



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

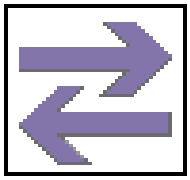


If any of the addresses is incomplete or contains a number other than 0 to 255, an error message displays when you select the **Save** icon. To clear this error, correct the address and select **Save** again.

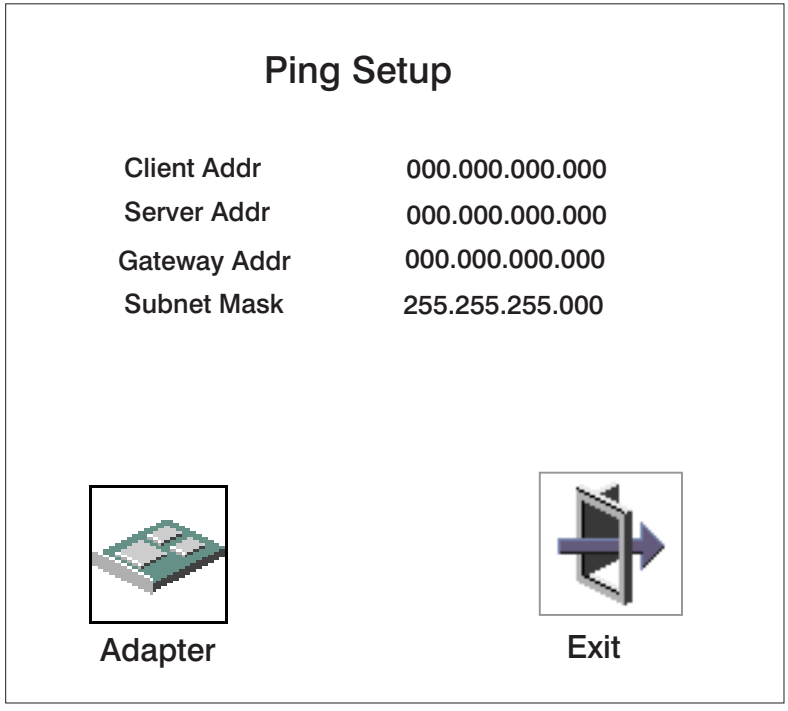
Attention: If the client system and the server are on the same subnet, set the gateway IP address to [0.0.0.0].

To change an address, press the backspace key on the highlighted address until the old address is completely deleted. Then enter the new address.

Ping

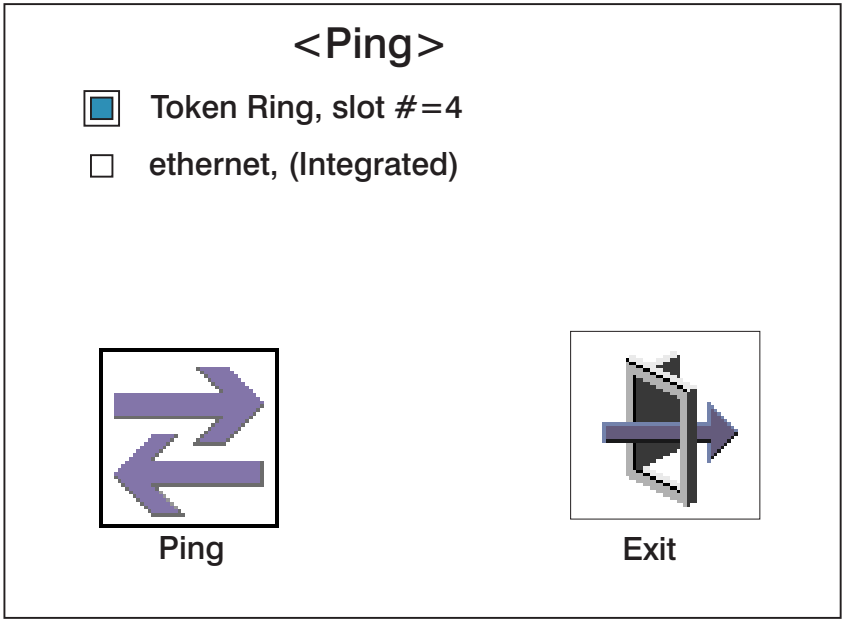


The **Ping** icon allows you to confirm that a specified address is valid by sending a test transmission to that address.



To change an address, press the backspace key on the highlighted address until the old address is completely deleted. Then enter the new address.

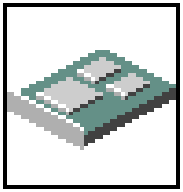
Selecting the **Ping** icon displays a screen in which you select the communications (token-ring or Ethernet) to be used to send test transmissions.



To use this screen, do the following:

1. Use the arrow keys or mouse to highlight an adapter to configure.
2. Press the spacebar to select the adapter.
3. Highlight the **Ping** icon and press Enter to send the test transmission.

Config

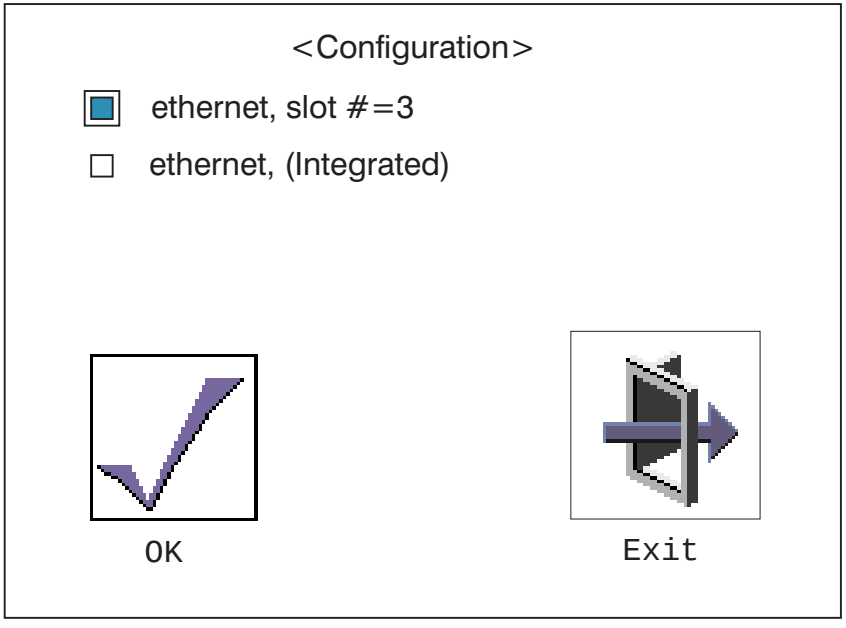


The **Config** icon allows you to configure network adapters which require setup.

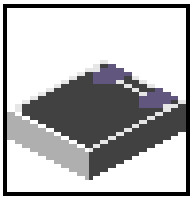
Selecting the **Config** icon causes a list of the adapters requiring configuration to display.

To use this screen, do the following:

1. Use the arrow keys or mouse to highlight an adapter to configure.
2. Press the spacebar to select the adapter.
3. Highlight the **OK** icon and press Enter.



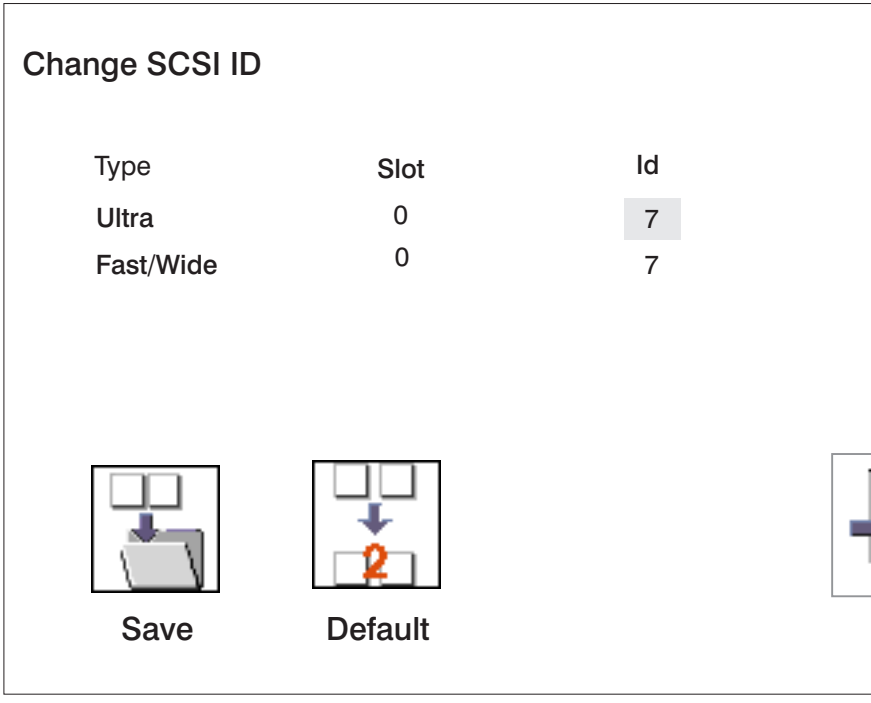
SCSI ID



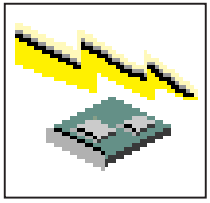
Select this icon to view and change the addresses (IDs) of the SCSI controllers attached to your system unit.

Select this icon to view and change the addresses (IDs) of the SCSI controllers attached to your system unit. To change a SCSI controller ID, highlight the entry by moving the up or down arrow keys, then use the spacebar to scroll through available IDs. After you have entered the new address, use the left or right arrow keys or mouse to highlight the **Save** icon and press Enter.

At any time in this process, you can select the **Default** icon to change the SCSI IDs to the default value of 7.



Firmware Update



Attention: The SMS firmware update utility does not support the combined image update process. It is recommended only for those systems that boot AIX. Detailed instructions on using the SMS utilities to update system and service processor firmware can be obtained from the RS/6000 support website:

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

If you are not able to obtain firmware update images or instructions from this website, contact your service representative.

If the firmware update image is available on your network from another system, see “Appendix D. Firmware Updates” on page 291 for instructions on updating the system and service processor firmware using a combined image from the AIX command line.

Firmware Recovery

If a troubleshooting procedure has indicated that the system firmware unit has been damaged, it may be possible to recover it. For example, if the system hangs during startup with `E1EA` displayed on the operator panel, the system firmware has been damaged but may be recovered.

To recover damaged system firmware, do the following:

1. Create a firmware recovery diskette. This must be a 3.5″ high-density (1.44 MB) diskette that has been formatted for DOS.
2. Obtain the system firmware update image file from one of the following sources:
   a. From the Web address: http://www.rs6000.ibm.com/support/micro
   b. From a service representative if you cannot access the Web address.
3. Copy the system firmware update image file to the recovery diskette, naming it PRECOVER.IMG. The file must be written in DOS format.
4. When the system stops booting, for example at `E1EA`, insert the recovery diskette. If the diskette drive LED does not light up, power the system unit off, then back on again.
5. If the recovery procedure is successful, the system will continue starting up and display checkpoints of the form `E1XX`.
6. Enter the System Management Service menu. When the keyboard indicator displays, press the 1 key if the system console is an ASCII terminal. If the system console is a graphics display and directly attached keyboard, press the F1 key.

7. When the main menu displays, choose Utilities, then perform an update of the system firmware by following the prompts that are displayed.

   Attention: A companion service processor firmware update may be required. Go to the RS/6000 support website at http://www.rs6000.ibm.com/support/micro to get additional information on companion levels, and detailed update instuctions.

Text-Based System Management Services

The text-based System Management Services are available if an ASCII terminal is attached to your system unit. The text-based System Management Services make it possible for you to view information about your system unit and to perform such tasks as setting passwords and changing device configurations.

To start the text-based System Management Services, press the number **1** key on the ASCII terminal keyboard when the keyboard text symbol displays during startup. After the text-based System Management Services starts, the following screen displays.

Note: The version of firmware currently installed in your system unit is displayed at the top of each screen in the text-based System Management Services. Note the version number. Processor and other device upgrades may require a specific version of firmware to be installed in your system unit. Update System Firmware is an option under the Utilities menu.

```
System Management Services


 1   Display Configuration
 2   Multiboot
 3   Utilities
 4   Select Language


                                                    .------.
                                                    |X=Exit|
                                                    '------'

 ===>
```

After you have finished using the text-based System Management Services, type **x** (for exit) to start your system unit. On all other screens, the **x** takes you back to the prior screen.

Display Configuration

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

```
  Device Name

  Power PC, POWER3  375 MHz
  L2-Cache 4096K
  Power PC, POWER3  375 MHz
  L2-Cache 4096K
  Memory
     Memory DIMM slot=1,               size=128MB
     Memory DIMM slot=2,               size=128MB
Service Processor
Tablet Port
  LPT
     addr=378
  COM
     addr=3F8
  COM
     addr=2F8
  Audio
  Keyboard
  Mouse
  Diskette Drive
     addr=3F0
  SCSI controller id=7



.-----------. .-----------.                          .------.
|P=prev-page| |N=next-page|                          |X=Exit|
'-----------' '-----------'                          '------'
```

Multiboot Menu

Use this screen to view and set various options regarding the operating system and boot sequence.

```
Multiboot Menu

 1 Select Software
 2 Software Default
 3 Select Install Device
 4 Select Boot Device
 5 OK Prompt
 6 Multiboot Startup









                                                  .------.
                                                  |X=Exit|
                                                  '------'

 ===>
```

Select Software: If this option is supported by the operating system, shows the name of the operating system installed. This option may not be supported by all operating systems.

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

```
No Operating System Installed
```

this indicates that information in nonvolatile storage could have been lost, as would happen if the battery had been removed. To re-create this value, run the **bootlist** command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. See the **bootlist** command in your AIX documentation.

Software Default: 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.

Select Install Device: Produces a list of devices, for example the CD-ROM, from which the operating system is installed. Select a device 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.

Select Boot Device: Provides a list of devices that can be selected to be stored in the boot list. Up to five devices are supported.

OK Prompt: Provides access to the open firmware command prompt.

Multiboot Startup: Toggles between OFF and ON and selects whether the Multiboot menu invokes automatically on startup.

Select Boot Device

Select this option to view and change the custom boot list, which is the sequence of devices read at startup time.

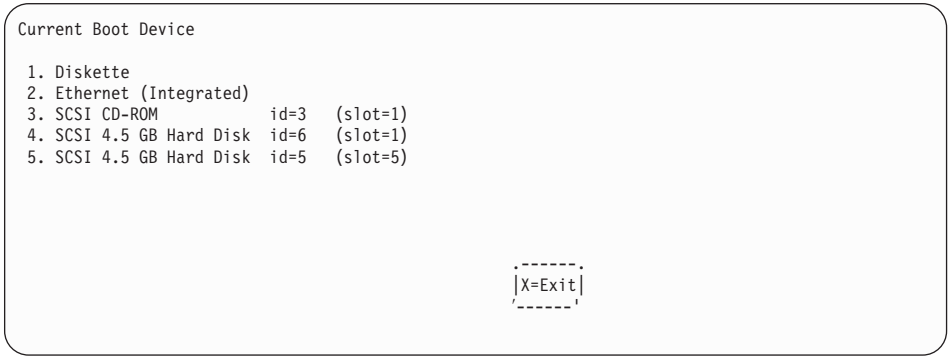
```
Select Boot Devices

 1 Display Current Settings
 2 Restore Default Settings
 3 Configure 1st Boot Device
 4 Configure 2nd Boot Device
 5 Configure 3rd Boot Device
 6 Configure 4th Boot Device
 7 Configure 5th Boot Device


                                                  .------.
                                                  |X=Exit|
                                                  '------'

 ===>
```

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



Restore Default Settings: Restores the boot list to the default device of:

1. Primary diskette drive
2. CD-ROM drive
3. Tape drive
4. Hard disk drive
5. Network adapter.

Attention: To change the custom boot list back to the default values, select the **Default**. 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.

Configure Nth Boot Device

In the description below, **Nth** can be **1st, 2nd, 3rd,** etc. depending on your choice on the previous menu.

Options display a screen similar to the following:

```
Configure Nth Boot Device

   Device              Current             Device
   Number              Position             Name

      1                   1               Diskette
      2                   2               Ethernet
      3                   3               SCSI CD-ROM
      4                   4               SCSI 4.5GB Hard Disk
      5                   -

                                          .------.
                                          |X=Exit|
                                          '------'

===>
```

Type the device number of the device name that you want to select as the **Nth** boot device. For example, if you entered this menu by selecting 4 on the previous menu (configure 2nd Boot Device), then enter the number 3 based on the list shown above. You are thus selecting the SCSI CD-ROM device to be the 2nd **(Nth)** device in the boot sequence.

Utilities

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

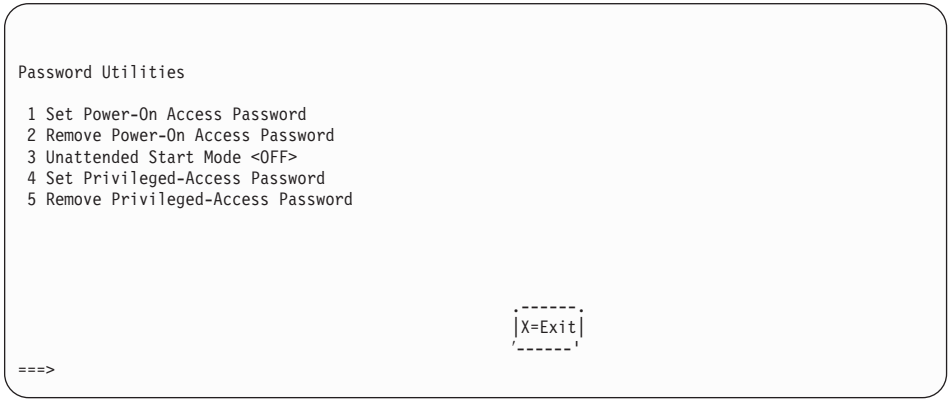
```
Utilities

 1 Set Passwords and Unattended Start Mode
 2 SCSI Spin up
 3 Display Error Log
 4 Remote Initial Program Load Setup
 5 Change SCSI id
 6 Update System Firmware
 7 Update Service Processor Firmware
 8 Select Console

                                          .------.
                                          |X=Exit|
                                          '------'
===>
```

Set Password and Unattended Start Mode

Entering this selection permits access to the following options.



Set Power-On Access Password

Setting a power-on access 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 must type the password again for verification. Passwords are not case-sensitive upon entry.

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

Note: If you forget the power-on access password, the battery must be removed for longer than 30 seconds to reset the NVRAM. The system unit power cable must be disconnected before removing the battery.

A password becomes effective only after the system is turned off and back on again.

Unattended Start Mode:

Use this option to instruct the service processor to immediately power-on the server after a power failure, bypassing power-on password verification. Unattended start mode can also be enabled or disabled using service processor menus. Unattended start mode can be used on servers that require automatic power-on after a power failure.

Note: Unlike other systems, unattended start mode is not automatically disabled when the power-on access password is removed.

Set Privileged-Access Password

The privileged-access password protects against the unauthorized starting of the system programs.

Attention: If the privileged-access password has been enabled, you are asked for the privileged-access password at startup every time you boot your system.

