RS/6000 7025 F40 Series

Service Guide

IBM

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IBM

Second Edition (June 1997)

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Contents

Communications Statements

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

If the Graphics Subsystem or the Video Output Option is NOT installed, this system complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

Federal Communications Commission (FCC) Statement

Note: The *IBM 7025 Model F40* has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult an authorized dealer or service representative for help.

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

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

Responsible Party:

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

European Union (EU) Statement

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

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

International Electrotechnical Commission (IEC) Statement

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

United Kingdom Telecommunications Safety Requirements

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

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

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

VCCI Statement

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

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

This equipment is in the Class 2 category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area.

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

Read the instructions for correct handling.

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

If the Graphics Subsystem (Feature Code 7252 or 7253) or the Video Output Option (Feature Code 7254) IS installed, this system complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

Federal Communications Commission (FCC) Statement

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

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

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

European Union (EU) Statement

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

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

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

International Electrotechnical Commission (IEC) Statement

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

United Kingdom Telecommunications Safety Requirements

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

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Canadian Department of Communications Compliance Statement

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

VCCI Statement

　この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

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

This equipment is in the Class 1 category (information equipment to be used in
commercial and/or industrial areas) and conforms to the standards set by the
Voluntary Control Council For Interference by Data Processing Equipment and
Electronic Office Machines aimed at preventing radio interference in commercial
and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio
interference may be caused to radios and TV receivers, etc.

Read the instructions for correct handling. VCCI-1.

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

<u>Hinweis</u>

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

Safety Notices

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

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

Electrical Safety

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

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**
>
> **Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.**
>
> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
>
> **Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.**