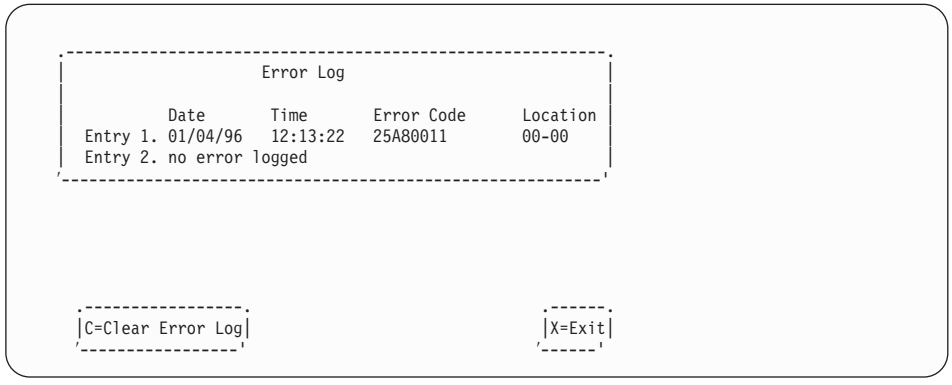
If you previously had set a privileged-access password and want to remove it, select **Remove Privileged-Access Password**.

SCSI Spin Up

Selecting this utility allows you to adjust the hard disk spin-up delay in your system unit.

Display Error Log

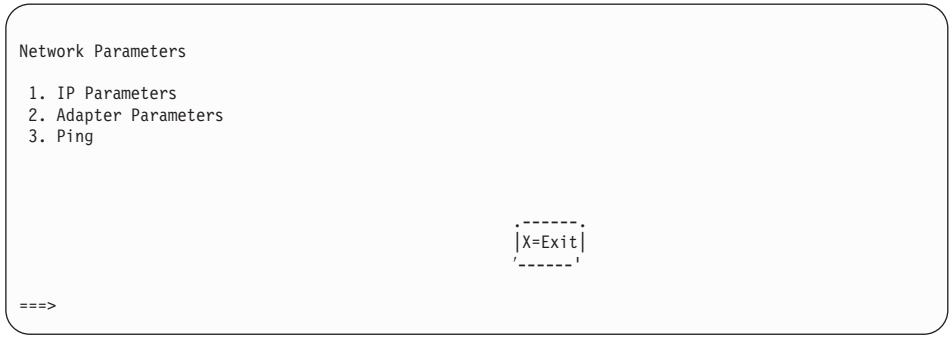
Use this option to view or clear your system unit's error log. A screen similar to the following displays when you select this option.



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

Remote Initial Program Load Setup

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



Selecting the IP (Internet Protocol) Parameters option displays the following screen.

```
IP Parameters

 1. Client IP Address    [000.000.000.000]
 2. Server IP Address    [000.000.000.000]
 3. Gateway IP Address   [000.000.000.000]
 4. Subnet Mask          [255.255.255.000]









                                                .-------.
                                                |X=Exit|
                                                '------'


===>
```

To change IP parameters, type the number of the parameters for which you want to change the value.

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

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

```
 Device                    Slot             Hardware Address

 1. ethernet               3                0004AC5E08D2
 2. token-ring             5                0020357A0530
 3. ethernet            Integrated          0004ACE4020B









                                                .-------.
                                                |X=Exit|
                                                '------'


(Press enter after making selection)                          ===>
```

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

```
10/10c ethernet TP PCI Adapter


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









                                                    .------.
                                                    |X=Exit|
                                                    '------'
```

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

```
                    .-----------------.
                    | DATA RATE       |
                    | 1. 10 Mbps      |
                    | 2. 100 Mbps     |
                    | 3. Auto         |
                    '-----------------'



===>
```

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

```
                    .-----------------.
                    | Full Duplex     |
                    | 1. Yes          |
                    | 2. No           |
                    | 3. Auto         |
                    '-----------------'



===>
```

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

```
Device                    Slot            Hardware Address

1. ethernet               3               0004AC5E08D2
2. token-ring             5               0020357A0530
3. ethernet Integrated                    0004ACE4020B




                                                .------.
                                                |X=Exit|
                                                '------'


(Press enter after making selection)                          ===>
```

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

```
Ping IP Address

 1. Client IP Address    [129.132.4.20]
 2. Server IP Address    [129.132.4.10]
 3. Gateway IP Address   [129.132.4.30]
 4. Subnet Mask          [255.255.255.0]









      .---------.                                .------.
      |E=Execute|                                |X=Exit|
      '---------'                                '------'

===>
```

Change SCSI ID

This option allow you to view and change the addresses of the SCSI controllers attached to your system unit.

Update System or Service Processor Firmware

Attention: The SMS firmware update utility does not support the combined image update process. It is recommended only for those systems that cannot boot AIX. Detailed instructions on using the SMS utilities to update system and service processor firmware can be obtained from the RS/6000 support website:

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

If you are not able to obtain firmware update images or instructions from this website, contact your service representative.

If the firmware update image is available on your network from another system, see “Appendix D. Firmware Updates” on page 291 for instructions on updating the system and service processor firmware using a combined image from the AIX command line.

Firmware Recovery

For instructions on firmware recovery, go to “Firmware Recovery” on page 195.

Select Console

The Select Console Utility allows the user to select which console the user would like to use to display the SMS Menus. This selection is only for the SMS menus and does not affect the display used by the AIX operating system.

Follow the instructions that display on the screen. To return to the SMS, press the number **1** key after the word keyboard displays and before the tone sounds.

Select Language

Note: Your TTY must support the ISO-8859 character set to properly display languages other than English.

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

```
SELECT LANGUAGE

 1.  English
 2.  Francais
 3.  Deutsch
 4.  Italiano
 5.  Espanol
 6.  Svenska


====>                                                  .------.
                                                       |x=Exit|
                                                       '------'
```

Open Firmware

To enter the open firmware command line, press the number 8 key *after* the keyboard text symbol displays during startup and *before* the tone sounds. If you have pressed the number 8 key, the open firmware command line (an OK prompt) displays 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.

Note: If you have installed a privileged-access password, you are prompted for this password before you gain access to the open firmware command line.

Chapter 9. Removal and Replacement Procedures

Servicing of this system unit can be performed with the system unit either in the vertical or horizontal position. If you choose to put the system into the horizontal position, be sure the system unit's plastic feet are tucked under the system unit.

Note: This guide shows the system unit in the vertical position.

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 unit or the devices that attach to the system unit. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electric 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 unit 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 has a 3-wire power cable and plug for the user's safety. Use this power cable 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 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 unit.
- 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 to prevent permanent damage.

Procedure List

The following table contains an alphabetical component listing of the procedures found in this chapter.

Procedure	Procedure Name and Page Location
Adapters	“Adapters” on page 230
Battery Replacement	“Battery Replacement” on page 221
Bezel Door	“Bezel Door Removal” on page 216
CD-ROM Drive	“CD-ROM Drive and Tape Drive” on page 243
Cover, Front	“Front Cover Bezel Removal” on page 215
Cover, Left Side	“Left Side Cover Removal” on page 212
Cover, Right Side	“Right Side Cover Removal” on page 218
Cover, Top	“Handle Cover, Handle, and Top Cover Removal” on page 216
Cover Support Bridge	“Cover Support Bridge Removal” on page 220
Disk Drives	“Disk Drive Removal” on page 235
Diskette Drive	“Diskette Drive Removal” on page 241
Disk Drive Configuration or Unconfiguration	“Disk Drive Configuration or Unconfiguration” on page 234
Fan, Bottom Front	“Bottom Front Fan Removal” on page 252
Fan, Rear	“Rear Fan Removal” on page 250
Fan, Top Front	“Top Front Fan Removal” on page 253
Fan, Heatsink	“Processor Card Heatsink Fan Removal” on page 229
Handle Removal	“Handle Cover, Handle, and Top Cover Removal” on page 216
Internal Drives	“Internal Drive Overview” on page 233
Media Drives	“Media Drive Removal” on page 243
Memory Modules	“Memory Module Removal” on page 223
Operator Panel	“Operator Panel” on page 238
Optional CD-ROM Drive	“Optional CD-ROM and Tape Drive Installation” on page 245
Optional Tape Drive	“Optional CD-ROM and Tape Drive Installation” on page 245
Optional Media	“Optional Media Bay Preparation” on page 244

Procedure	Procedure Name and Page Location
Optional Media Bay Disk Drive	“Optional Media Bay Disk Drive Installation” on page 246
Power Supply	“Power Supply” on page 248
Power Supply Test Switch	“Power Supply Test Switch Procedure” on page 249
Processor Card	“Processor Card” on page 227
System Board	“System Board” on page 255
Tape Drive	“CD-ROM Drive and Tape Drive” on page 243
VPD Update	“Operator Panel Vital Product Data (VPD) Update Procedure” on page 240

System Unit Shutdown

Attention: When using the shutdown procedure for your system unit, follow the correct shutdown procedure before you stop the system unit. Failure to do so may result in the loss of data.

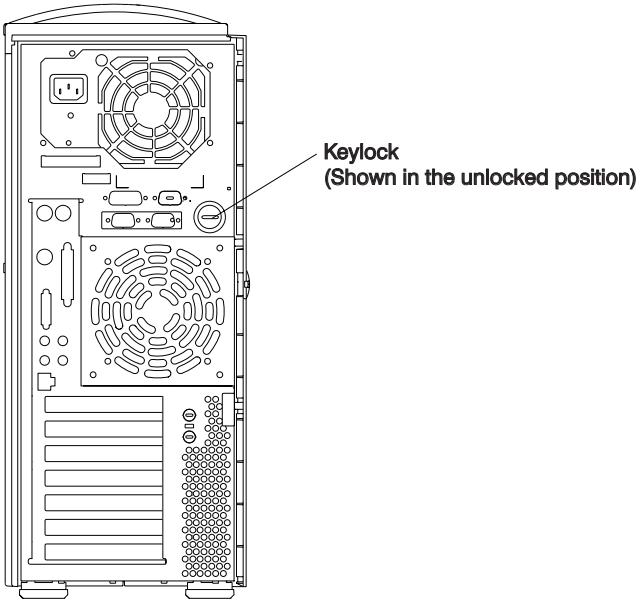
1. At the command line, as root user, enter `shutdown` to stop the operating system and power off the system unit.
2. After you shut down the operating system, set the power switches to Off on your system unit and any attached devices.

Covers

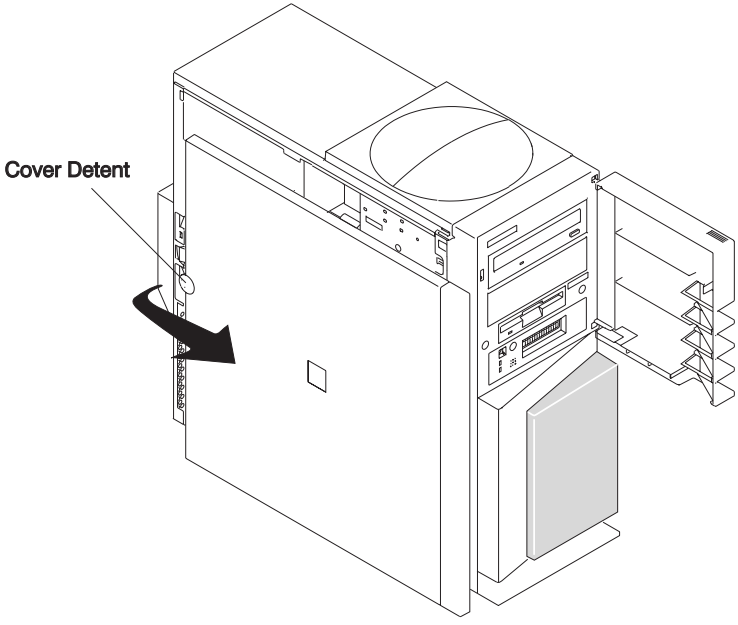
Before performing these procedures, read “Safety Notices” on page xi.

Left Side Cover Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Turn the keylock on the rear cover of the system unit to the unlocked position, as shown in the following illustration:



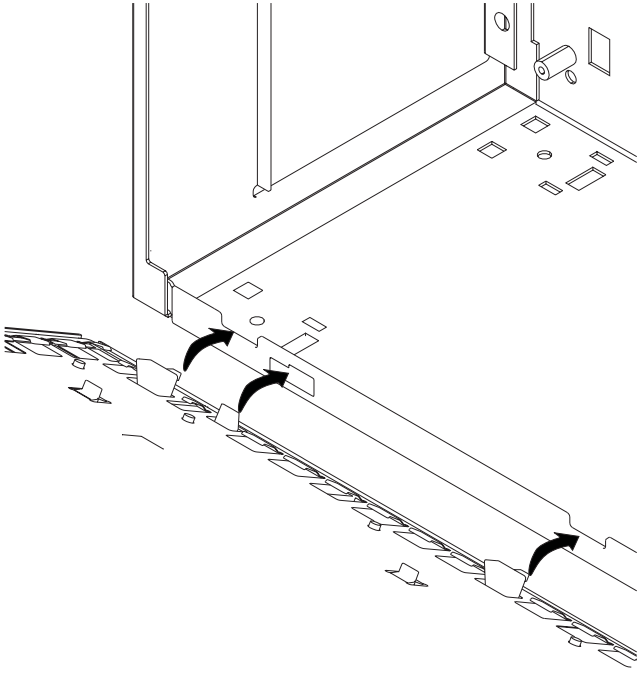
4. Place your index finger behind the left-cover detent located toward the rear of the system unit.
5. Gently pull the cover detent out (away from the rear of the system unit), then slide the cover toward the front of the system unit. This action releases the slide tabs that hold the cover to the chassis.



Left Side Cover Replacement

To replace the left side cover, do the following:

1. Align and insert the hooked tabs located along the bottom edge of the cover into their respective slots on the chassis.



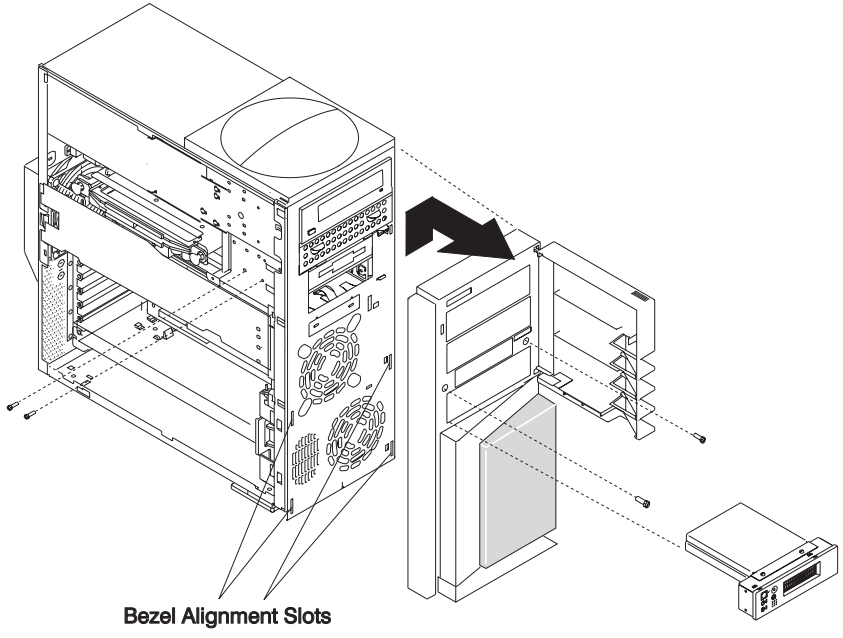
2. Rotate the cover into place, ensuring that the remaining slide tabs are inserted.
3. Slide the cover toward the rear of the chassis, ensuring that the cover lays flat against the chassis. The detent tab latches the cover, keeping it from sliding toward the front of the system unit.
4. Rotate the keylock located on the back of the system unit into the locked position. See the illustration in step 3 on page 212.

Front Cover Bezel Removal

Note: Front cover removal is necessary only when replacing the top front fan and top cover.

To remove the front cover bezel, do the following:

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
3. Open the front door.
4. Remove the operator panel as described in “Operator Panel Removal” on page 238.
5. Remove the screws from the media drive and diskette drive. Gently slide the drives back into the system unit about .25 inch (6mm).
6. Remove the two bezel mounting screws located next to the diskette drive.
7. Slide the cover toward the top and away from the system unit. This action releases the plastic slide tabs.



Front Cover Bezel Replacement

To replace the front cover bezel, do the following:

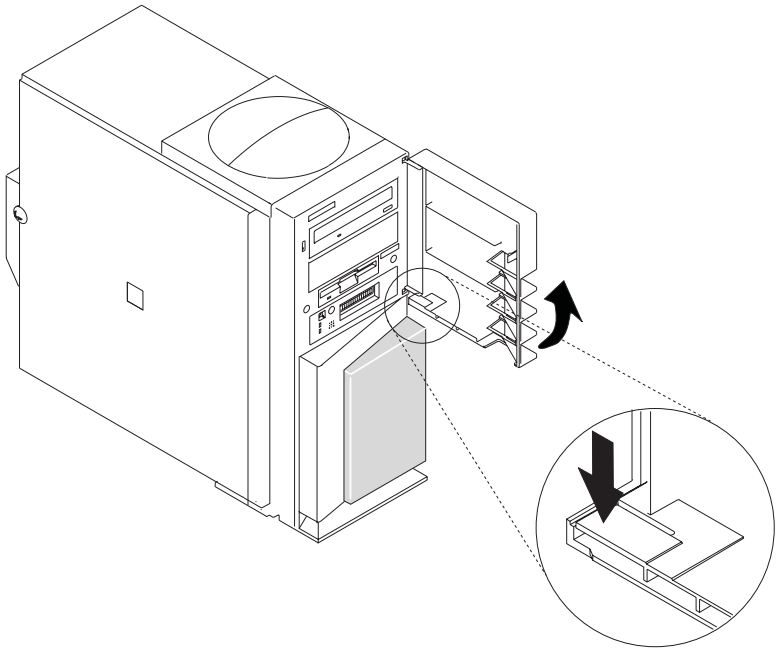
1. Align the plastic slide tabs located on the back side of the cover to the slots located on each side of the front of the chassis.
2. Press down on the cover until slide tabs are secured in the slots.
3. The screw holes on the plastic cover align with those on the front of the chassis.

4. Secure the front cover using the two screws removed earlier.

Bezel Door Removal

To remove the bezel door, do the following:

1. Open the front door.
2. Press down on the lower hinge bracket located on the inside of the door.
3. Rotate the door away from the lower hinge bracket.
4. Lift the door up and away from the top hinge bracket.



Bezel Door Replacement

To replace the bezel door, do the following:

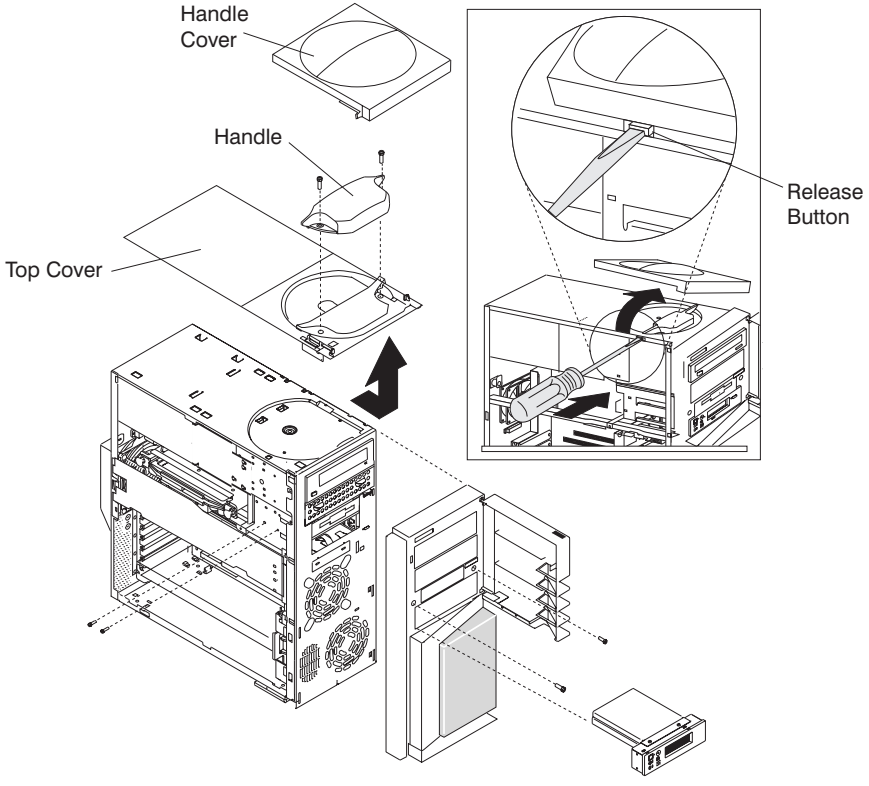
1. Insert the top hinge alignment pin into the recess located on the inside of the bezel door.
2. Rotate the door toward the lower hinge alignment pin.
3. Press down on the lower hinge bracket located on the inside of the door.
4. Release the lower hinge bracket when the hinge pin is aligned with the recess.

Handle Cover, Handle, and Top Cover Removal

Note: Except to repair physical damage, do not remove these plastic top covers.

To remove the handle cover, handle, and top cover, do the following:

1. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
2. Remove the front cover bezel as described in “Front Cover Bezel Removal” on page 215.
3. Use a screwdriver or similar tool to gently press the release button until the handle cover releases. The release button is located under the left side edge of the handle cover.
4. Remove the two screws securing the handle.
5. Slide the top cover toward the front and then off the system unit.
6. Remove the top cover from the chassis.



Handle Cover, Handle and Top Cover Replacement

To replace the handle cover, handle, and top cover, do the following:

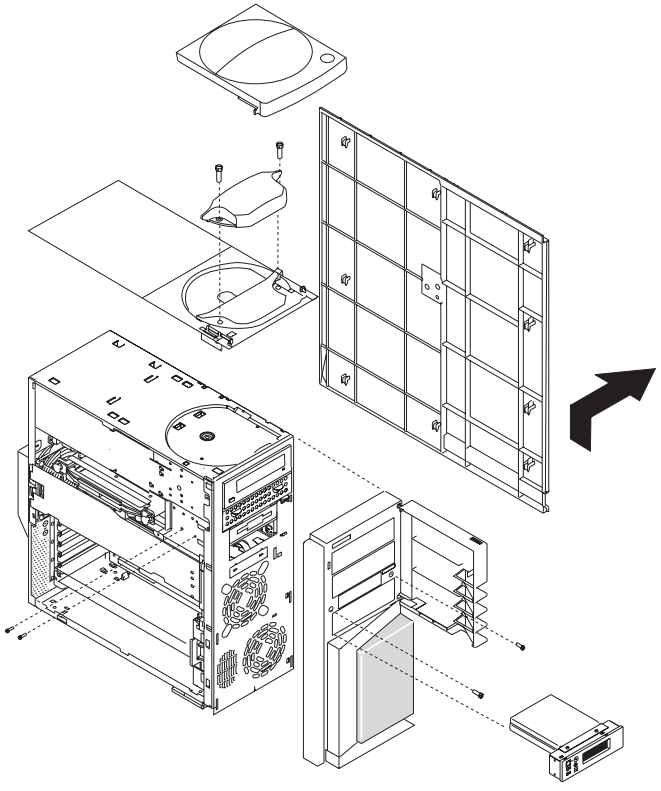
1. Place the top cover on top of the system unit. See the illustration on page 217.
2. Ensure that the plastic tabs located on the underside of the top cover align and seat in the slots located on the chassis.
3. Slide the plastic cover toward the rear of the system unit until the screw holes, which secure the handle to the top cover and chassis align, with the screw holes located on the chassis.
4. Place the handle into position on the top cover, and align the screw holes.
5. Secure the top cover and the handle with the two screws removed earlier.
6. To attach the handle cover to the top cover and the handle, do the following:
   a. Place the tabs located on the underside of the handle cover beneath the tabs located on the right side of the top cover.
   b. Slide the handle cover across the system unit from right to left.
   c. Press the left side of the handle cover firmly into place above the release button. (Listen for the locking click.)

Right Side Cover Removal

Note: Except to repair physical damage, do not remove the right side cover.

To remove the right side cover, do the following:

1. Remove all components used to make up the top cover and handle.
2. Grasp the lower edge of the cover, sliding it up and away from the system unit.



Right Side Cover Replacement

To replace the right side cover, do the following:

1. Place the cover against the right side of the system unit.
2. Ensure that the plastic tabs align and seat in the slots located on the chassis.
3. Slide the cover down to engage the nine plastic tabs.
4. Replace all other removed components in reverse order.

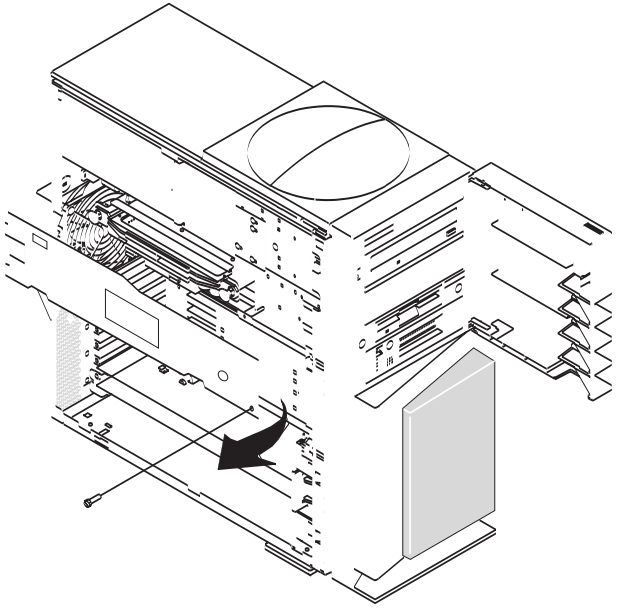
Cover Support Bridge

Before performing these procedures, read “Safety Notices” on page xi.

Cover Support Bridge Removal

To remove the cover support bridge, do the following:

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left-side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the screw securing the cover support bridge.
5. Pivot the cover support bridge out from front to back and then remove from the system unit.



Cover Support Bridge Replacement

To replace the cover support bridge, perform the removal steps in the reverse order.

Battery Replacement

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.

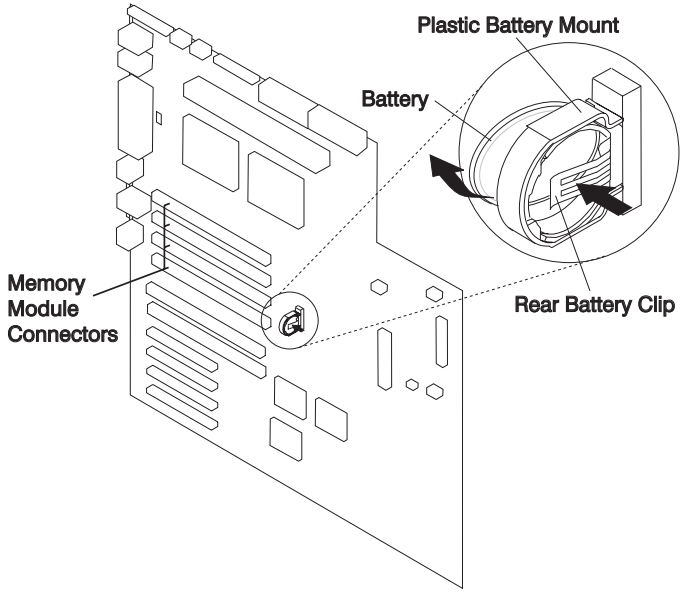
The battery connector is polarized; do not attempt to reverse polarity.

Dispose of the battery according to local regulations.

Before performing these procedures, read “Safety Notices” on page xi.

To replace the battery, do the following:

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left-side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
5. Locate the battery on the system board.



6. If needed, remove any adapters mounted in the top two adapter slots as described in “Adapter Removal” on page 230.

7. Pry the battery out of its mount using your fingernail or small blunt object. After the top of the battery has cleared the plastic mount, pull it up and out of the system unit.

   Note: You may need to pry the battery out of the mount after the top of the battery has cleared the battery mount. *Do not* wiggle the plastic mount from side to side or try to separate the plastic battery mount from the system board. The plastic mount connections are soldered to the system board. Permanent damage can result to the system board if the battery mount is damaged or removed.
8. Ensure that the battery polarity is correct. With the positive (+) side of the battery facing the memory DIMM connectors, insert the battery between the front and rear battery mount clips.
9. Using your thumb, gently press the battery into the battery mount. Use your index finger to support the back of the battery mount during this operation.
10. Replace any removed adapters as described in “Adding or Replacing an Adapter” on page 231.
11. Replace the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
12. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
13. Reconnect all removed cables.
14. Turn on the power.
15. Reset the time and date.
16. If you are running AIX, the **bootlist** command may need to be run while logged in as root user. This restores the custom bootlist and allows the option of *Select Software* under multiboot to start the operating system. IP parameters may also need to be rebuilt.

Memory Modules

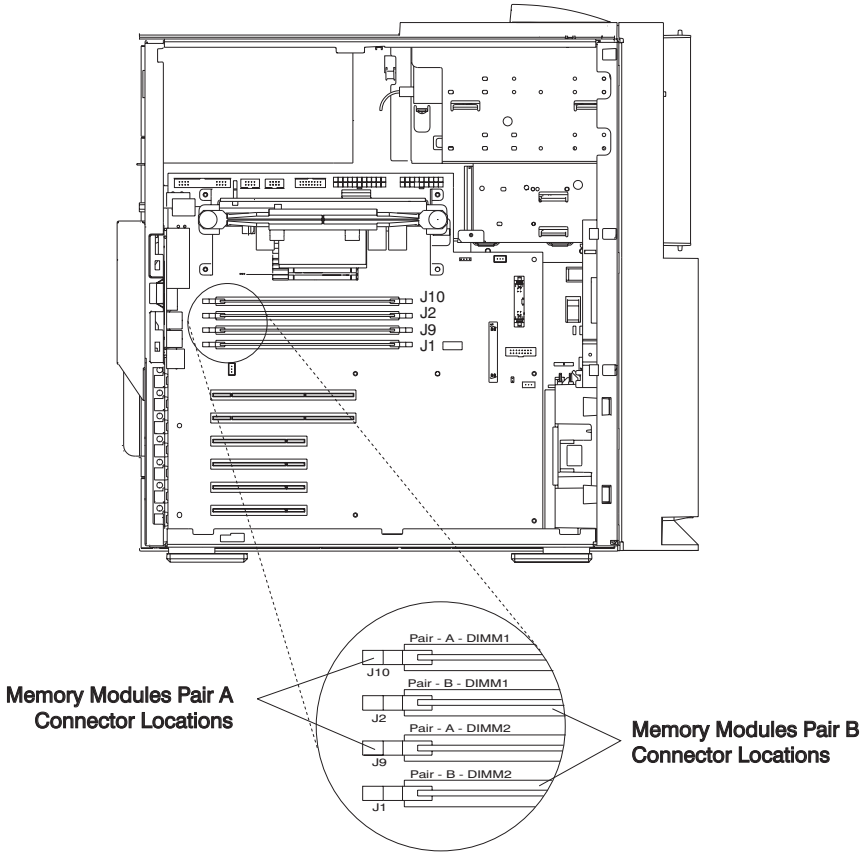
Before performing these procedures, read “Safety Notices” on page xi.

Note: Before handling any card, board, or memory DIMM, touch any metal surface of the chassis with one hand to minimize static electric discharge. See “Handling Static-Sensitive Devices” on page 209.

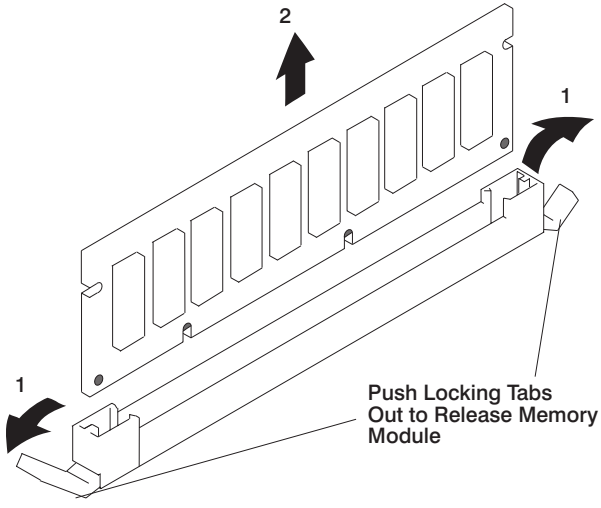
Memory Module Removal

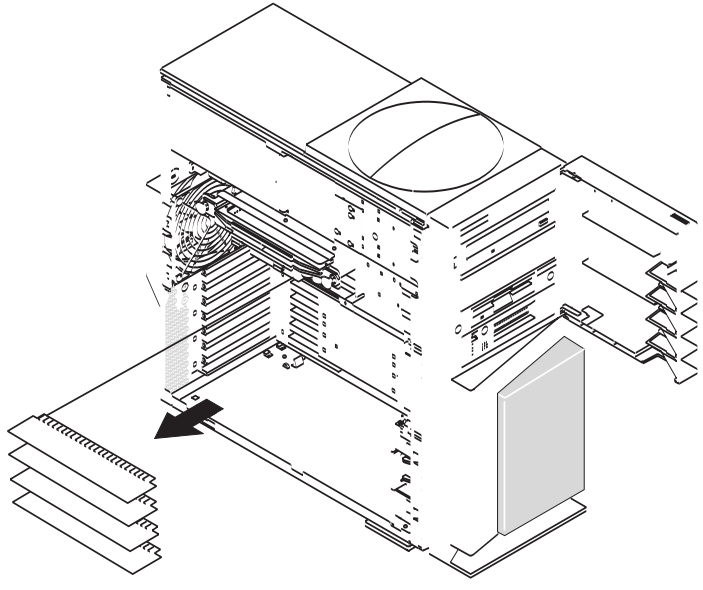
Note: Memory DIMMs are located on the system board and must be installed in pairs as shown in step 5.

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
5. Locate the memory DIMM connectors and determine which module you want to remove.



6. Remove the memory DIMM by pushing the tabs out and then down. The tabs begin forcing the memory DIMM out of the connector.
7. Pull the memory DIMM out of the connector and system unit.





Adding or Replacing Memory DIMMs

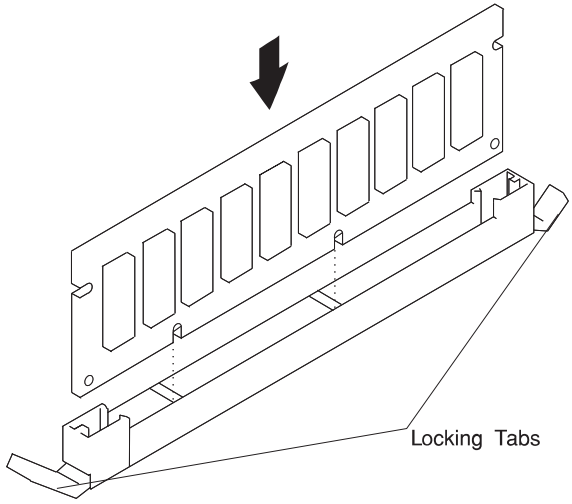
Notes:

1. Memory DIMMs must be installed in pairs and in the correct slot configuration. (Slots J1 and J2 are a pair, and slots J9 and J10 are a pair.) See the illustration in step 5 on page 223.

2. If you are replacing one DIMM of a pair, be sure to use the same FRU part number as the DIMM it is replacing. If this is not possible, replace the pair with a matched pair.

To add or replace memory DIMMs, do the following:

1. With one hand, touch any metal surface of the chassis to minimize static electric discharge, and then pick up the memory DIMM.
2. Locate the memory DIMM connector on the system board.
3. Ensure that the connector locking tabs are pushed out in the unlocked position before installing a new memory DIMM.
4. Insert the memory DIMM firmly into the connector. The locking tabs located on each end of the memory DIMM connector should have moved back into the locked position.



5. Ensure that the locking tabs are in the secure position. (Tabs are in the secure position when they are parallel to the side of the connector.)
6. Replace the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
7. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
8. Reconnect all cables.
9. Turn on the power.

Processor Card

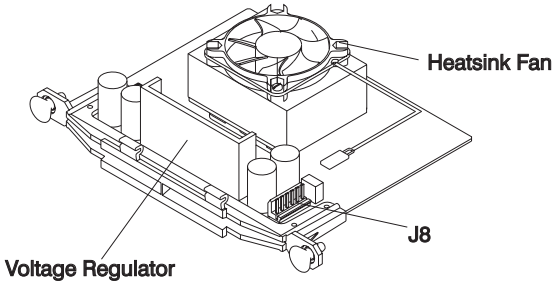
Before performing these procedures, read “Safety Notices” on page xi.

Processor Card Removal

Attention: Installing a new processor into your system unit may require a firmware update, especially if a higher-speed processor is being installed. Go to the RS/6000 support website at http://www.rs6000.ibm.com/support/micro to obtain detailed firmware update instuctions and verify whether a firmware update is needed.

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
5. Unplug the power connector (P11) from the processor card connector (J8). See the illustration on page 227.
6. Pull out the two snap buttons, located on each side of the processor card.
7. Pull on the blue plastic card handle until the card is unseated from the connector.

   Note: Grasp only the blue plastic handle. *Do not* push, pull, or grasp the voltage regulator, which is located just below the blue handle on the underside of the processor card.
8. Remove the card from the system unit and store it in a safe place.