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

DANGER

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

Laser Safety Information

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

```
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.

About This Book

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

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

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

ISO 9000

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

Related Publications

The following publications are available for purchase:

- The *IBM RS/6000 7025 F40 Series User's Guide* contains information to help users set up, install options, configure, modify, and solve minor problems.

- The *RS/6000 Diagnostic Information for Multiple Bus Systems* contains common diagnostic procedures, error codes, service request numbers, and failing function codes. This manual is intended for trained service technicians.

- The *RS/6000 Adapter, Device, and Cable Information for Multiple Bus Systems* contains information about adapters, external devices, and cabling. This manual is intended to supplement information found in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

- The *Site and Hardware Planning Information* contains information to help you plan your installation.

Chapter 1. Reference Information

System Unit Locations

Front View with Media Door Off

Operator
Panel
Display

Serial
Number

Power
Switch
Power LED
Reset
Audio Out
Audio In

Rear View

Expansion Slots

Audio In

Serial Connectors

Parallel Connector

Audio Out

Mouse Connector

Keyboard Connector

Tablet Connector

Ethernet Connector

Ethernet Twisted Pair

External SCSI Connector
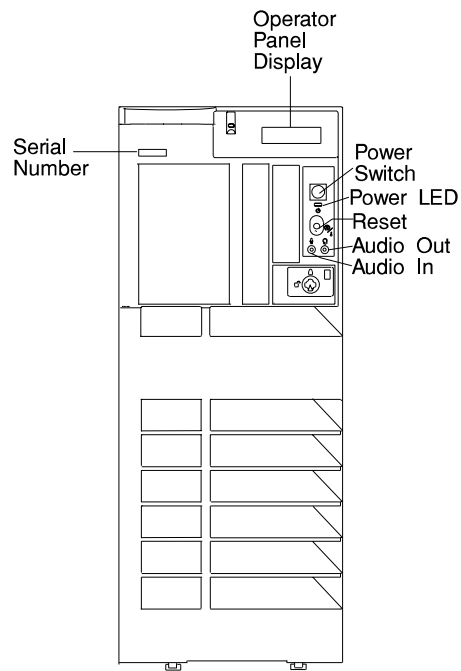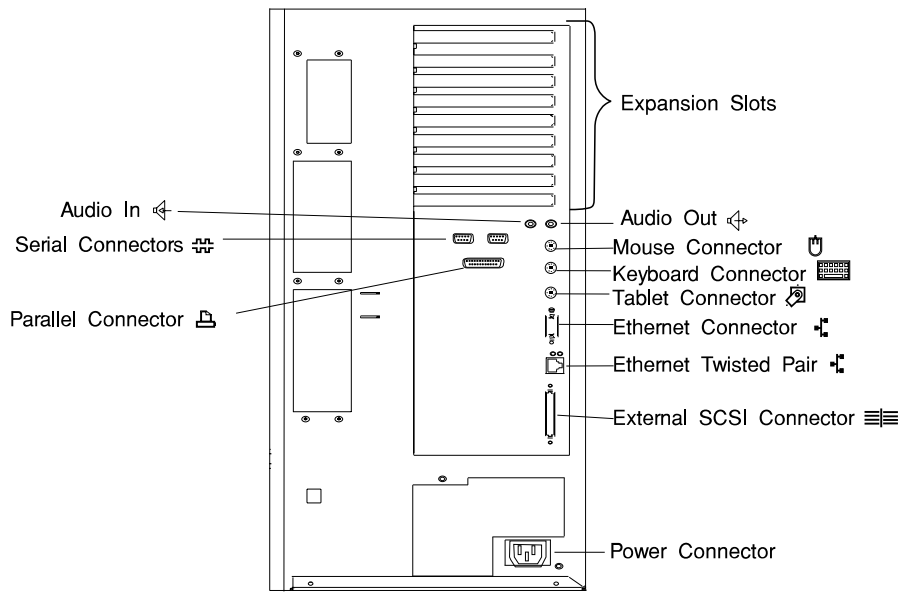
Power Connector

SCSI IDs and Bay Locations

Open Bay
SCSI ID 5

Open Bay
SCSI ID 6

Bank C
Bays: 1-6
SCSI IDs:
 0-5 or 8-13

Bank D
Bays: 1-6
SCSI IDs:
 0-5 or 8-13

Bank E
Bays: 1-6
SCSI IDs:
 0-5 or 8-13

B1   B2   A1   A2

CD-ROM
SCSI ID 4

Diskette Drive

Open Bays

POWER GTX1000 Rear View

External Sync
Connector

Video Out
Connector

Y/C Out
Connector

Display (RGB)
Connector

Attachment Adapter
Connector

Stereo
Connector

Logic Boards

GPSS Card

VOO Card

RSS Card

GPSS/RSS
Cross-Over Card

GPSS Board

J7   J8 J26

J9

J11

J10

RSS Board

U2 / 801
*U6 / 803
U10 / 800
*U14 / 802

U2*

J5

U16 / 806
*U20 / 808
U26 / 805
*U32 / 807

U15*

J6

U36 / 811
*U39 / 813
U47 / 810
*U49 / 812

U33*

J2

U53 / 816
*U54 / 818
U60 / 815
*U64 / 817

U47*

U66 / 821
*U70 / 823
U75 / 820
*U81 / 822

U68*

J4   J3

J1
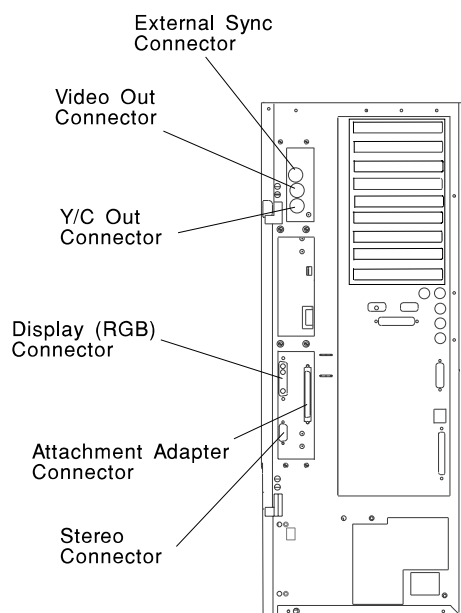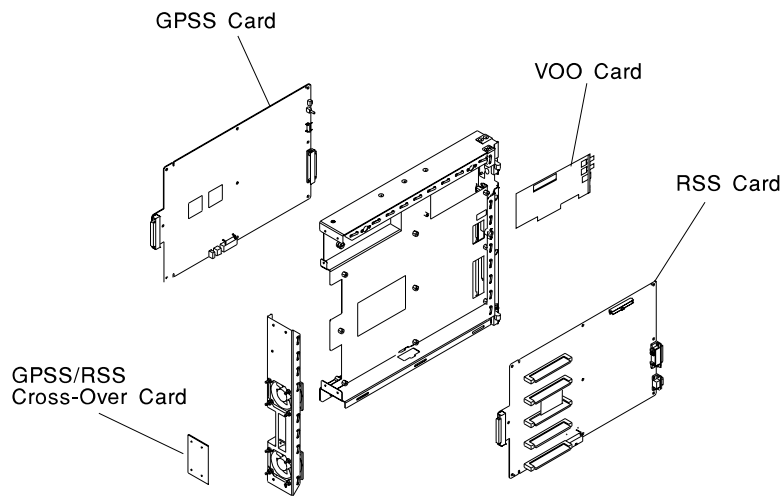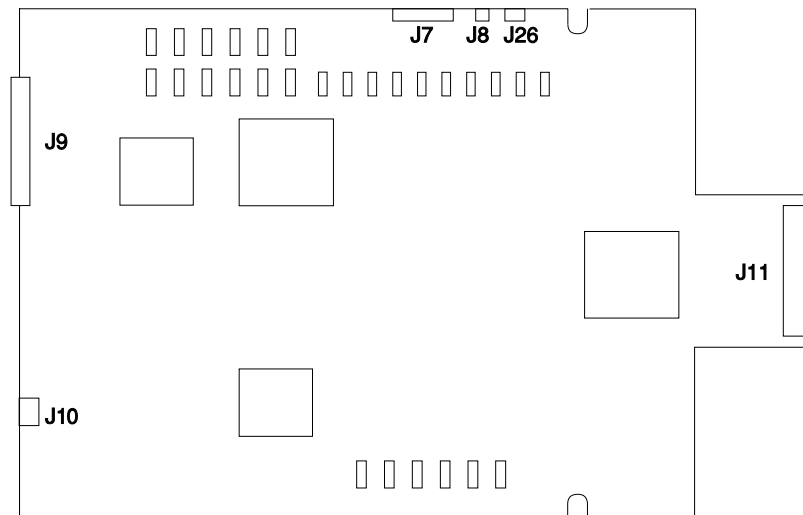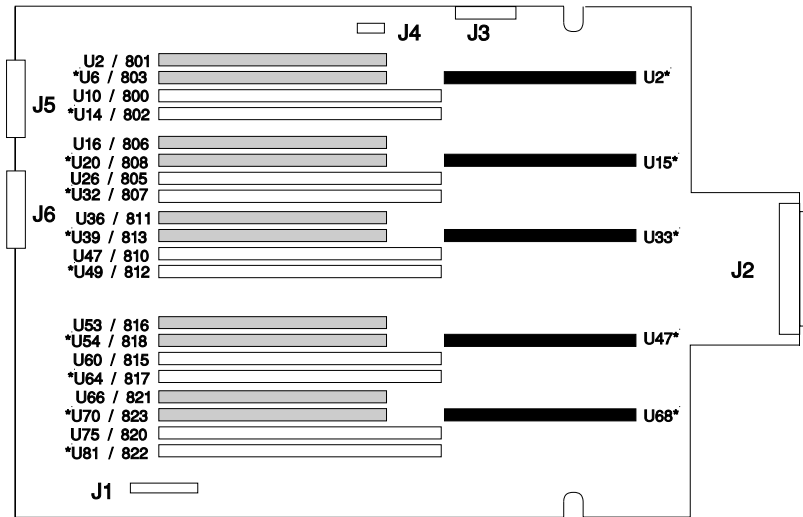
12 MB VRAM SIMMS
16 MB VRAM SIMMS
16 MB VRAM SIMMS

*' = Advanced Graphics Feature

VOO Board
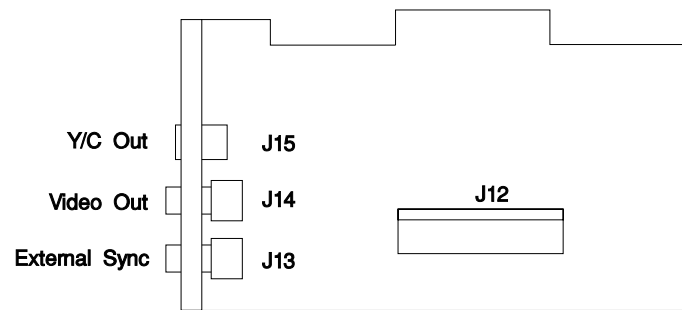
System Board Locations
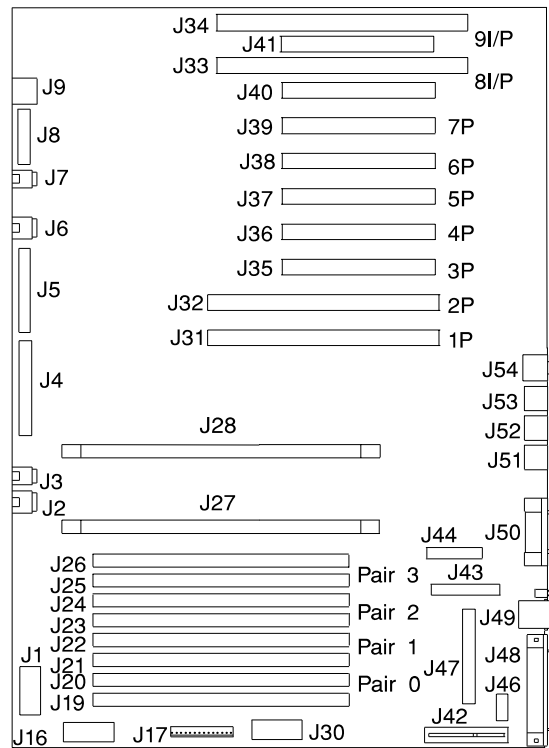
J1	Power connector (3.3V)
J2	Fan #1
J3	Fan #2
J4	Internal SCSI connector
J5	Diskette drive connector
J6	Fan #3
J7	Fan #4
J8	Operator panel connector
J9	Operator panel audio connector
J16	Power connector (3.3V)
J17	Power connector
J19, J20, J21, J22	Memory module connectors
J23, J24, J25, J26	Memory module connectors

J27	CPU #0 connector
J28	CPU #1 connector
J30	Power connector (5.0V)
J31, J32	64-bit PCI connectors
J33, J34	ISA connectors
J35, J36, J37, J38	32-bit PCI connectors
J39, J40, J41	32-bit PCI connectors
J42	Service processor connector
J43	Parallel connector
J44	Serial connector
J46	SCSI security jumpers
J47	Internal SCSI connector
J48	External SCSI connector
J49	Ethernet connector (twisted pair)
J50	Ethernet connector (thick)
J51	Tablet connector
J52	Keyboard connector
J53	Mouse connector
J54	Audio connectors

Operator Panel

Power On   Display
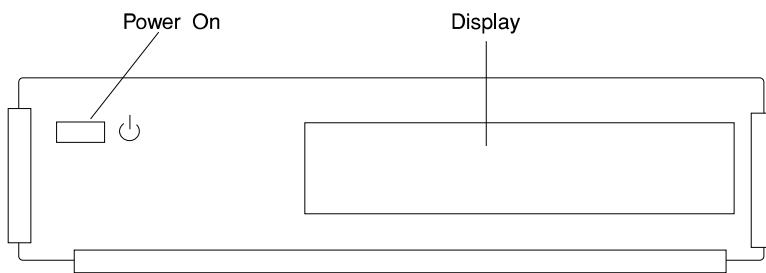
Specifications

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

Dimensions

Height - 620 mm (24.3 inches)

Depth - 695 mm (27.3 inches)

Width - 245 mm (9.6 inches)

Weight

Configuration dependent

Operating Environment - Class B

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

Humidity - 8% to 80% noncondensing

Maximum Altitude - 2135 m (7000 feet)

Power Source Loading

Typical - 0.41 kVA

Maximum - 0.56 kVA

Power Requirements

Typical - 330 watts

Maximum - 450 watts

Power Factor

0.8 - 0.96

Operating Voltage

100 to 127V ac; 50 to 60 Hz

200 to 240V ac; 50 to 60 Hz

Heat Output (Maximum)

Typical - 1125 BTU/hr

Maximum - 1535 BTU/hr

Acoustics

5.8 Bels operating

5.5 Bels idle

Power Cables

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

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

- Electrical cables, Type SVT or SJT.

- Attachment plugs complying with National Electrical Manufacturers Association (NEMA) 5-15P. That is:

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

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

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

Power cables used in other countries consist of the following:

- Electrical cables, Type HD21.

- Attachment plugs approved by the appropriate testing organization for the specific countries where they are used.

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

Refer to Chapter 8, " Parts Information" on page 8-1 to find the power cables that are available.

Service Inspection Guide

Perform a service inspection on the system when:

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

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

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

Perform the following checks:

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

    a. Check for damage to the power cord.

b. Check for the correct grounded power cable.

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

13. Install the covers.

Chapter 2. System Unit Maintenance Analysis Procedures (MAPs)

Entry MAP

Use the following table to determine your starting point.

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 "Firmware Location Codes" on page 4-25.

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 control assembly to the new one. If the old VPD module has to be replaced call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys for licensed programs may be required.

3. If a network adapter or the 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 may need to be changed in order to enable system startup.

Symptom	Action
Service Actions	
You have parts to exchange or a corrective action to perform.	1. Go to the *Removal and Replacement Procedures*. 2. Go to the *Repair Checkout Procedure* in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
You need to verify that a part exchange or corrective action corrected the problem.	Go to the *Repair Checkout Procedure* in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
You need to verify correct system operation.	Go to the *System Checkout Procedure* in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
Symptom Analysis	
You do not have a determined symptom.	Go to "MAP 1020: Problem Determination" on page 2-5.

Symptom	Action
You have an 8-digit error code displayed.	Record the error code. Go to Chapter 4, "Error Code to FRU Index" on page 4-1.
You have an SRN.	Go to the Fast Path MAP in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
The system POST indicators are displayed on the system console, the system pauses and then restarts. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	Go to "Fxx Code Boot Problems" on page 4-22.
The system stops and POST indicators are displayed on the system console. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	1. Use MAP 1540 to isolate the problem.
The system stops and the message "STARTING SOFTWARE PLEASE WAIT..." is displayed on ASCII terminal, the boot indicator ( ) is displayed on a graphics terminal.	Go to "Firmware Checkpoints" on page 4-19.
The system will not respond to the password being entered or the system login prompt is displayed when booting in service mode.	Verify that the password is being entered from the ASCII terminal or keyboard defined as the system console. If so, then the keyboard or its controller may be faulty. 1. If entering the password from the keyboard which is attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the system board. (See notes on 2-1.) 2. If entering the password from a keyboard which is attached to a ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the system board if these procedures do not reveal a problem.
Nothing is displayed on the system console, and the operator panel is blank.	1. If using a graphic display, go to the *Problem Determination Procedures* for the display. 2. If you do not find a problem then replace the display adapter. 3. Go to "MAP 1540: Minimum Configuration" on page 2-14.

Symptom	Action

All display problems.	1. If using a graphics display, go to the *Problem Determination Procedures* for the display.
	
	2. If you do not find a problem then replace the display adapter.
	
	3. If the problem is with the ASCII terminal:
	
	   a. Make sure that the ASCII terminal is connected to S1.
	
	   b. If problems persist, go to the *Problem Determination Procedures* for the terminal.
	
	4. If you do not find a problem then suspect the system board. Go to "MAP 1540: Minimum Configuration" on page 2-14.

A flashing 888 is displayed in the control panel followed by a additional error codes.	Go to the Fast Path MAP in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
The system stops and a 3-digit number is displayed in the operator panel display.	If the number displayed begins with the character "A" or "F" then go to "Firmware Checkpoints" on page 4-19. For all other numbers 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 *RS/6000 Diagnostic Information for Multiple Bus Systems*.
The power light does not come on, or stay on.	Go to "MAP 1520: Power" on page 2-9.
No codes are displayed on the operator panel within a few seconds of turning on the system.	Reseat the operator panel cable. If problem not resolved, replace in order: 1. Operator panel display. 2. Operator panel control assembly. 3. System board (See notes on 2-1.)

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 the integra SCSI controller on the system board). **Note:** In a "Twin-tailed" configuration where there is more than one initiator device (normally another system) attached to the SCSI bus, it may be necessary to change the ID of the SCSI controller or adapter with the System Management Services.
You cannot load diagnostics.	Go to "MAP 1020: Problem Determination" on page 2-5.
You have a problem that does not prevent the system from booting.	Go to the Fast Path MAP in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
You suspect a cable problem.	See the *RS/6000 Adapter, Device, and Cable Information for Multiple Bus Systems*.
You Cannot Find the Symptom in this Table	
All other problems.	Go to "MAP 1020: Problem Determination" on page 2-5.