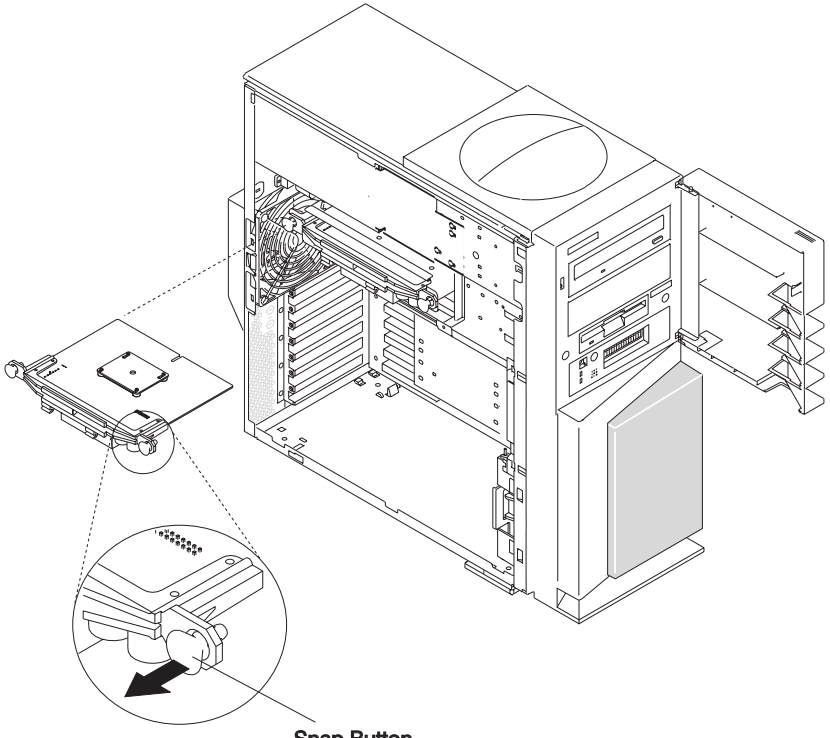


Processor Card Replacement

Note: Servicing of this system unit can be performed with the system unit either in the vertical or horizontal position. If you choose to put the system into the horizontal position, be sure the system unit’s plastic feet are tucked under the system unit.

1. If removed, install the heatsink fan as described in “Processor Card Heatsink Fan Removal” on page 229.

Note: Ensure that the snap buttons are in the unlocked position on the new processor card.



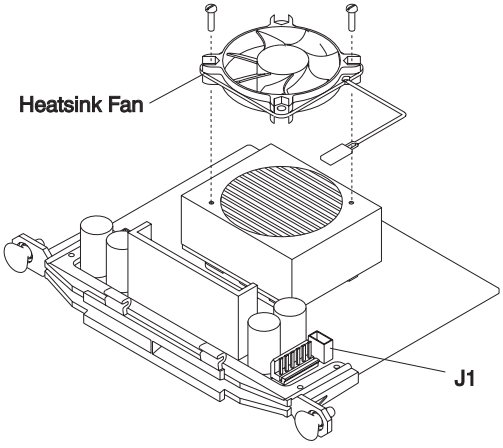
2. Align the edges of the processor card with the guides on the support tower. Ensure that the heatsink fan is facing the bottom of the system unit.
3. Carefully align the processor card with the card connector.
4. Firmly press on the blue plastic handle to insert the processor card into the card connector.

   Note: *Do not* press on the snap buttons or voltage regulator while inserting the processor card into the connector.
5. After the processor card has been seated into the connector, press the snap buttons into their locking position. The snap buttons make a clicking sound when securely fastened.
6. Plug the power cable (P11) into processor card connector (J8). See the illustration on page 227.
7. Replace the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
8. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
9. Reconnect all cables.

10. Turn on the power.

Processor Card Heatsink Fan Removal

1. Remove the processor card as described in “Processor Card” on page 227.
2. After removing the processor card, unplug the heatsink fan from the processor card connector (J1).
3. Remove the two screws securing the fan to the heatsink, as shown in the following illustration.
4. Remove the fan from the heatsink.



Processor Card Heatsink Fan Replacement

Replace in reverse order of removal. Be sure to reconnect the heatsink fan cable to the processor card connector (J1).

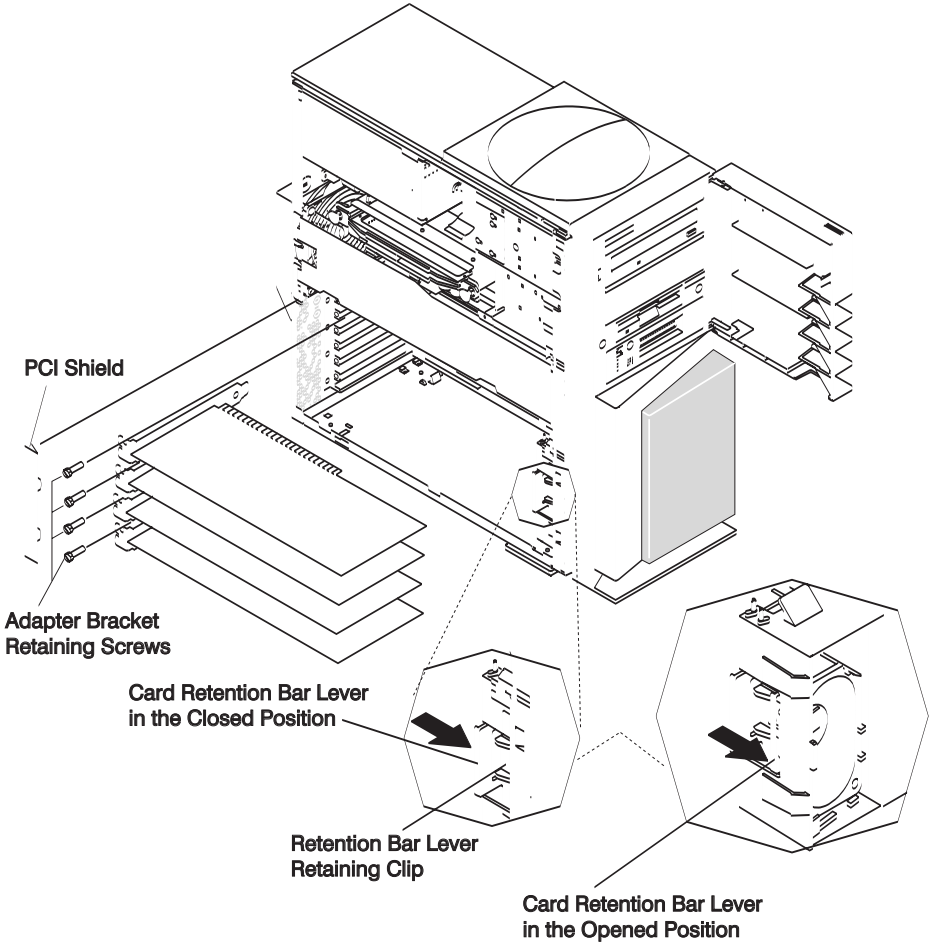
Adapters

Before performing these procedures, read “Safety Notices” on page xi.

Adapter Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Record the slot number and location of the adapter being removed.

   Note: Adapter slots are numbered on the rear of the system unit, from top to bottom, one through six.
5. Label and disconnect all cables attached to the adapter being removed.
6. Remove PCI shield by reaching behind the shield and gently pulling on the two pull tabs. See the illustration on page 231.
7. If you are removing or installing full-length adapter cards, then retract the adapter card retention bar which is built into the lower front fan housing. See the illustration on page 231.
8. Remove the adapter bracket retaining screw.
9. With one hand, touch any metal surface of the chassis to minimize static electric discharge. See “Handling Static-Sensitive Devices” on page 209.
10. Remove the adapter card from the system unit, and store it in a safe place.
11. If you are not installing another adapter in this slot location, replace the expansion-slot cover and screw, if available. If you are installing another adapter, go to “Adding or Replacing an Adapter” on page 231.
12. If retracted, release the card retention bar lever that is located on the lower front fan housing.
13. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
14. Reconnect all cables.
15. Turn on the power.

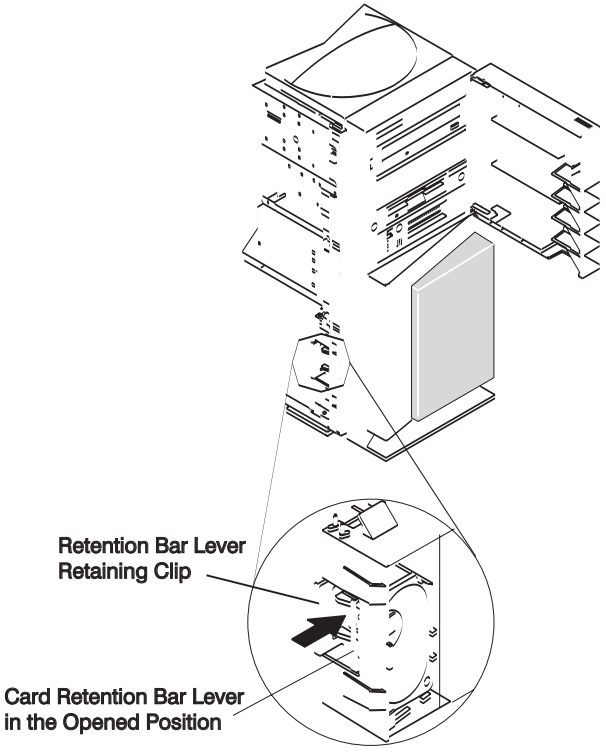


Adding or Replacing an Adapter

When installing an adapter card, do the following:

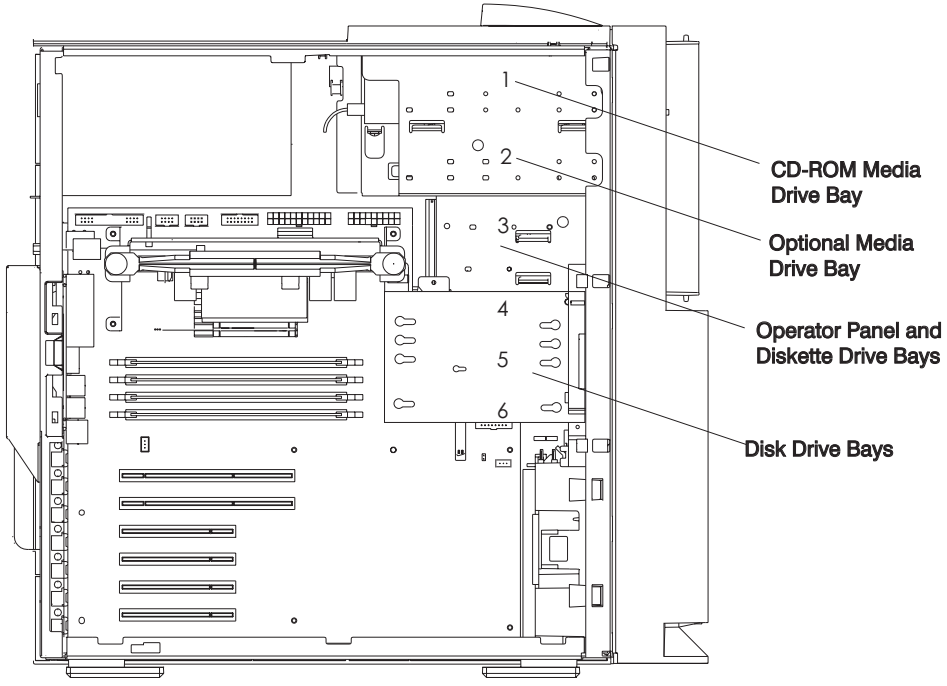
1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Before handling the adapter, touch any metal surface of the chassis with one hand to minimize static electric discharge. See “Handling Static-Sensitive Devices” on page 209.
5. If you adding or installing a full-length adapter card, ensure that the card retention bar lever has been retracted. See the illustration on page 231.

6. Carefully grasp the adapter by the edges, and align the adapter with the expansion-slot cover and connector.
7. Press the adapter firmly into the connector.
8. Use the screw you removed earlier from the expansion-slot cover or previous adapter to secure the adapter card bracket to the system unit.
9. If retracted, release the card retention bar lever that is located on the lower front fan housing.
10. Replace the PCI shield with the pull tabs facing inside the system unit.
11. Reconnect all cables.
12. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
13. Start the system unit.



Internal Drive Overview

The 44P Model 170 has six drive bays, as shown in the next illustration.



- One 3.5 inch diskette bay
- Two 5.25 inch media bays, for CD-ROM drives, tape drives, or disk drives.
- Three 1 inch disk drive bays

Note: The three 1 inch disk drive bays can be used to mount three 1 inch disk drives, or two 1-1/2 inch disk drives. Also, an additional 1 inch or 1-1/2 inch disk drive can be installed into the optional media bay when mounted in the optional disk drive carrier. The disk drive carrier is a customer-purchased option and is not provided with the system unit.

A diskette drive and CD-ROM drive are preinstalled in most system units. An optional disk drive carrier is necessary when adding an additional disk drive in the media bay.

Checklist for Handling Drives

Consider the following cautions when installing or removing media drives:

- Use caution when handling all disk drives. Disk drives are more likely to be damaged during installation and service than at any other time. A fall of as little as .25 inch, bumping, or rough handling can cause latent failures.

- Media drives are particularly sensitive to electrostatic discharge. Follow the electrostatic handling procedures found in “Handling Static-Sensitive Devices” on page 209 before handling the media drive.
- See the documentation provided with your drive to determine if any drive-specific procedures must be followed, such as setting switches or jumpers, or attaching the drive to a carrier tray.
- SCSI drives must have their SCSI address set manually. See the documentation provided with your drive for more information on setting the SCSI address. See “SCSI IDs and Bay Component Locations” on page 6 for more information on SCSI addresses in your system unit.

Disk Drive Configuration or Unconfiguration

Use the procedure in this section to configure or unconfigure a disk drive.

Disk Drive Configuration

After adding a new disk drive, do the following to configure the drive:

1. Log in as root user.
2. Enter the **smit** command.
3. Select **Devices**.
4. Determine the type of disk drive you want to configure. Select that type of drive from the menu.
5. Select **Add a** *drive type*, where *drive type* is the type of drive that you are configuring.
6. A list provides various models of the drive type you selected. Select the specific type of drive that you are adding.

Note: For more information on configuring a disk drive, refer to your operating system documentation.

Disk Drive Unconfiguration

Before removing a disk drive, do the following to unconfigure the drive:

1. Log in as root user.
2. Enter the **smit** command.
3. Select **Devices**.
4. Determine the type of disk drive you want to remove or unconfigure. Select that type of drive from the menu.
5. For the Keep Definition option, select **Yes**. This selection retains the details of the drive in the device configuration database.
6. A list provides various models of the drive type you selected. Select the specific type of drive that you are removing.
7. Select the **Do** option to unconfigure the drive.

Disk Drives

Before performing these procedures, read “Safety Notices” on page xi.

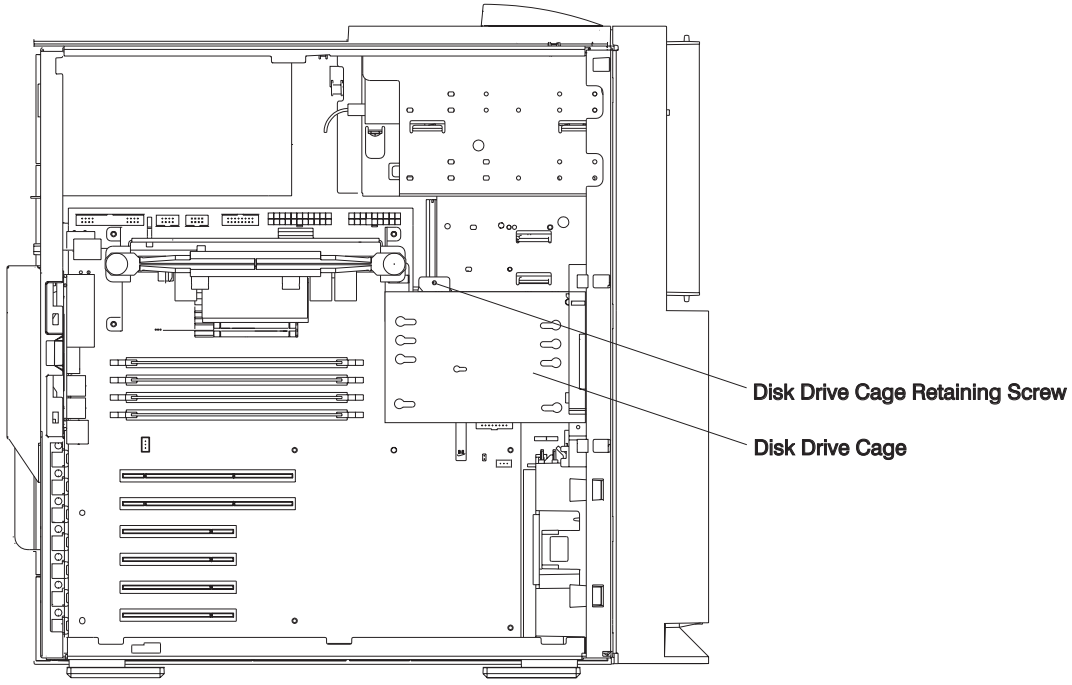
Note: Your system came with three 1 inch disk drive bays and an optional media bay. You can populate these bays with the following disk drive combinations:

- The three 1 inch disk drive bays can be used to mount:
  - Three 1 inch disk drives
  - Two 1-1/2 inch disk drives
  - One 1 inch disk drive and a 1-1/2 inch disk drive.
- A 1 inch or 1-1/2 inch disk drive can be installed into the optional media bay when mounted in the optional disk drive carrier. The disk drive carrier is a customer-purchased option and is not provided with the system unit.

Disk Drive Removal

Note: If you are not replacing the disk drive with a new disk drive, go to step 2.

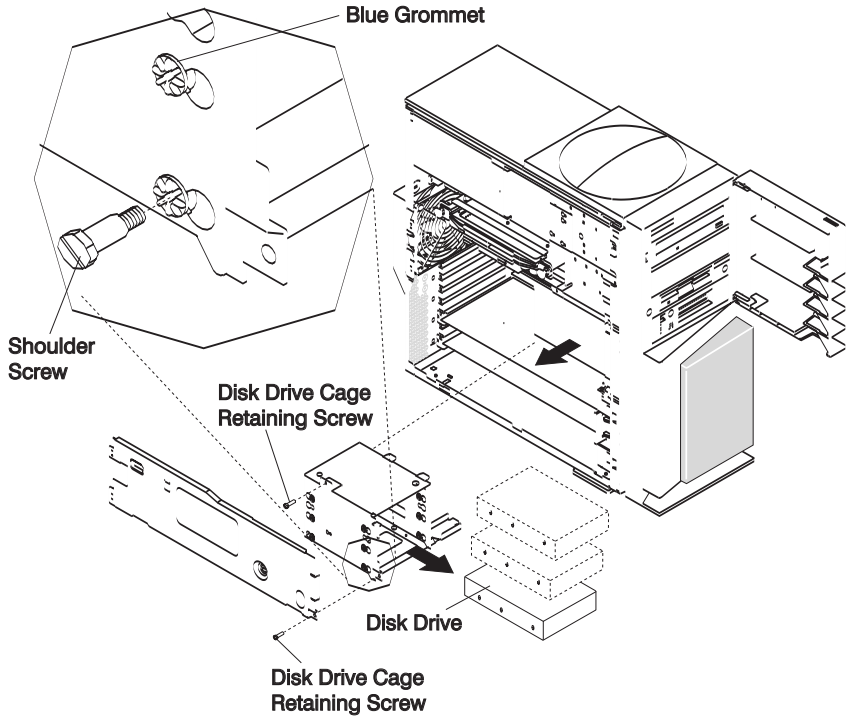
1. Unconfigure the disk drive if you are going to replace it with a new disk drive. See “Disk Drive Unconfiguration” on page 234 for instructions.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. If you are removing a disk drive and carrier from the optional media bay, see “Optional Media Bay Preparation” on page 244.
5. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
6. Locate the disk drive cage, as shown in the following illustration.