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 *RS/6000 Diagnostic Information for Multiple Bus Systems.*

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

Step 1020-1

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

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

1. Insert the diagnostic CD-ROM disc into the CD-ROM drive.

2. Turn the power off.

3. Turn the power on.

4. If 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.

5. Enter any requested passwords.

6. Wait until the diagnostics are loaded or the system appears to stop.

7. Find your symptom in the following table; then follow the instructions given in the Action column.

Symptom	Action
The diskette LED is blinking rapidly, or FEA or FEB is displayed on the operator panel.	The flash EPROM data is corrupted. The recovery procedure for the flash EPROM should be executed. See "Firmware Recovery" on page 6-23.
The system stops with a prompt to enter a password.	Enter the password. You are not allowed to continue until a correct password has been entered. When you have entered a valid password go to the beginning of this table and wait for one of the other conditions to occur.
The diagnostics loaded.	Go to MAP 0020 in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.
The system login prompt is displayed.	You may not have pressed the correct key or you may not have pressed the key soon enough when you were to indicate a Service Mode IPL of the diagnostic programs. If this was the case start over at the beginning of this Step. **Note:** Perform the systems shutdown procedure before turning off the system. If you are sure you pressed the correct key in a timely manner, go to "Step 1020-2" on page 2-7.
The system does not respond when the password is entered.	Go to "Step 1020-2" on page 2-7.
The system stopped and a POST indicator is displayed on the system console and an eight-digit error code is not displayed.	If the POST indicator represents: • memory, record error code M0MEM002. • keyboard, record error code M0KBD000. • SCSI, record error code M0CON000. • network, record error code M0NET000. • speaker (audio), record error code M0BT0000. Go to "Step 1020-3" on page 2-7.
All other symptoms.	If you were directed here from the Entry MAP, go to "MAP 1540: Minimum Configuration" on page 2-14. Otherwise, find the symptom in the "Entry MAP" on page 2-1.

Step 1020-2

There is a problem with the keyboard.

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

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

Step 1020-3

Take the following actions:

1. Find the eight-digit error code in Chapter 4, "Error Code to FRU Index" on page 4-1.

   Note: If the eight-digit error code is not listed in Chapter 4, "Error Code to FRU Index," look for it in the following:

   - Any supplemental service manual for the device

   - The diagnostic problem report screen for additional information

   - The Service Hints service aid

   - The CEREADME file (by using the Service Hints service aid).

2. Perform the action listed.

Step 1020-4

1. Turn off, then turn on the system unit.

2. When the keyboard indicator appears, press the F1 key on a directly attached keyboard or the 1 key on an ASCII terminal. If the keyboard indicator does not appear, go to "MAP 1540: Minimum Configuration" on page 2-14.

3. When the System Management Services appear, check the error log for any errors.

   - Choose Utilities

   - Choose Error Log

   - If an error is logged, check the time stamp.

   - If the error was logged during the current boot attempt, record it.

   - Look up the error in the Chapter 4, "Error Code to FRU Index" on page 4-1 and do the listed action.

   - If no recent error is logged in the error log, go to "MAP 1540: Minimum Configuration" on page 2-14.

MAP 1520: Power

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

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

Observe the following safety notice during service procedures.

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent and electrical shock.**
>
> **Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.**
>
> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
>
> **Use on hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.**

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

DANGER

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

Step 1520-1

You may be directed to this MAP for several reasons:

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

   Go to "Step 1520-2."

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

   Go to "Step 1520-3" on page 2-11.

Step 1520-2

1. Turn the power off.

2. Check that the external power cable to the system unit has continuity.

3. Check that the power outlet has been wired correctly with the correct voltage.

4. Check that the external power cable is plugged into both the system unit and the power outlet.

Did you find a problem?

NO   Go to "Step 1520-3" on page 2-11.

YES   Correct the problem. Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems.*

Step 1520-3

Note: Either the cooling fans, the power supply or the system board is defective.

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

- Front cooling fans (one at a time)
- Power supply
- System board

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

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

NO   Reinstall the original FRU.

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