7. Disconnect the power and SCSI cables from the disk drives.
8. Remove the retaining screw that secures the disk drive cage to the chassis.
9. Pull out the disk drive cage and disk drives as a unit.
10. Remove the four shoulder screws that secure the disk drive to the disk drive cage.

    Note: The screws that secure the disk drive to the disk drive cage are special shoulder screws. These screws and the blue grommets *must* be used when installing a disk drive. Failure to use the blue grommets and shoulder screws, which came with the system unit, can result in permanent damage to the disk drive.

11. Remove the disk drive from the disk drive cage.
12. If you are replacing a disk drive, go to “Disk Drive Replacement” on page 237.
13. Replace the disk drives and cage as a unit.
14. Replace all disk drive retaining screws.
15. Reconnect all cables that were previously disconnected.
16. Replace the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
17. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
18. Plug in the power cable.
19. Start the system unit.



Disk Drive Replacement

Note: SCSI drives must have their SCSI address set manually. See the documentation provided with your disk drive for more information on setting the SCSI address. See “SCSI IDs and Bay Component Locations” on page 6 for more information on SCSI addresses in your system unit.

1. If you are installing a disk drive and carrier into the optional media bay, see “Optional CD-ROM and Tape Drive Installation” on page 245. If you are replacing a disk drive, go to step 2.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. If you are removing a disk drive and carrier from the optional media bay, see “Optional Media Bay Preparation” on page 244.
5. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
6. Locate the disk drive cage, as shown in the previous illustration.
7. Disconnect the power and SCSI cables from the disk drives.
8. Remove the retaining screw that secures the disk drive cage to the chassis.
9. Pull out the disk drive cage and disk drives as a unit.

10. With one hand, touch any metal surface of the chassis to minimize static electric discharge. See “Handling Static-Sensitive Devices” on page 209.
11. Insert the new disk drive into the disk drive cage.
12. Align the screw holes on the disk drive with the screw holes on the disk drive cage.
13. Install the four shoulder screws. Ensure that the blue grommets are in the correct position.

    Note: The screws that secure the disk drive to the disk drive cage are special shoulder screws. These screws and the blue grommets *must* be used when installing a disk drive. Failure to use the blue grommets and special shoulder screws can result in permanent damage to the disk drive. The shoulder screws and blue grommets must also be used if you are installing a one-inch high disk drive into the disk drive carrier.
14. Install the disk drive cage back into the system unit.
15. Install the previously removed disk drive cage retaining screw.
16. Reconnect all disk drive cables.
17. Install the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
18. Install the left side cover as described in “Left Side Cover Replacement” on page 213.
19. Plug in the power cable.
20. Restart the system unit.
21. Configure the drive using **smit**. See “Disk Drive Configuration” on page 234 for instructions on configuring the drive. Then wait five minutes for the drive to warm up.

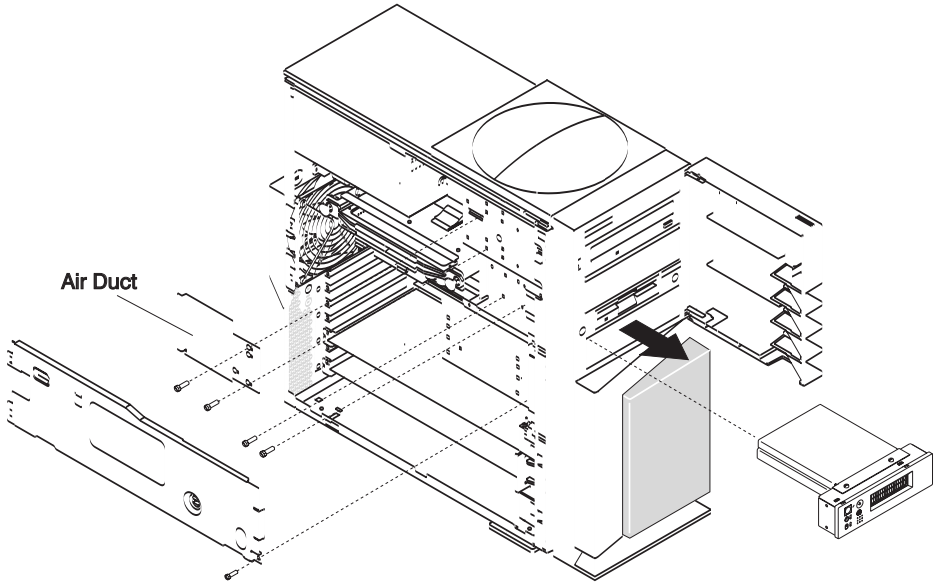
Operator Panel

Before performing these procedures, read “Safety Notices” on page xi.

Operator Panel Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the two screws that secure the air duct.
5. Remove the air duct, located between the power supply and media bay.
6. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
7. Remove the disk drive cage and drive unit as described in “Disk Drives” on page 235.

8. This step is optional. Remove the processor card as described in “Processor Card” on page 227 and the support tower as described in step 11 on page 255 of “System Board” on page 255.
9. Remove the two retaining screws that secure the operator panel to the chassis housing.
10. Unplug the operator panel cable from the system board at connector J14. See “System Board Component Locations” on page 3.
11. Carefully slide the operator panel and cable out of the system unit.



Operator Panel Replacement

Attention: If you are replacing the operator panel with a FRU, you *must* write the system VPD information (machine type, model number, and serial number). You *must* contact the support center to obtain instructions and the necessary password to enter the information into the VPD module. If you type an incorrect serial number, the operator panel is rendered inoperable, and a new operator panel must be reordered.

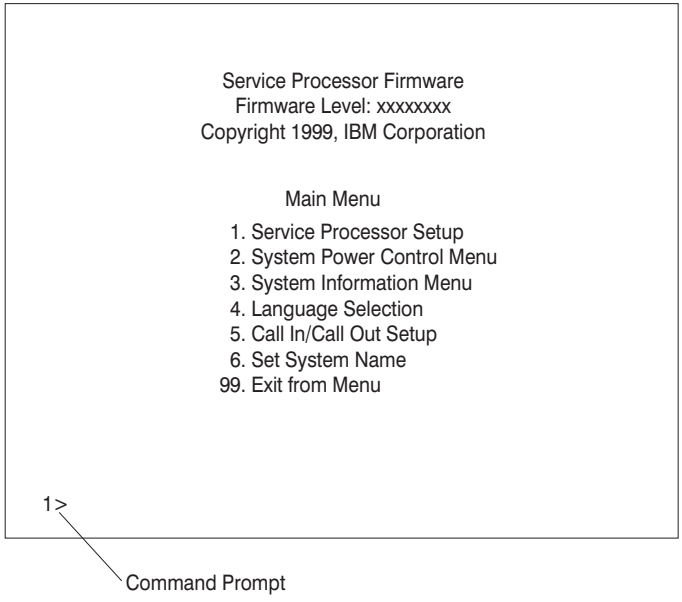
Note: See “Operator Panel Vital Product Data (VPD) Update Procedure” on page 240 for the correct procedure.

Perform the removal steps in reverse order.

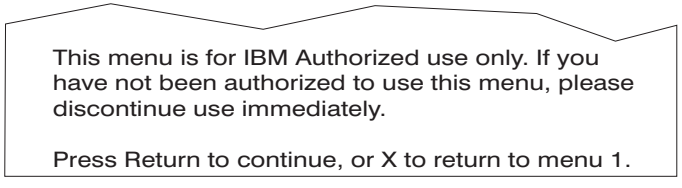
Operator Panel Vital Product Data (VPD) Update Procedure

If you replaced the operator panel with a new FRU, you must perform the following procedure to ensure that the VPD is correct.

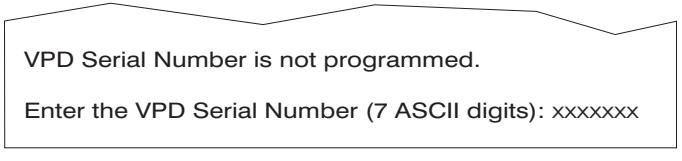
1. After you install the new operator panel, plug the system unit's power cord into the electrical outlet. Wait for ″ok″ to display on the operator paneldisplay.
2. Start the **Service Processor Firmware** menu.



3. At the command prompt, type the code which accesses the hidden menus. If necessary, call your local support center to obtain the code.

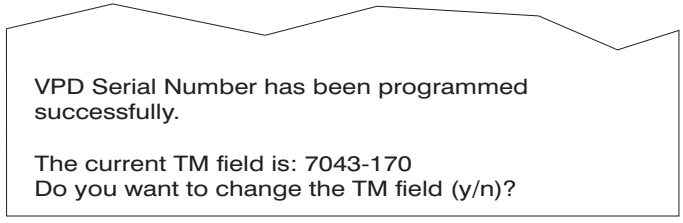


4. Press Return to continue.

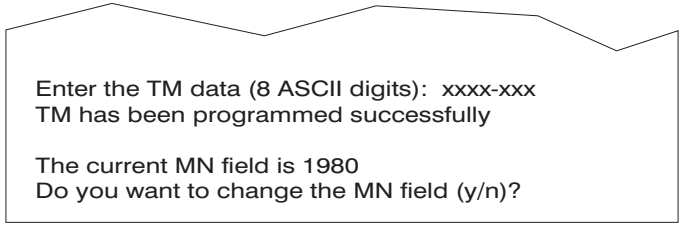


5. Type the VPD serial number.

   Note: The serial number *must* be entered correctly. Enter the last seven digits only. Do not include the dash (-) in the serial number as a digit. If the serial number is not entered correctly, a new operator panel must be ordered and installed.



6. Type **y** (yes) if the system unit's type/model (TM) you are working on is different from the one listed on the screen.
7. Type the machine type and model number of the system unit.



8. The MN field is for manufacturing use only. Enter **n**(no) to change the MN field.
9. Enter 99 at the command line of the Main Menu to exit.

Diskette Drive

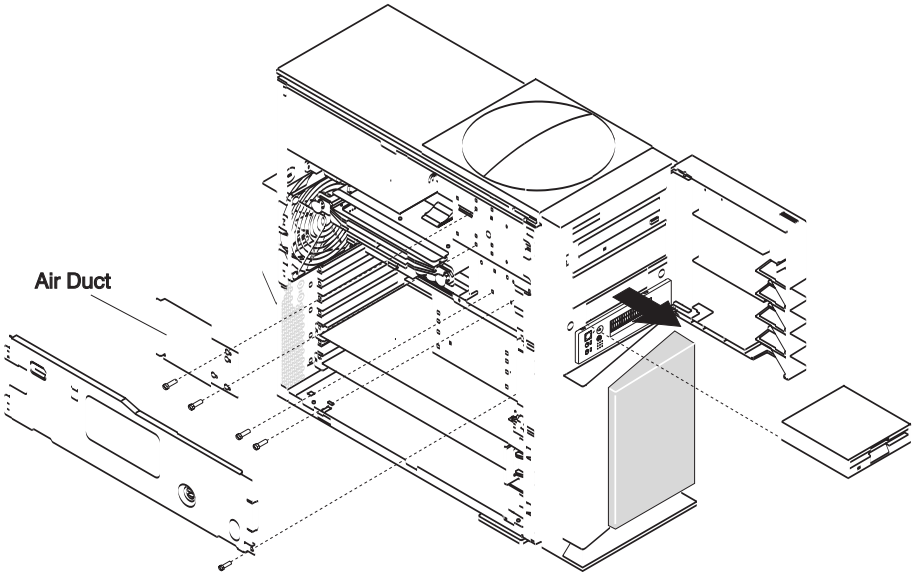
Attention: Do not open the drive; no user adjustments or serviceable parts are inside.

Before performing these procedures, read "Safety Notices" on page xi.

Diskette Drive Removal

1. Shut down the system unit as described in "System Unit Shutdown" on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in "Left Side Cover Removal" on page 212.
4. Remove the two screws that secure the air duct.
5. Remove the air duct, located between the power supply and media bay.
6. Remove the cover support bridge as described in "Cover Support Bridge Removal" on page 220.

7. This step is optional. Remove the optional media or media drive carrier as described in “Optional Media Bay Preparation” on page 244.
8. Disconnect the diskette drive cables.
9. Remove the two retaining screws that secure the diskette drive to the chassis.
10. Slide the diskette drive out of the system unit.



Diskette Drive Replacement

To replace the diskette drive, do the following:

1. Slide the diskette drive into the diskette drive bay past the alignment location.
2. With the diskette drive connector now exposed, connect the cable to the diskette drive.
3. Carefully slide the diskette drive toward the front of the system unit, realigning the screw holes.
4. Replace the two mounting screws.
5. Install the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
6. Reinstall any optional media that may have been removed.
7. Install the air duct.
8. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
9. Plug in the power cable.
10. Start the system unit.

CD-ROM Drive and Tape Drive

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

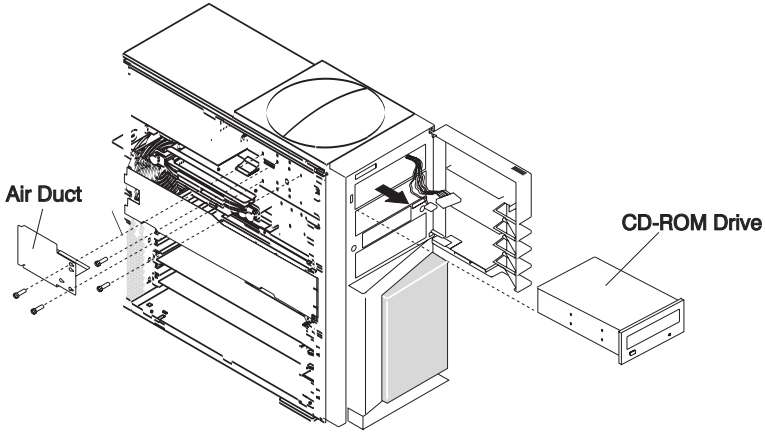
Before performing these procedures, read the following:

- "Safety Notices" on page xi
- "Laser Safety Information" on page xiii

Media Drive Removal

Note: The front cover does not need to be removed to service media devices.

1. Shut down the system unit as described in "System Unit Shutdown" on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in "Left Side Cover Removal" on page 212.
4. Remove the two air-duct screws.
5. Remove the air duct located between the power supply and media bay.
6. Remove the screws that secure the media drive to the system unit chassis.
7. Carefully slide the drive forward and out the front of the system unit.
8. Disconnect the power and data cables from the drive that you are removing.
9. If you are removing the upper CD-ROM drive, disconnect the audio cable from the rear of the CD-ROM drive.



Media Drive Replacement

Notes:

1. The CD-ROM and tape drives are designed to have the cables connected and disconnected from the front of the system unit.

- Set the SCSI address jumpers at the rear of the drive to the correct address before installation. See the documentation provided with your drive for details on setting the SCSI address. See “SCSI IDs and Bay Component Locations” on page 6 for more information on SCSI addresses in your system unit.
- Locate the SCSI cable. Connect the cable to the connector at the rear of the drive.
- If you are installing the upper CD-ROM drive, connect the audio cable from the processor board to the audio connector at the rear of the drive.
- The two media bays share a common power cable. Connect an available connector on the power cable to the 4-pin connector at the rear of the drive.

To replace media drives, do the following:

1. Carefully slide the drive into the system unit until the screw holes on the media device align with the screw holes located on the media device cage.

   Note: Be careful not to damage or unplug the media device cables while performing this procedure.
2. Replace all removed screws.
3. Replace the air duct.
4. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
5. Plug in the power cable.
6. Start the system unit.

Optional Media Bay Preparation

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

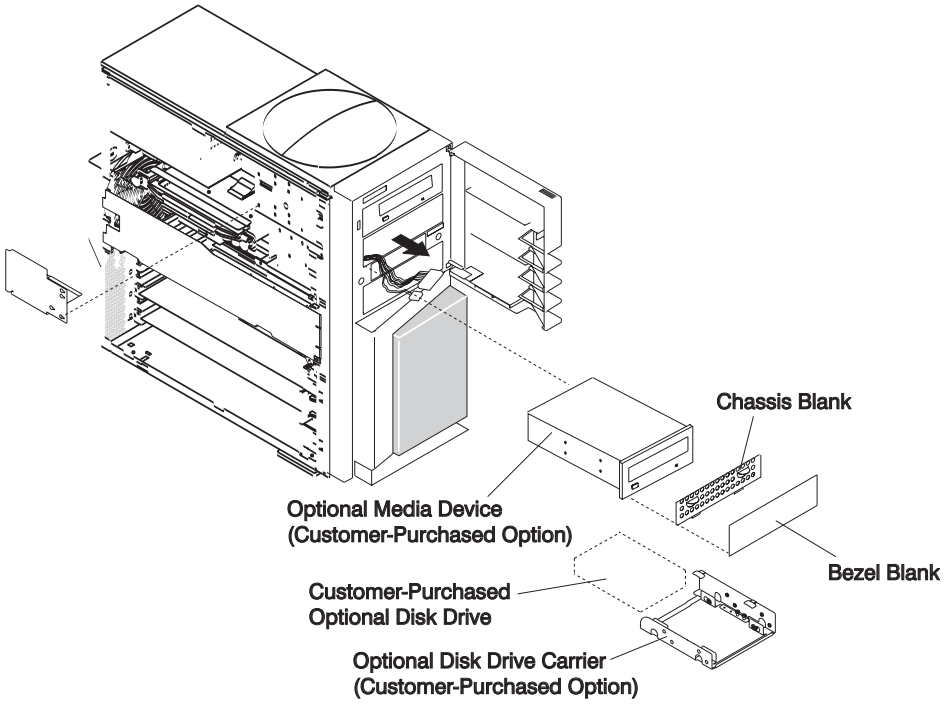
Notes:

1. The optional media bay can be used to house a CD-ROM, tape drive, or disk drive. If you are installing a disk drive you must use the optional disk drive carrier. See the illustration on page 245.
2. Before performing these procedures, read the following:
   - “Safety Notices” on page xi
   - “Laser Safety Information” on page xiii

If you plan to use the optional media bay, do the following:

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Gently push the bezel blank inward toward the chassis.

   Note: The bezel blank slides from front to back on two plastic studs connected to the front cover bezel.



4. Using the two tabs located on the chassis blank, pull the chassis blank up and then out from the chassis.
5. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
6. Remove the air duct located between the power supply and media bay.
7. Push the SCSI and power cables out the front of the system unit.

Optional CD-ROM and Tape Drive Installation

Note: The optional media bay and cables are designed to be serviced from the front of the system unit.

- Set the SCSI address jumpers to the correct address before installation. See the documentation provided with your drive for details on setting the SCSI address. See “SCSI IDs and Bay Component Locations” on page 6 for more information on SCSI addresses in your system unit.
- Locate the SCSI cable. Connect the cable to the connector at the rear of the drive.
- The two media bays share a common power cable. Connect an available connector on the power cable to the 4-pin connector at the rear of the drive.