        If the symptom did not change and all the FRUs have been exchanged, go to "Step 1520-4" on page 2-12.

YES   Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1520-4

1. Turn the power off.

2. Unplug the system unit power cable from the wall outlet.

3. Record the slot numbers of all the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters.

4. Remove all pairs of the memory modules.

5. Remove the CPU card(s).

6. Unplug the power cables from all the SCSI devices.

7. Unplug all the fans, except the fan in the power supply.

8. Connect the system unit power cable to the wall outlet.

9. Turn the power on.

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

NO   Replace the system board. Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*

YES   Go to "Step 1520-5" on page 2-13.

Step 1520-5

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

1. CPU card.

2. Memory modules (Install in pairs).

3. SCSI devices, lowest bay to highest bay.

4. PCI cards, lowest slot to highest slot.

5. ISA cards, lowest slot to highest slot.

6. Fans.

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

1. Turn the power off.

2. Unplug the system unit power cable from the wall outlet.

3. Install or connect one of the parts in the list.

4. Connect the system unit power cable to the wall outlet.

5. Turn the power on.

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

NO   Replace the last part you installed.

Repeat these steps until all the parts have been installed.

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

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1520-1" on page 2-10 in this MAP and follow the instructions for the new symptom.

YES   Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

MAP 1540: Minimum Configuration

Notes:

1. This MAP assumes that a CD-ROM drive is installed and connected to the integrated SCSI adapter, and a Diagnostics CD-ROM disc is available.

2. 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.

3. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).

Purpose of this MAP

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

Step 1540-1

1. Ensure that the diagnostics and the operating system are shut down.

2. Insert the diagnostic CD-ROM into the CD-ROM drive.

3. Turn the power off.

4. Turn the power on.

5. When the keyboard indicator is displayed (the word **keyboard** on an ASCII terminal or the keyboard and hand icon on a graphical display), press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal.

6. If the Console Selection screen is displayed, choose the system console.

7. Enter the appropriate password when prompted to do so.

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

NO   Go to "Step 1540-2" on page 2-15.

YES   Go to "Step 1540-12" on page 2-26.

Step 1540-2

1. Turn the power off.

2. Disconnect all external cables.

3. Remove the top cover.

4. Record the slot numbers of the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters.

5. Remove the second processor card.

6. Record the slot numbers of the memory modules, and then remove all but the memory modules in the slots of Pair 0 (sockets 1 and 2).

7. Disconnect the SCSI cable from the SCSI connectors on the system board.

8. Disconnect the diskette drive cable from the diskette drive connector on the system board.

9. Disconnect the internal serial, Ethernet, and tablet port cables.

10. Turn the power on.

Does the operator panel stabilize with code FDC, FF2, FF3, or F4D displayed, or is one of these codes displayed immediately before the system unit attempts to restart?

NO   Go to "Step 1540-3" on page 2-16.

YES   Go to "Step 1540-4" on page 2-17.

Step 1540-3

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

If the following steps call for a system board to be replaced, see notes on page 2-1.

1. If F24 is displayed in the operator panel, turn the power off and exchange the following FRUs in order:

   a. Memory modules (pair)

   b. System board (see notes on page 2-1.)

2. If F24 is NOT displayed in the operator panel, turn the power off and exchange the following FRUs in order:

   a. Processor cards

   b. Memory modules (pair)

   c. System board (see notes on page 2-1.)

Does the operator panel stabilize with code FDC, FF2, FF3, or F4D displayed, or is one of these codes displayed immediately before the system unit attempts to restart?

NO   Reinstall the original FRU.

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

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

         If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-14 in this MAP and follow the instructions for the new symptom.

YES   Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-4

No failure was detected with this configuration.

1. Turn the power off.

2. Install a pair of memory modules.

3. Turn the power on.

Does the operator panel stabilize with code FDC, FF2, FF3, or F4D displayed, or is one of these codes displayed immediately before the system unit attempts to restart?

NO   Go to "Step 1540-5."

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

            After all the memory modules are installed and tested, turn the power to off.

            Go to "Step 1540-7" on page 2-19.

Step 1540-5

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

1. Turn the power off.

2. Exchange the last memory module pair installed.

3. Turn the power on.

Does the operator panel stabilize with code FDC, FF2, FF3, or F4D displayed, or is one of these codes displayed immediately before the system unit attempts to restart?

NO   Go to "Step 1540-6" on page 2-18.

YES   Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-6

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

1. Turn the power off.

2. Exchange the following FRUs the order listed.

    a. System board (See notes on 2-1.)

    b. Power supply.

3. Turn the power on.

Does the operator panel stabilize with code FDC, FF2, FF3, or F4D displayed, or is one of these codes displayed immediately before the system unit attempts to restart?

NO   Reinstall the original FRU.

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

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

              If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-14 in this MAP, and follow the instructions for the new symptom.

YES   Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-7

1. Turn the power off.

2. Reconnect the system console.

   Notes:

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

   b. If a display attached to a display adapter has been defined as the system console, install the display adapter and connect the display to it. Plug the keyboard into the keyboard connector on the rear of the system unit.

3. Turn the power on.

4. If the ASCII terminal or graphics display (including display adapter) are connected differently than before, the Console Selection screen appears and requires that a new console be selected.

5. When the keyboard indicator is displayed, press the F1 key on the directly attached keyboard or the number 1 key on an ASCII terminal. This triggers the SMS.

6. Enter the appropriate password when prompted to do so.

7. Wait until the SMS screen is displayed or the system appears to stop.

Is the SMS screen displayed?

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

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

1. Go to the Problem Determination Procedures (test procedures) for the device attached to the S1 serial port or the display attached to the graphics adapter, and test those devices. If a problem is found, follow the procedures for correcting the problem on that device.

2. Graphics adapter (if installed).

3. Cable (async or graphics, including internal async cable).

4. System board. (see notes on page 2-1.)

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

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

If the symptom changed, check for loose cards and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-14 and follow the instructions for the new symptom.

YES   Go to "Step 1540-8" on page 2-21.

Step 1540-8

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

2. Turn the power off.

3. Plug the internal SCSI cable into the SCSI connector on the system board.

4. Disconnect the signal and power connectors from all the SCSI devices except the CD-ROM drive.

5. Turn the power on.

6. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.

7. Enter the appropriate password when prompted to do so.

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

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

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

1. SCSI cable

2. Last SCSI device connected (CD-ROM drive, tape drive, etc.)

3. The graphics adapter, if the system console is defined as a graphical display.

4. System board (see notes on page 2-1.)

5. Processor card

6. Power Supply.

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

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

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-14 in this MAP and follow the instructions for the new symptom.

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

Go to "Step 1540-9" on page 2-23.

Step 1540-9

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

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

2. Turn the power off.

3. Plug the diskette drive cable into the diskette drive connector on the system board.

4. Turn the power on.

5. 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.

6. Enter the appropriate password when prompted to do so.

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

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

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

      1. Diskette drive

      2. Diskette drive cable

      3. System board (see notes on page 2-1).

      4. Power supply

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

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

     If the symptom has changed check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-14 in this MAP and follow the instructions for the new symptom.

YES Go to "Step 1540-10" on page 2-24.

Step 1540-10

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

1. Turn the power off.

2. Install the second CPU card if one was removed. If a second CPU card was not removed, or has already been reinstalled and verified, install a FRU (adapter) and connect any cables and devices that were attached to it.

3. Turn the power on.

4. If the Console Selection screen displays, choose the system console.

5. After the keyboard indicator displayeds, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.

6. Enter the appropriate password when prompted to do so.

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

NO   Go to "Step 1540-11" on page 2-25.

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

Step 1540-11

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

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