To install a CD-ROM or tape drive in the optional media bay, do the following:

1. Carefully slide the drive into the system unit until the screw holes on the media device align with the screw holes located on the media device cage.

Note: Be careful not to damage or unplug the media device cables while performing this procedure.

2. Using the provided screws, secure the drive to the chassis housing.
3. Replace the air duct.
4. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
5. Plug in the power cable.
6. Start the system unit.

Optional Media Bay Disk Drive Installation

If you are installing a disk drive in the optional media bay, do the following:

1. If you are installing an additional disk drive into the optional media bay, mount the disk drive into the optional disk drive carrier. The optional disk drive carrier is a customer-purchased option. Refer “Chapter 10. Parts Information” on page 257 for a diagram and FRU part number of the optional disk drive carrier.

   Note: The screws which secure the disk drive to the disk drive carrier are special shoulder screws. These screws and the blue grommets *must* be used when installing a disk drive. Failure to use the blue grommets and special shoulder screws can result in permanent damage to the disk drive.

2. Carefully slide the disk drive and carrier into the system unit. Align the screw holes on the disk drive carrier with the screw holes located on the media device cage.

   Note: Be careful not to damage or unplug the disk drive cables while performing this procedure.

3. Using the provided screws, secure the drive to the chassis housing.
4. Replace the air duct.
5. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
6. Replace the EMC shield, if available.
7. Replace the plastic bezel blank.

   Note: Mount the plastic bezel blank onto the two studs that are welded to the inside of the front bezel. Slide the plastic bezel blank forward until flush with the bezel.

8. Plug in the power cable.
9. Start the system unit.

Installing an Optional Media Fan Assembly

1. Shut down the system as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Loosen, *but do not remove*, the screws holding the existing air duct to the media bays (see steps 1 through 5 of “Media Drive Removal” on page 243).

   Note: Loosen the screws only enough to enable the air duct to slide forward for removal.
5. Remove and discard the air duct located between the power supply and media bay.
6. If you are installing a new disk drive in the optional media bay, do so now. See steps 1 through 3 of “Optional Media Bay Disk Drive Installation” on page 246, then return to the next step.
7. Ensure that all cables between the optional DASD bays and the power supply do not interfere with the new fan and air-duct assembly.
8. Remove the internal DASD cage to access the front fan connector, J32 (see steps 5 through 9 of “Disk Drives” on page 235), then return here.
9. Note where the front fan is connected to the system board (connector J32).
10. Unplug the front fan from the system board.
11. Plug the front fan connector into the connector on the short wire from the optional media fan.
12. Plug the optional media fan into connector J32.
13. Install the optional media fan assembly between the optional DASD bays and the power supply.

    Note: Do not pinch or damage any cables or wires while installing the optional media-fan assembly.
14. Tighten the screws to hold the optional media fan assembly to the optional media bays.
15. Replace the DASD cage removed in step 8. See steps 14 through 17 of “Disk Drive Replacement” on page 237.
16. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
17. Reconnect all cables.
18. Turn on the power.

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.

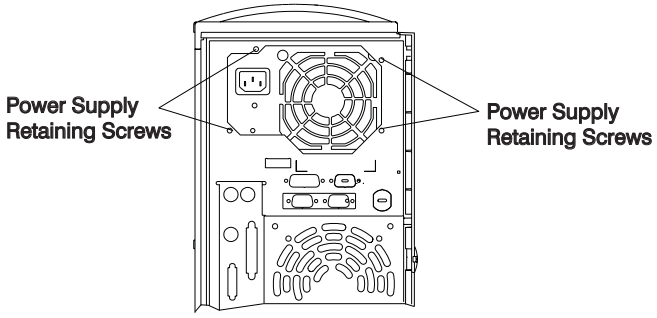
Before performing these procedures, read “Safety Notices” on page xi.

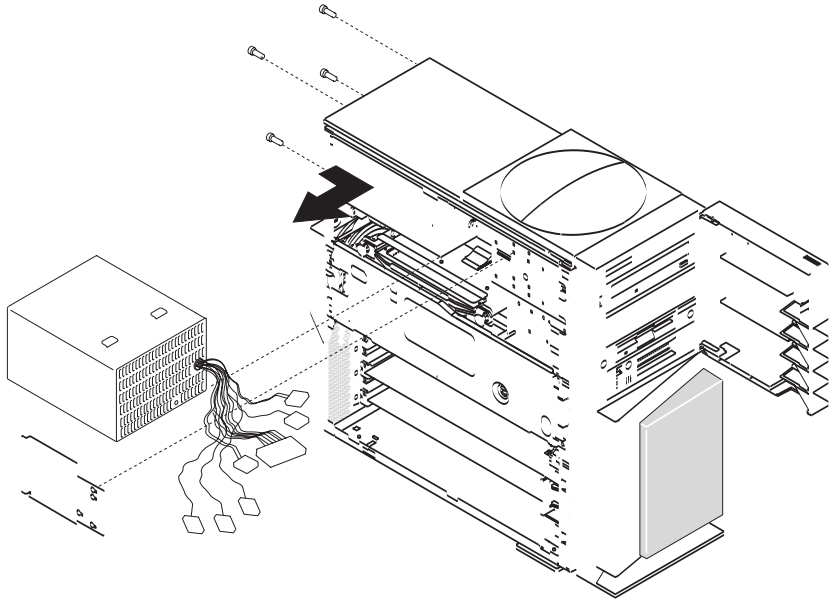
Power Supply Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Loosen, *but do not remove*, the screws holding the existing air duct to the media bays (see steps 1 through 5 of “Media Drive Removal” on page 243).

   Note: Loosen the screws only enough to enable the air duct to slide forward for removal.
5. Slide the air duct forward and remove.
6. This step is optional. Remove the processor card as described in “Processor Card Removal” on page 227, and if necessary, the support tower as described in step 11 on page 255 of “System Board” on page 255.
7. Disconnect all power supply cables at the device connection.
8. Disconnect the power cables from the system board connectors (J44 and J50). See “System Board Component Locations” on page 3.
9. Remove the four retaining screws that secure the power supply to the rear of the system unit.

   Attention: The power supply is heavy. When removing the power supply, ensure that the power supply does not drop and damage any components or connectors.
10. Slide the power supply slightly toward the front of the system unit to release the slide tabs located on top of the power supply.
11. Carefully remove the power supply from the system unit.





Power Supply Replacement

To replace the power supply, perform the removal steps in reverse order. Ensure that the power supply slide tabs engage with the top of the chassis cover. This assists in proper alignment of the power supply screws.

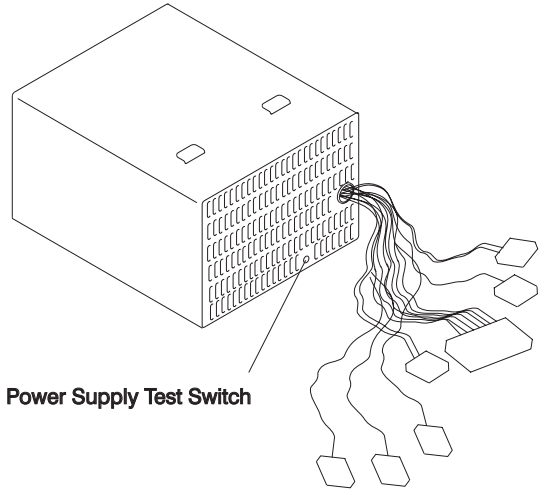
Power Supply Test Switch Procedure

Before performing these procedures, read “Safety Notices” on page xi.

Before you replace a power supply, use the following procedure to determine if the power supply needs replacing.

1. Remove the power supply as described in “Power Supply Removal” on page 248.
2. Connect the power cable to the power supply, and examine the rear of the power supply.

- If the LED on the rear of the power supply is not blinking, the power supply is defective and needs to be replaced.
- If the LED on the rear of the power supply is blinking, go to the next step.



3. Locate the test switch on the power supply.
4. Use an object similar to a ball-point pen to press and hold the test switch in for at least 30 seconds.
   - If the LED on the rear of the power supply is on steady and the fan spins, the power supply is good and can be returned to the system unit.
   - If the LED on the rear of the power supply is not on steady and the fan does not spin, the power supply is defective and needs to be replaced.

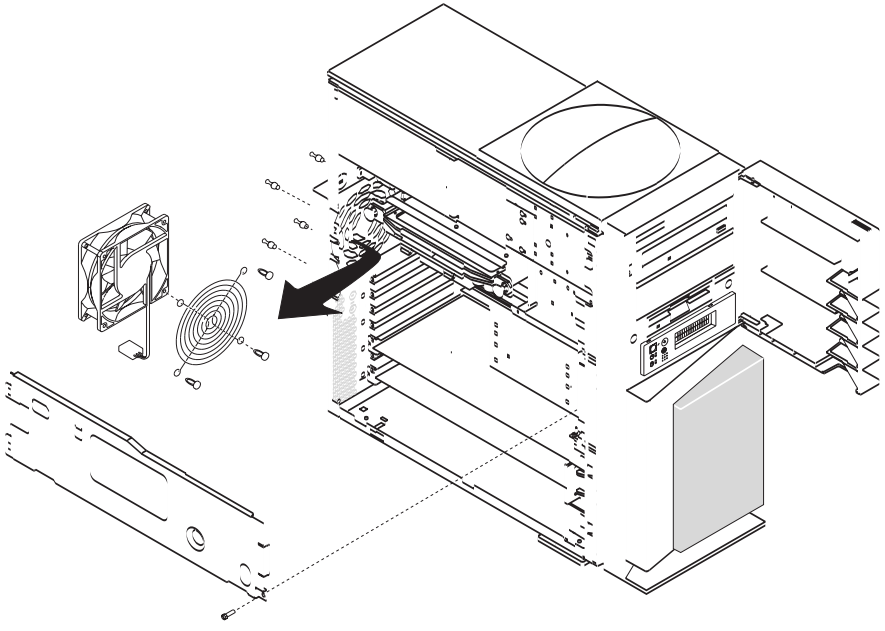
Fans

Before performing these procedures, read “Safety Notices” on page xi.

Rear Fan Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
5. Disconnect the fan cable from the connector (J34) on the system board. See “System Board Component Locations” on page 3.

6. Pull on the fan from inside while pushing on the rubber shock mounts from outside the system unit. Use a small screwdriver or ball-point pen to help push the shock mounts through to the inside of the system unit. Work on one shock mount at a time.
7. Gently pull the rear fan out of the system unit.



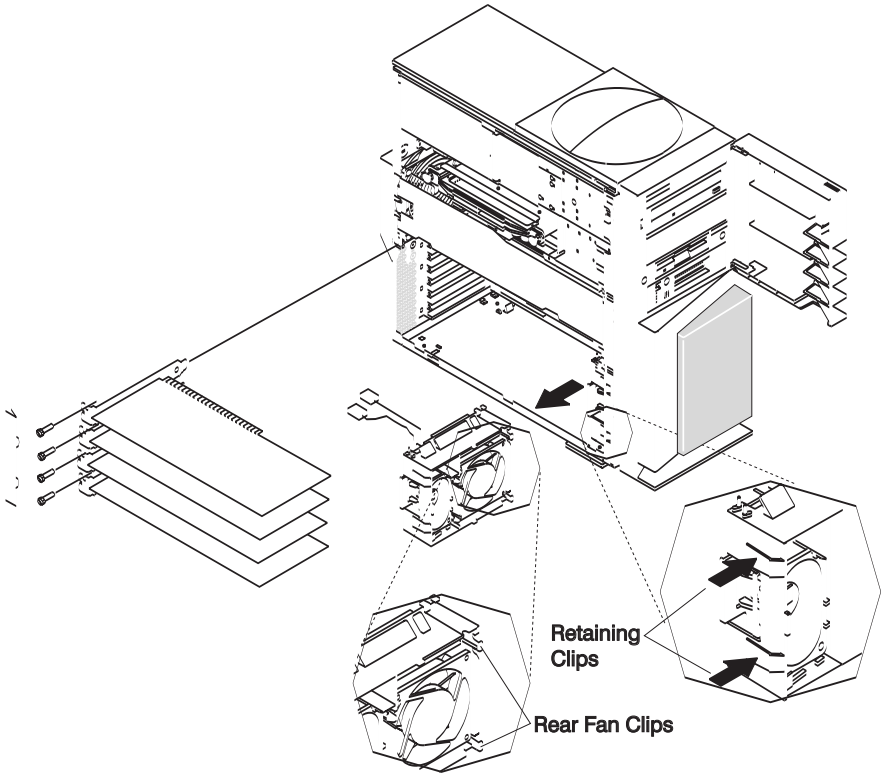
Rear Fan Replacement

To replace the rear fan, do the following:

1. Look for the fan air-flow direction mark located on the fan. Ensure that the new fan installs with the air flow going from front to back of the system unit.
2. Transfer the shock mounts to the new fan.
3. Hold the fan against the system unit, having the four shock mounts protrude through their respective openings.
4. Pull the shock mounts in a circular motion until they are seated in the opening.
5. Plug the fan into connector J34 located on the system board.
6. Replace the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
7. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
8. Plug in the power cable.
9. Start the system unit.

Bottom Front Fan Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Disconnect all adapter cables.
5. Remove adapters whose board extends to the front of the system unit. See “Adapter Removal” on page 230.
6. Disconnect the fan cable from connector J33 on the system board. See “System Board Component Locations” on page 3.
7. Disconnect the speaker cable from connector J25 on the system board. See “System Board Component Locations” on page 3.
8. Press on the two retaining clips to release speaker and fan assembly.
9. Slide the fan and speaker assembly out of the system unit.



Bottom Front Fan Replacement

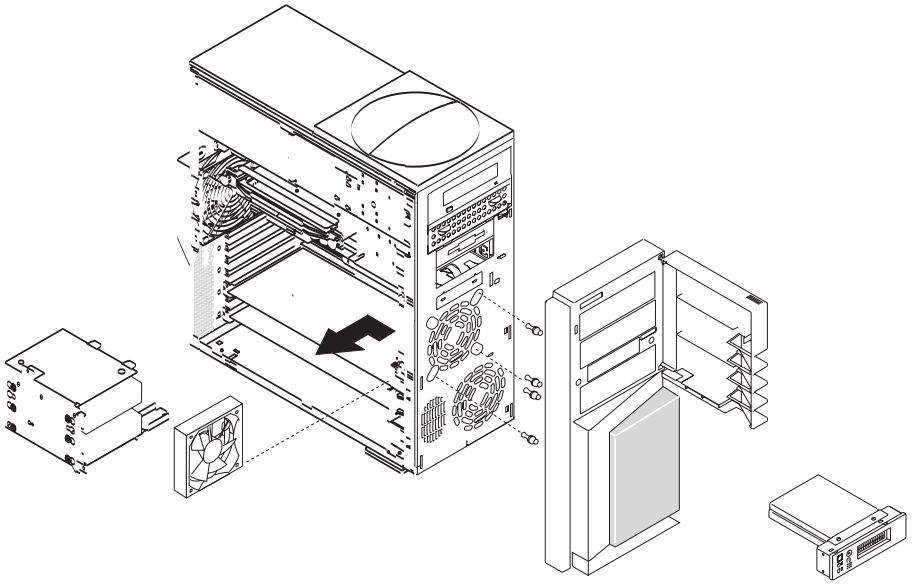
To replace the bottom front fan, do the following:

1. Place the upper and lower rear fan clips into slots located on the lower right side of the front of the chassis.

2. Swing the fan toward the front of the system unit until the plastic retaining clips lock into place.
3. Reconnect the fan cable to the J33 connector located on the system board. See “System Board Component Locations” on page 3.
4. Reconnect the audio cable to the J25 connector located on the system board. See “System Board Component Locations” on page 3.
5. Install all previously removed adapters.
6. Reconnect all adapter cables.
7. Replace the left side cover as described in “Left Side Cover Replacement” on page 213.
8. Plug in the power cable.
9. Start the system unit.

Top Front Fan Removal

1. Shut down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
4. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
5. Remove the disk drive cage and drive unit as described in “Disk Drives” on page 235.
6. Remove the front cover bezel as described in “Front Cover Bezel Removal” on page 215 .
7. Unplug the fan from the system board connector (J32). See “System Board Component Locations” on page 3.
8. Pull on the fan from inside while pushing on the rubber shock mounts from outside the system unit. Use a small screwdriver or ball-point pen to help push the shock mounts through to the inside of the system unit. Work on one shock mount at a time.
9. Gently pull the top front fan out of the system unit.



Top Front Fan Replacement

To replace the top front fan, do the following:

1. Look for the fan air-flow direction mark located on the fan. Ensure that the new fan installs with the air flow going from front to back of the system unit.
2. Transfer the shock mounts to the new fan.
3. Hold the fan against the system unit, having the four shock mounts protrude through their respective openings.
4. Pull the shock mounts in a circular motion until they are seated in the opening.
5. Plug the fan into connector J32 located on the system board. See “System Board Component Locations” on page 3.
6. Install the front cover bezel as described in “Front Cover Bezel Replacement” on page 215.
7. Install the disk drive cage and drive unit as described in “Disk Drive Replacement” on page 237.
8. Reconnect all cables.
9. Install the cover support bridge as described in “Cover Support Bridge Replacement” on page 220.
10. Install the left side cover as described in “Left Side Cover Replacement” on page 213.
11. Plug in the power cable.
12. Start the system unit.

System Board

Before performing these procedures, read “Safety Notices” on page xi.

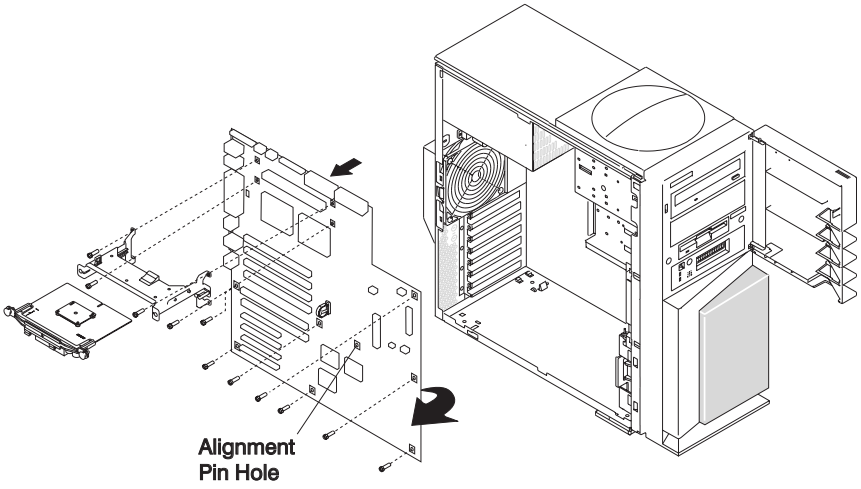
System Board Removal

Attention: Record the location of all components before you remove or disconnect them. Record the settings of any jumpers on the board before removing it from the system unit.