2. Turn the power off.

3. Starting with the last installed adapter, disconnect one attached device and cable.

4. Turn the power on.

5. If the Console Selection screen is displayed, choose the system console.

6. After the keyboard indicator appears, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.

7. Enter the appropriate password when prompted to do so.

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

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

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

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

1. Adapter (last one installed)

2. System board

   If the system board or a network adapter is replaced, see notes on page 2-1.

3. Power supply.

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

If the symptom has changed check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-14 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 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

Step 1540-12

1. Follow the instructions on the screen to select the system console.

2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.

3. If the terminal type has not been defined, you must use the Initial Terminal option on the FUNCTION SELECTION menu to initialize the AIX operating system environment before you can continue with the diagnostics. This is a separate and different operation than selecting the console display.

4. Select Advanced Diagnostic Routines.

5. When the DIAGNOSTIC MODE SELECTION menu displays, select System Verification.

6. Start with the first item on the list and test all the adapters and devices.

Did you get an SRN?

NO   Go to "Step 1540-14" on page 2-27.

YES   Go to "Step 1540-13."

Step 1540-13

Look at the FRU part numbers associated with the SRN.

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

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

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

If the system board or a network adapter is replaced, see notes on page 2-1.

Go to "Map 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems*.

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

Step 1540-14

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

Go to "MAP 0410: Repair Checkout" in the *RS/6000 Diagnostic Information for Multiple Bus Systems.*

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

Chapter 3. SSA Problem Determination Procedures

Problem determination procedures are provided by power-on self-tests (POSTs), service request numbers (SRNs), and maintenance analysis procedures (MAPs). Some of these procedures use the using system service aids that are described in the system unit User's Guide.

Disk Drive Module Power-On Self-Tests (POSTs)

Attention: Disk drive modules are fragile. Handle them with care. Follow all ESD-sensitive parts procedures when handling disk drive modules. For ESD information, see "Handling Static–Sensitive Devices" on page 7-2.

The disk drive module POSTs start each time the module is switched on or when a **Send Diagnostic** command is received from the SSA adapter. They check whether the disk drive module is working correctly. The POSTs also help verify a repair after a FRU has been exchanged.

There are two power-on self-tests: POST-1 and POST-2.

POST-1 runs immediately after the 'power-on reset' line goes inactive, and before the disk drive module motor starts. POST-1 includes tests of the:

- Microprocessor
- ROM
- Safety circuits

If POST-1 completes successfully, POST-2 is enabled.

If POST-1 fails, the disk drive module check light stays on, and the disk drive module is not configured into the SSA network.

POST-2 runs after the disk drive module motor has started. POST-2 includes tests of:

- Motor control
- Servo control
- Read and write on the diagnostic cylinder (repeated for all heads)
- Error checking and correction (ECC)

If POST-2 completes successfully, the disk drive module is ready for use by the using system.

Adapter Power-On Self-Tests (POSTs)

Two power-on self-tests (POSTs) are resident in the SSA adapter. The tests are POST-1 and POST-2.

POST-1 tests all the functions that are necessary to enable the adapter to communicate with the Micro Channel. POST-1 can fail for either of two reasons:

- A hardware error has been detected. In such instances, the POST code enters a tight loop, and does not put the identification of the SSA adapter into the programmable option select (POS) registers. If this error occurs, the SSA adapter must be exchanged for a new one.

- The flash erasable programmable read-only memory (EPROM) has a check sum that is not valid. This error can be caused if the power fails while microcode is being downloaded. In such instances, the POST checks all the hardware that is needed to download the microcode. If all the hardware is correct, the POST sets the ROS level to zero, puts the identification of the SSA adapter into POS 0-1, and puts error data into the adapter status register.

  To recover from this type of error, microcode must be downloaded to the SSA adapter. If the using system can have an initial program load (IPL) without the adapter, the configuration code detects the down-level ROS code and downloads the latest level of code. The configuration code then uses control register bit 7 to reset the adapter and restart POST-1.

If no error is detected during POST-1, the identification of the SSA adapter is put into the POS registers, and POST-2 is started.