1. Shut-down the system unit as described in “System Unit Shutdown” on page 211.
2. Unplug the power cable.
3. Remove all cables attached at the rear of the system unit.
4. Remove the left side cover as described in “Left Side Cover Removal” on page 212.
5. Remove the cover support bridge as described in “Cover Support Bridge Removal” on page 220.
6. With one hand, touch any metal surface of the chassis to minimize static electric discharge. See “Handling Static-Sensitive Devices” on page 209.
7. Remove the disk drive and disk drive cage unit as described in “Disk Drive Removal” on page 235.
8. Remove all adapter cards as described in “Adapter Removal” on page 230.
9. Remove all memory DIMMs as described in “Memory Module Removal” on page 223.
10. Remove the processor card as described in “Processor Card Removal” on page 227 .
11. Remove the four retaining screws that secure the processor card support tower to the system board, and remove the tower.

    Note: The support-bracket retaining screws also aid in securing the system board to the chassis.
12. Before disconnecting any of the cables, replace and tighten a previously removed screw into the screw hole closest to the power supply connector (J50). This screw supports the upper edge of the system board while you disconnect the power supply connectors. See “System Board Component Locations” on page 3.
13. Disconnect all cables from the system board connectors.
14. Remove the screws that secure the system board to the chassis.
15. Grasping the front edge of the system board, (edge closest to the front of the system unit), carefully begin lifting until the alignment pin is clear of the system board.

    Note: You will need to use some force to release the board from the alignment pin.



System Board Replacement

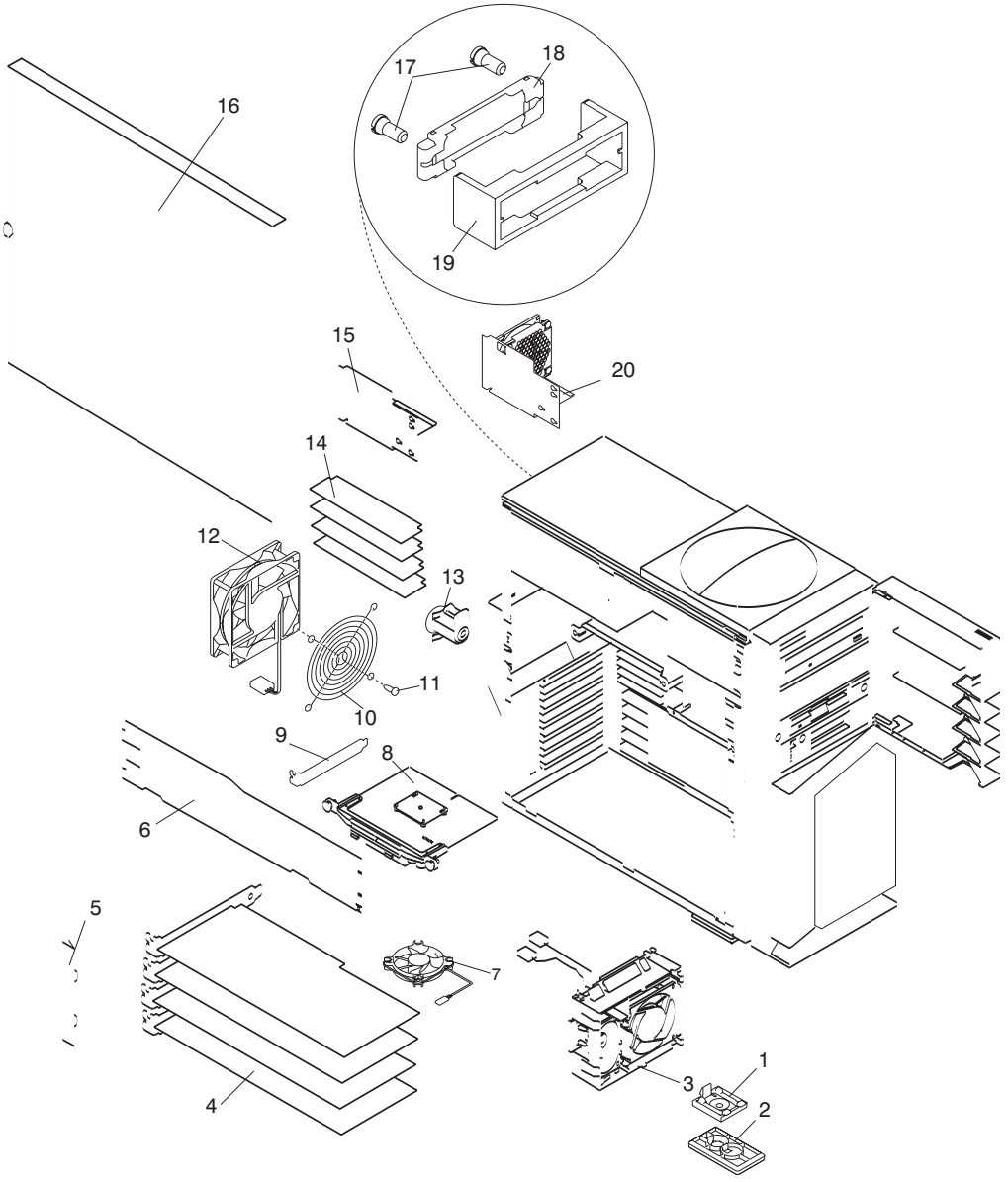
To replace the system board, do the following:

1. Insert rear edge of the system board first.
2. Align the rear connectors with the matching holes in the back wall of the chassis.
3. Align the system board with the alignment pin. The mounting hole near the battery connector (B1) engages the system board alignment pin. You will need to use some force to engage and disengage this pin.
4. Align all screw holes, and start all screws. *Do not* tighten the screws until the system board has been correctly aligned and all screws have been started in their respective holes.

   Note: Remember to replace the processor card support tower before you tighten any of the screws.
5. Replace all cables. For cable-connection diagrams, see “Signal Cable Routing” on page 262
6. Install all other components in the reverse order of their removal.

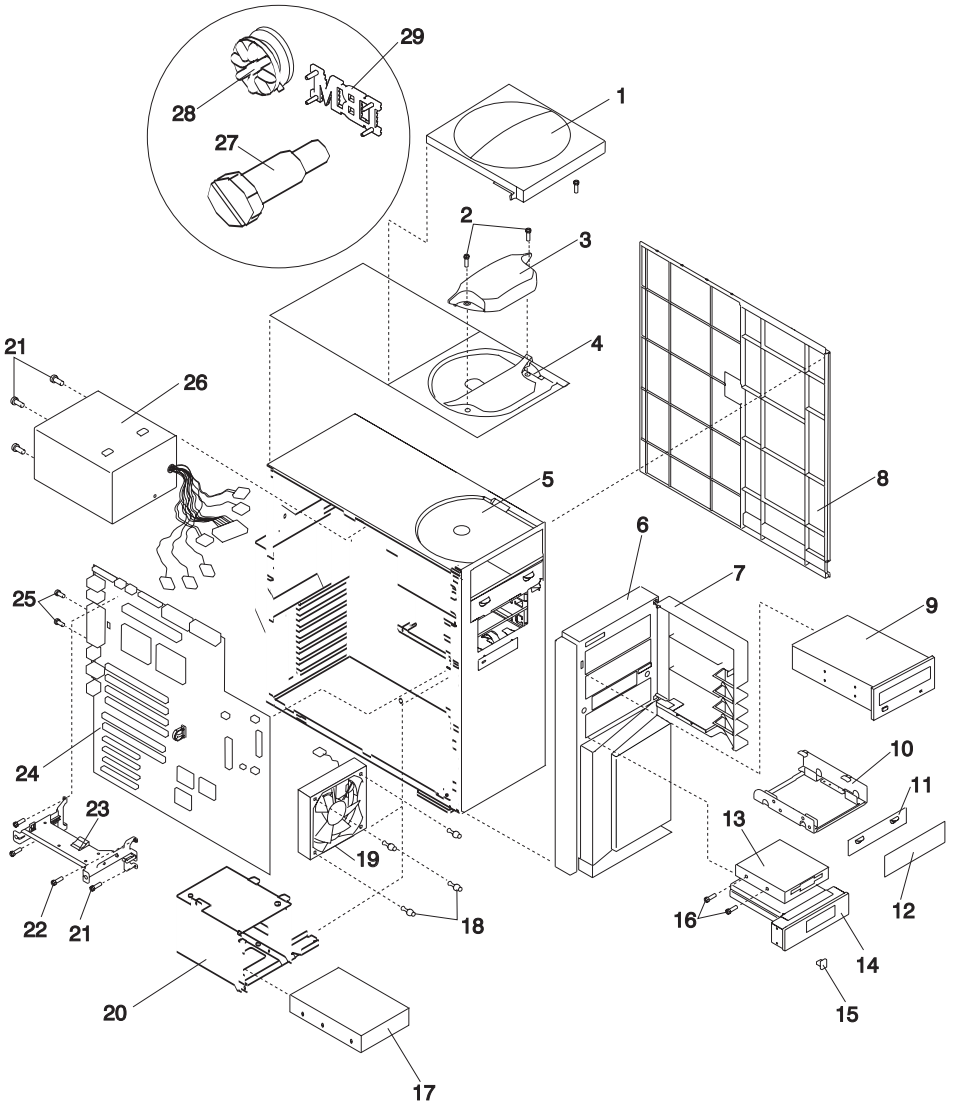
Chapter 10. Parts Information

This chapter contains parts information for the 44P Model 170.


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Index	Part Number	Units Per Assembly	Description
1	00P1626	4	Foot Base
2	00P1627	4	Foot Swivel
3	41L6172	1	Bottom Front Fan/Speaker Asm.
4	See Note	0 to 6	Adapter Cards
5	10L5570	1	PCI Shield
6	10L5565	1	Cover Support Bridge
7	03N4134	1	Processor Card Heatsink Fan
8	09P0277	1	Processor Card (333MHz)
	09P0272		Processor Card (400MHz)
	09P0943		Processor Card (450MHz)
9	60G1994	1 to 7	PCI Card Slot Blank
10	93H6015	1	Rear Fan Grill
11	28L4559	4	Rear Fan Grill Clip
12	10L5574	1	Rear Fan
13	12J5101	1	Keylock Assembly
14	93H4702	2 or 4	128MB Memory Module
	07L9030		256MB Memory Module
	07L9758		512MB Memory Module
	09P0550		256MB Memory Module
	09P0491		512MB Memory Module
15	03N3257	1	Power Supply Air Duct
16	41L6182	1	Left Side Cover
17	81F9137	2	Latch Stud
18	11H9760	1	Ethernet Connector Latch
19	81F9178	1	Ethernet Connector Slide
20	09P1651	0-1	Optional DASD Fan

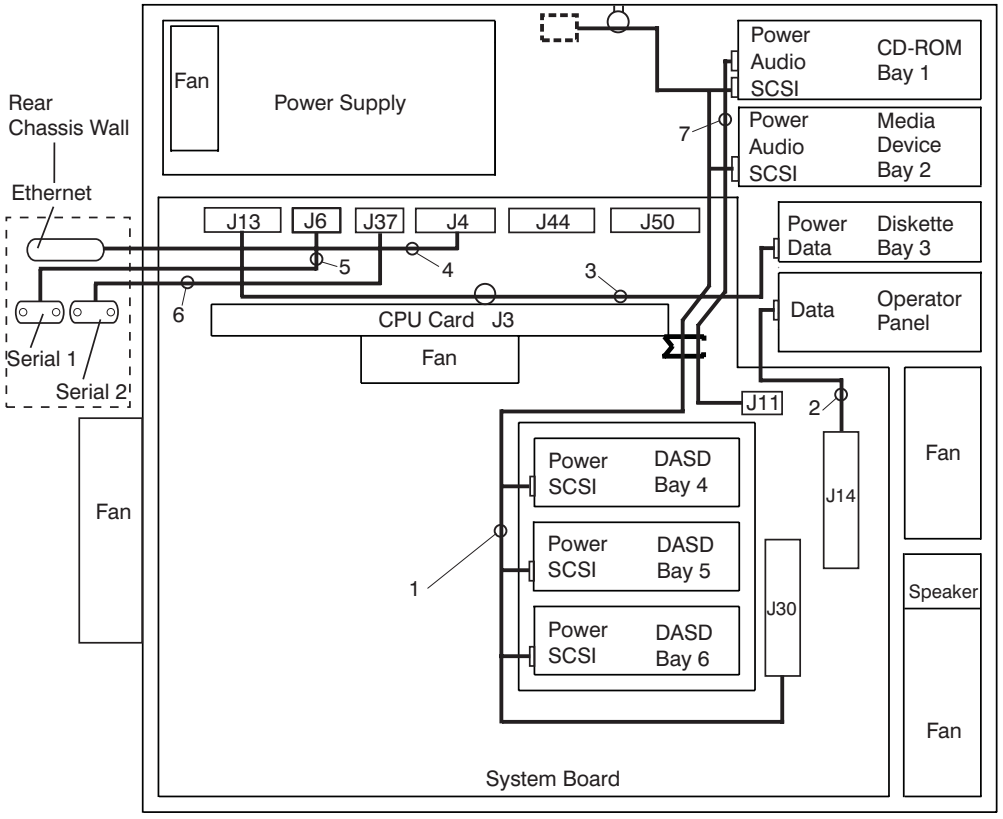
Note: See the ″Failing Function Codes″ and ″FRU Cross-References″ chapters in the *Diagnostic Information for Multiple Bus Systems* for part numbers.


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Index	Part Number	Units Per Assembly	Description
1	41L6179	1	Plastic Handle Cover
2	12J6340	2	Handle Screw
3	00P1628	1	Handle
4	41L6184	1	Chassis Top Cover
5	41L6169	1	System Unit Chassis
6	03N3165	1	Front Bezel
7	11K0020	1	Bezel Door with Logo
8	03N3780	1	Right Side Cover
9	97H7795	1	CD-ROM Drive, 32x bezel
	97H7611		Black bezel
	97H7612		White bezel
10	09P1689	1	Disk Drive Carrier (Optional)
11	10L5608	1	Media Bay Chassis Shield
12	07L9111	1	Media Bay Bezel Blank
13	76H4091	1	Diskette Drive
14	41L6173	1	Operator Panel with Bezel and Cable
14	41L6175	1	Operator Panel Bezel only
15	07L7242	1	Power Button
16	33G3907	8 to 10	M3 Screw, (Media Drives, Operator Panel, and Bezel)
17	See Note	1 to 4	Disk Drive
18	12J5103	8	Fan Rubber Shock Mounts
19	10L5575	1	Top Front Fan
20	10L5572	1	Disk Drive Cage
21	92F1294	22	M3.5 Screw (System Board, Chassis)
22	11K0435	2	M3.5 Screw (Support Tower)
23	41L6305	1	Processor Card Support Tower
24	09P0037	1	System Board
25	07L7411	2	SCSI Jack Screw
26	41L5215	1	Power Supply
27	76H3381	12	Disk Drive Shoulder Screws
28	01K1649	12	Disk Drive Mounting Blue Grommets.
29	08L0033	1	IBM Logo (Bezel Door Detail)
	15F8409	1	Battery (Located on the system board)

Note: See the ″Failing Function Codes″ and ″FRU Cross-References″ chapters in the *Diagnostic Information for Multiple Bus Systems* for part numbers.

Signal Cable Routing



Index	Part Number	Units Per Assembly	Description
1	41L6178	1	7-drop SCSI Cable
2	97H9328	1	Operator Panel Cable
3	09P1053	1	Diskette Drive Cable
4	11H6956	1	AUI Ethernet Cable
5	11K0019	1	Serial 1 Cable
6	73H0432	1	Serial 2 Cable
7	11K0022	1	CD-ROM Audio Cable
	62X0388	4	Serial Cable Jack Screw (Not Shown)

Keyboards and Mouse



Index Number	FRU Part Number	Units Per Assembly	Description
1	93H8120	1	Keyboard, 101 United States English (ID 103P)
	93H8121	1	Keyboard, 102 Canada French (ID 058)
	93H8122	1	Keyboard, 102 Canada French (ID 445)
	93H8123	1	Keyboard, 102 Spanish (ID 171)
	93H8124	1	Keyboard, 104 Brazil Portuguese (ID 275)
	93H8125	1	Keyboard, 102 Arabic (ID 238)
	93H8126	1	Keyboard, 102 Belgium French (ID 120)
	93H8127	1	Keyboard, 102 Belgium (ID 120)
	93H8128	1	Keyboard, 102 Bulgarian (ID 442)
	93H8129	1	Keyboard, 102 Czech (ID 243)
	93H8130	1	Keyboard, 102 Danish (ID 159)
	93H8131	1	Keyboard, 102 Dutch (ID 143)
	93H8132	1	Keyboard, 102 French (ID 189)
	93H8133	1	Keyboard, 102 German (ID 129)
	93H8134	1	Keyboard, 102 Greek (ID 319)
	93H8135	1	Keyboard, 101 Hebrew (ID 212)
	93H8136	1	Keyboard, 102 Hungarian (ID 208)
	93H8137	1	Keyboard, 102 Icelandic (ID 197)
	93H8138	1	Keyboard, 102 Italian (ID 142)
	93H8139	1	Keyboard, 102 Norwegian (ID 155)
	93H8140	1	Keyboard, 102 Polish (ID 214)
	93H8141	1	Keyboard, 102 Portuguese (ID 163)
	93H8142	1	Keyboard, 102 Romainian (ID 446)
	93H8143	1	Keyboard, 101 Russian (ID 443)
	93H8144	1	Keyboard, 102 Serbian (ID 118)
	93H8145	1	Keyboard, 102 Slovak (ID 245)
	93H8146	1	Keyboard, 102 Spanish (ID 172)
	93H8147	1	Keyboard, 102 Sweden/Finland (ID 153)
	93H8148	1	Keyboard, 105 Swiss F/G (ID 150)
	93H8149	1	Keyboard, 102 Turkish (ID 179)
	93H8150	1	Keyboard, 102 Turkish (ID 440)
	93H8151	1	Keyboard, 102 UK English (ID 166)
	93H8152	1	Keyboard, 102 Latvia (ID 234)
	93H8153	1	Keyboard, US English ISO9995 (ID 103P)

Index Number	FRU Part Number	Units Per Assembly	Description
	93H8154	1	Keyboard, 106 Japanese (ID 194)
	93H8155	1	Keyboard, 101 Chinese/US (ID 467)
	93H8156	1	Keyboard, 103 Korean (ID 413)
	93H8157	1	Keyboard, 101 Thailand (ID 191)
2	76H5084	1	Three Button Mouse

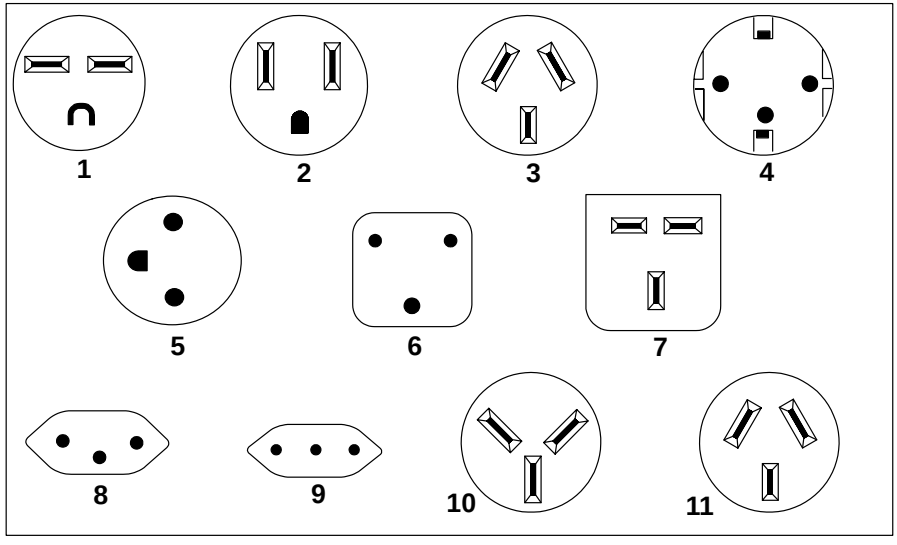
Keyboards and Mouse (Black)



Index Number	FRU Part Number	Units Per Assembly	Description
1	07L9446	1	Keyboard, 101 United States English (ID 103P)
	07L9447	1	Keyboard, 102 Canada French (ID 058)
	07L9448	1	Keyboard, 102 Canada French (ID 445)
	07L9449	1	Keyboard, 102 Spanish (ID 171)
	07L9450	1	Keyboard, 104 Brazil Portuguese (ID 275)
	07L9451	1	Keyboard, 102 Arabic (ID 238)
	07L9452	1	Keyboard, 102 Belgium French (ID 120)
	07L9453	1	Keyboard, 102 Belgium (ID 120)
	07L9454	1	Keyboard, 102 Bulgarian (ID 442)
	07L9455	1	Keyboard, 102 Czech (ID 243)
	07L9456	1	Keyboard, 102 Danish (ID 159)
	07L9457	1	Keyboard, 102 Dutch (ID 143)
	07L9458	1	Keyboard, 102 French (ID 189)
	07L9459	1	Keyboard, 102 German (ID 129)
	07L9460	1	Keyboard, 102 Greek (ID 319)
	07L9461	1	Keyboard, 101 Hebrew (ID 212)
	07L9462	1	Keyboard, 102 Hungarian (ID 208)
	07L9463	1	Keyboard, 102 Iceland (ID 197)
	07L9464	1	Keyboard, 102 Italy (ID 142)
	07L9465	1	Keyboard, 102 Norwegian (ID 155)
	07L9466	1	Keyboard, 102 Polish (ID 214)
	07L9467	1	Keyboard, 102 Portuguese (ID 163)
	07L9468	1	Keyboard, 102 Romainian (ID 446)
	07L9469	1	Keyboard, 101 Russian (ID 443)

Index Number	FRU Part Number	Units Per Assembly	Description
	07L9470	1	Keyboard, 102 Serbian (ID 118)
	07L9471	1	Keyboard, 102 Slovak (ID 245)
	07L9472	1	Keyboard, 102 Spanish (ID 172)
	07L9473	1	Keyboard, 102 Sweden/Finland (ID 153)
	07L9474	1	Keyboard, 105 Swiss F/G (ID 150)
	07L9475	1	Keyboard, 102 Turkish (ID 179)
	07L9476	1	Keyboard, 102 Turkish (ID 440)
	07L9477	1	Keyboard, 102 UK English (ID 166)
	07L9478	1	Keyboard, 102 Latvia (ID 234)
	07L9479	1	Keyboard, US English ISO9995 (ID 103P)
	07L9480	1	Keyboard, 106 Japan (ID 194)
	07L9481	1	Keyboard, 101 Chinese/US (ID 467)
	07L9482	1	Keyboard, 103 Korea (ID 413)
	07L9483	1	Keyboard, 101 Thailand (ID 191)
2	08L0362	1	Three Button Mouse (Black)

Power Cable



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
8	14F0051	Liechtenstein, Switzerland
9	14F0069	Chile, Ethiopia, Italy
10	14F0087	Israel
11	6952291	Paraguay, Colombia, Uruguay

Appendix A. Environmental Notices

Product Recycling and Disposal

This unit contains materials such as circuit boards and connectors with lead that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. This manual contains specific information on batteries where applicable. This product may contain nickel-cadmium and/or lithium batteries. The battery(s) must be recycled or disposed of properly. Recycling facilities may not be available in your area. In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used sealed lead acid, nickel cadmium and nickel metal hydride batteries and battery packs from IBM equipment. For information on proper disposal of the nickel cadmium batteries in this product, please contact IBM at 1-800-426-4333. For information on battery disposal outside the United States, contact your local waste disposal facility.

Environmental Design

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

Unit Emissions

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

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

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

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Appendix C. Modem Configurations

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

Sample Modem Configuration Files

Several sample modem configurations files are supplied that 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
modem_m0.cfg	modem_m0.sp
modem_m1.cfg	modem_m1.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

One of these configuration files should be suitable for your use with the following selection procedures and your modem manual,

1. Is your modem an IBM 7852-400?

   If yes, use modem configuration file **modem_m0.cfg** and go to step 7 on page 272.

   Note: The IBM 7852-400 modem has DIP switches on the right side of the unit. See “IBM 7852-400 DIP Switch Settings” on page 274 for the correct switch settings.

   If no, continue with step 2.

2. Is your modem an IBM 7857-017?

   If yes, use modem configuration file **modem_m1.cfg** and go to step 7 on page 272.

Note: The IBM 7857-017 modem has two telephone line connections on the back of the unit. One is marked **LL** (for leased line), and the other is marked **PTSN** (for public telephone switched network). The service processor expects to use the modem on the public network, so the telephone line should attach to the PTSN connector. See the note on page 273

If no, continue with step 3.

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

   If yes, go to step 5.

   If no, continue with step 4.

4. Does your modem respond to:

   a. ATZ reset command,
   or

   b. ATZn reset commands, where n can be 0, 1, and so on?

      If ATZ, configuration file **modem_z.cfg** is recommended.

      If ATZn, configuration file **modem_z0.cfg** is recommended.

   Go to step 7.

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

   If yes, this test must be disabled. You can use sample configuration files **/usr/share/modem_m0.cfg** or **/usr/share/modem_m1.cfg** as a model to help you create a file for your particular modem. See “Customizing the Modem Configuration Files” on page 273 for additional information. Go to step 7.

   If no, go to step 6.

6. Does your modem respond to:

   a. AT&F reset command, or

   b. AT&Fn reset commands, where n can be 0, 1, and so on?

   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.

7. You have completed selection of the configuration file.

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

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

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

Note: Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message causes the service processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out Policy Setup Menu. These retries result in redundant pages.

Examples for Using the Generic Sample Modem Configuration Files

The following table contains information to help you determine which modem configuration file to use with various modems.

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 **				X	
Bocamodem 1440E			X		
Hayes Smart Modem 300	X				
IBM 5841	X				
IBM 5843	X				
IBM 7851				X	
IBM 7852-10				X	
IBM 7855					X
USRobotics 36.6K Sportster					X
Zoom V.32			X		

Note: ** Ring interrupt only on first ring.

Customizing the Modem Configuration Files

You can create your own modem configuration files or modify the samples provided. After you customize your modem configuration files, you *must* access them through the Configure Remote Maintenance Policy Service Aid rather than from the service processor menus.

Notes:

1. 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.
2. If you have not already set up your serial ports, line speeds, authorizations, and telephone numbers from the service processor menus, you can use the service aids to set them while you specify your customized modem configuration files.

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

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

   Change the third line of each of the following stanzas:
   - `condout`
   - `condin`
   - `ripo`
4. Save the changes.

IBM 7852-400 DIP Switch Settings

If you are using a 7852-400 modem to enable service processor communications, the DIP switches must be set according to the following table.

Switch	Position	Function
1	Up	Force DTR
2	Up	Flow Control &E4
3	Down	Result Codes Enabled
4	Down	Modem Emulation Disabled
5	Up	Auto Answer Enabled
6	Up	Maximum Throughput Enabled
7	Up	RTS Normal Functions
8	Down	Enable Command Mode
9	Down	Remote Digital Loopback Test Enabled
10	Up	Dial-Up Line Enabled
11	*Up	AT Responses Enabled (Extended Responses Disabled)
12	*Down	Asynchronous Operation
13	Up	28.8KB Line Speed
14	Up	
15	Up	CD and DSR Normal Functions
16	Up	2-Wire Leased Line Enabled

* Only switches 11 and 12 are changed from the factory default settings.

Xon/Xoff Modems

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

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

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

Ring Detection

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

The service processor uses the ring interrupt request to count the number of rings when ring indicate power-on (RIPO) is enabled. If your modem produces an interrupt on only the first ring, set ring indicate power-on to start on the first ring. Otherwise, you can choose to start ring indicate power-on on any ring count.

Terminal Emulators

The service processor is compatible with simple ASCII terminals, and therefore compatible with most emulators. When a remote session is handed off from the service processor to the operating system, agreement between terminal emulators becomes important.

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

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

Recovery Procedures

Situations such as line noises and power surges can sometimes cause your modem to enter an undefined state. When it is being used for dial-in, dial-out, or ring indicate power-on, your modem is initialized each time one of these actions is expected. If one of these environmental conditions occurs after your modem has been initialized, it might 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 ensure it has been initialized recently.

If your system is difficult to access physically, another strategy is to protect it with an uninterruptible power source (UPS) and a phone line surge protector.

In case recovery becomes necessary, shut down your system 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 completely reinitialize your system.

Transfer of a Modem Session

Because many modem command variations exist, the sample modem configuration files located at the end of this appendix have been written to capture the largest number of workable modem settings.

The modem command **&Dn** (where *n* is a number) generally sets the modem response to the data terminal ready (DTR) signal from the server's serial port. The desired response is that the modem will hold a connection while DTR is enabled, and drop the connection when DTR is released. Using this mechanism, the server hangs up on a connection under normal conditions.

Consult your modem manual for its specific response scheme for the **&Dn** command.

Two strategies are available for dealing with the modem's response to DTR:

- Recovery
- Prevention

Before using one of these strategies, determine if your server's modem is set up correctly to respond to the DTR signal.

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, 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 in each of the following sample modem configuration files:

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

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 the following three sample modem configuration files:

   - 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, which breaks the connection.

Recovery Strategy

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

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

Prevention Strategy

The disconnect is caused by the operating system when it initializes the Primary Console. The tests listed in "Transfer of a Modem Session" on page 276 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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```

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

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

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

                                                # Expect a connection response.
```

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

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

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

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

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

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

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

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

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

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

Sample File modem_f1.cfg

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

ICDelay 1
DefaultTO 10
CallDelay 120
#  AT  Attention Code            ,   Inserts delay in dialing commands
# &F1  Reset. Restore profile 1 Q0   Turn on responses
#  E0  Turn echo off            Q1   Turn off responses
#  V0  Use numeric responses    S0=0 Automatic answer inhibit
# +++  Escape to command mode   S0=2 Answer on second ring
#  H0  Hang-up                  X0=0 Limit modem response codes
#                               T =  Tone mode.  When used as T\r, it is a
#                                    no op to maintain program synchronization
#                                    when modem may/will echo the commands.
```

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

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

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

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

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

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

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

condin:     send "AT&F1Q0T\r"                   # Reset modem. Select profile 1
            ignore "0\r" or "OK\r\n" timeout 2  # Ignore modem response.
```

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

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

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

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

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

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

Appendix D. Firmware Updates

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

Checking the Current Firmware Levels

To check the current levels that are installed on the system, do the following:

1. Log in as root user.
2. Enter the following command:

   lscfg -vp | grep alterable
3. Press enter. A report will be produced similar to the following:

```
ROM Level.(alterable).......sh000221   <=== service processor F/W level
ROM Level.(alterable).......SPH00056   <=== system F/W level
```

Notes:

1. In the example above, if the current version of service processor firmware is sh000221, the last six characters of the ROM level represent a date in a `yymmdd` format, where `yy` is the last two digits of the year, `mm` is the month and `dd` is the day of the firmware (Julian date).
2. Also in the example above, if the current version of system firmware is SPH00056, the last five characters of the ROM level represent a date in a `yyddd` format, where `yy` is the last two digits of the year and `ddd` is the Gregorian date of the firmware.

Check the RS/6000 support web site at http://www.rs6000.ibm.com/support/micro for the latest level of downloadable firmware. If the version of system firmware installed on your system is older than (has an earlier date than) the system firmware shown on the web site, you should consider downloading and applying the update. If the version of service processor firmware installed on your system is older than (has an earlier date than) the service processor firmware shown on the web site, you should consider downloading and applying the update.

Updating System Firmware

To update the system firmware, perform the following steps:

1. Log in as root user.
2. If the directory **/tmp/fwupdate** does not exist, create it by issuing the following command: `mkdir /tmp/fwupdate`
3. The firmware update file must be written into the **/tmp/fwupdate** directory on the Model 170. This can be done by using the **ftp** command to get the image from an ftp server, NFS-mounting the directory on the host server, or downloading it from the web site at http://www.rs6000.ibm.com/support/micro.

   After the firmware update file has been written into the **/tmp/fwupdate** directory, verify its existence by entering the following command:

```
ls /tmp/fwupdate/cb*.img
```

The update file name will have the format *cbyyddd.img*. The *cb* indicates that this is a combined image for a Model 170 server, *yy* is the last two digits of the year, and *ddd* is the Julian date of the update file.

4. After the update file has been written to the **/tmp/fwupdate** directory, enter the following commands:

   ```
   cd /usr/lpp/diagnostics/bin
   ```

   then

   ```
   ./update_flash -f /tmp/fwupdate/cbyyddd.img
   ```

   Notes:

   a. `cbyyddd.img` is the file you identified in the previous step.

   b. Make sure that you include the periods (.) in the commands shown above.

   c. AIX commands are case-sensitive. Type them exactly as shown.

   You are asked by the system for confirmation to proceed with the firmware update and the required reboot. If you confirm, the system applies the new firmware, reboots, and returns to the AIX prompt. This may take up to ten minutes, depending on the configuration of the system.

   Attention: On some systems, the message `Wait for rebooting before stopping` may appear on the system display. *Do not* turn off the system unit until the system has fully rebooted to the AIX login prompt. If a shutdown is necessary at that time, log in as root user and issue the **shutdown** command. While the update is in progress, you will see `Rebooting...` on the display for as long as three minutes.

The firmware update is complete.

Appendix E. Interpreting Firmware Error Codes

The error code is an 8-character (4-byte) hexadecimal code produced by firmware to identify the potential failing function or FRU in a system. The code consists of five source code characters and three reason code characters. Individual characters within the error code have specific field definitions, as defined in Table 6 and Table 7.

Table 6. Service Reference Code Field Layout

Source Code				Reason Code			
Byte 0		Byte 1		Byte 2		Byte 3	
S1	S2	S3	S4	S5	R1	R2	R3

Table 7. Service Reference Code Field Descriptions

Field	Description
S1	Maintenance package source that produced the error code. **0** Reserved **1** Reserved **2** POST, firmware **3** BIST **4** Service processor, base system controller, etc. **5** Reserved **8** Product-specific service guide, MAPs **9** Reserved **A-F** Reserved
S2	Base class
S3-S4	Sub-class
S5	Unique version of the device/FRU type for a particular product.
R1	Device/FRU unique failure reason codes. **1-7** Used in combination with R2, R3 for diagnostic test failure when maximum isolation was obtained. **8-9** Used in combination with R2, R3 for diagnostic test failure when maximum isolation was *not* obtained. **A** Log analysis of POST error log **B** Log analysis of machine check or checkstop error log **C** Reserved **D** Diagnostic detected missing resource **E-F** Reserved

Table 7. Service Reference Code Field Descriptions (continued)

Field	Description
R2 - R3	Device/FRU unique failure reason codes.

Table 8. Current PCI 2.1 Class Code Definition

PCI Base Class (lower nibble) S2	PCI Sub-Class S3 -S4	Description
0	Devices that were built before the class code field was defined.	
	00	All currently implemented devices except VGA-compatible devices.
	01	VGA-compatible devices
1	Mass storage controller	
	00	SCSI bus controller
	01	IDE controller
	02	Floppy disk controller
	03	Intelligent Peripheral Interface (IPI) bus controller
	04	Redundant Array of Independent Disk (RAID) controller
	80	Other mass storage controller
2	Network controller	
	00	Ethernet controller
	01	Token ring controller
	02	FDDI controller
	03	ATM controller
	80	Other network controller
3	Display controller	
	00	VGA-compatible controller
	01	Extended Graphics Array (XGA) controller
	80	Other display controller
4	Multimedia device	
	00	Video device
	01	Audio device
	80	Other multimedia device
5	Memory controller	
	00	RAM
	01	Flash
	80	Other memory controller

Table 8. Current PCI 2.1 Class Code Definition (continued)

6	Bridge devices	
	00	Host bridge
	01	ISA bridge
	02	EISA bridge
	03	MCA bridge
	04	PCI-to-PCI bridge
	05	PCMCIA bridge
	06	NuBus bridge
	07	Cardbus bridge
	80	Other bridge device
7	Simple communication controllers	
	00	Serial controllers
	01	Parallel port
	80	Other communication controllers
8	Generic system peripherals	
	00	PIC
	01	DMA controller
	02	System timer
	03	Real-time clock (RTC) controller
	80	Other system peripherals
9	Input devices	
	00	Keyboard controller
	01	Digitizer (pen)
	02	Mouse controller
	80	Other input controllers
A	Docking stations	
	00	Generic docking station
	80	Other type of docking station
B	Processors	
	00	Reserved
	01	Reserved
	02	Reserved
	10	Reserved
	20	PowerPC
	40	Co-processor

Table 8. Current PCI 2.1 Class Code Definition (continued)

C	Serial bus controllers	
	00	FireWire (IEEE 1394)
	01	ACCESS.bus
	02	Serial storage architecture (SSA)
	03	Universal serial bus (USB)
	04	Fiber channel

Table 9. S2-S3-S4 Definition for devices/FRUs not defined in the PCI specification

Base Class S2	**Sub-Class S3 - S4**	**Description**
0	10	AC Power
	11	DC Power
	20	Temperature-related problem
	21	Fans
	30-3x	Cables
	40-4x	Terminators
	50	Operator panels
	60-6x	Reserved
	70-7x	Reserved
	90-9x	Reserved
	A0	ROS heartbeat
	B0	O/S heartbeat
	D0	Unknown device
	E0	Security
1	A0	SCSI drivers (generic)
	B0	IDE drives
	C0	RAID drives
	D0	SSA drives
	E0	Tapes SCSI
	E1	Tapes IDE
	ED	SCSI changer
	EE	Other SCSI device
	EF	Diskette drive
	F0	CD-ROM SCSI
	F1	CD-ROM IDE
	F2	Read/write optical SCSI
	F3	Read/write optical IDE
	F4 - FF	TBD media devices

Table 9. S2-S3-S4 Definition for devices/FRUs not defined in the PCI specification (continued)

Base Class S2	Sub-Class S3 - S4	Description
5	A0	L2 cache controller including integrated SRAM
	A1	L2 cache SRAM
	A8	NVRAM
	A9	CMOS
	AA	Quartz/EEPROM
	B0 - Bx	Memory cards
	Cyy	Memory DIMMs, where C is S2, S3, or S4 and yy identifies the memory size and type.
7	A0	I^2C bus
8	A0	Power management functions
9	A0 - Ax	Keyboards
	B0 - Bx	Mouse(s)
	C0 - Cx	Dials
	D0	Tablet
	D1 - Dx	TBD input devices
B	A0	Service processor

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