POST-2 tests the remaining hardware on the SSA adapter card and tests the other FRUs that are attached to the adapter. If this test fails, an error code is saved and sent to the using-system error log when the error logger becomes available. An internal health check continues to send the error code at regular intervals.

Service Request Numbers (SRNs)

Service request numbers (SRNs) are generated for the SSA Hot-Swap Disk Drive by the system error-log analysis, system configuration code, diagnostics, and customer problem-determination procedures. SRNs help you to identify the cause of a problem, the failing field-replaceable units (FRUs), and the service actions that might be needed to solve the problem.

The SRN Table

Table 3-1 on page 3-5 lists the SRNs and describes the actions you should perform. The table columns are:

SRN The service reference number

FRU list The FRU or FRUs that might be causing the problem (see also "FRU Names Used in the SRN Table" on page 3-4)

% How likely it is (by percentage) that the FRU is causing the problem

Problem A description of the problem and the action you must take

Abbreviations used in the table are:

DMA Direct memory access

FRU Field-replaceable unit

IOCC Input/output channel controller

POS Programmable option select (POS registers)

POST Power-on self-test

PAA P = adapter port number
AA = SSA address

Using the SRN Table

1. Locate the SRN in the table. If you cannot find the SRN, you have a problem with the diagnostics, the microcode, or the documentation. Call your support center for assistance.

2. Read carefully the "Action" you must perform for the problem. *Do not exchange FRUs unless you are instructed to do so.*

3. Normally exchange only one FRU at a time, starting from the top of the FRU list for that SRN. Always use instructions given in the page reference when exchanging FRUs. After each FRU is exchanged, go to "MAP 410: Repair Checkout" in *RS/6000 Diagnostic Information for Multiple Bus Systems* to verify the repair.

Software and Microcode Errors

Some SRNs indicate that a problem might have been caused by a software error or by a microcode error. If you have one of these SRNs, perform the following actions:

1. Make a note of the contents of the error log for the device that has the problem.

2. Go to the using-system service aids and select Display Vital Product Data to display the VPD of the failing system. Make a note of the VPD for all the SSA adapters and disk drive modules.

3. Report the problem to your support center. The center can tell you whether you have a known problem and can, if necessary, provide you with a correction for the software or microcode.

FRU Names Used in the SRN Table

This section provides a glossary of the FRU names used.

FRU Name in Table	Definition
Backplane assembly	The disk drive modules, blank disk drive modules, and internal SSA cables, are connected to the backplane assembly.
Disk drive module	A disk drive assembly to a carrier that plugs into the backplane in the system unit.
Blank Disk drive module	This module must be installed in a slot that does not contain a disk drive module. This completes the SSA loop through the system unit.
External SSA cable	A cable that connects the bulkhead to the SSA adapter or to an SSA subsystem.
Internal SSA cable	Attaches the backplane to the SSA adapter card.
SSA adapter card	The SSA adapter card, which is located in the using system.

Table 3-1 (Page 1 of 9). Service Request Numbers			
SRN	**FRU List**	**%**	**Problem**
10101	**Disk drive module**	100	**Description:** Disk drive motor stopped. The disk drive module is bad. **Action:** If this SRN was received by one disk drive module only, then exchange that disk drive module.
10112	None	–	**Description:** Format degraded. A format operation has been ended before it has completed. **Action:** Use the Format service aid to format the disk drive module.
1*xxxx*	**Disk drive module**	100	**Description:** Disk drive module error. **Action:** Exchange the FRU for a new FRU. **Note:** In this SRN, an *x* represents a digit from 0 to F.
20PAA	**Disk drive module** **SSA adapter card External** **SSA Cables** **Backplane assembly** **Internal SSA Cable**	45 45 6 2 2	**Description:** An open SSA link has been detected. **Action:** Run the Link Verification service aid to isolate the failure. If the SSA service aids are not available: • When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 3-15. • When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
21PAA to 29PAA	**Disk drive module** **SSA adapter card** **External SSA Cables** **Backplane assembly** **Internal SSA Cable**	45 45 6 2 2	**Description:** An SSA threshold-exceeded-link error has been detected. **Action:** Run the Link Verification service aid to isolate the failure. If the SSA service aids are not available: • When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 3-15. • When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.

Table 3-1 (Page 2 of 9). Service Request Numbers

SRN	FRU List	%	Problem
2A002	**Disk drive module** **SSA adapter card**	50 50	**Description:** Async code 02 has been received. A software error has probably occurred. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging any FRUs.
2A003	**Disk drive module** **SSA adapter card**	50 50	**Description:** Async code 03 has been received. A software error has probably occurred. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging any FRUs.
2A004	**Disk drive module** **SSA adapter card**	50 50	**Description:** Async code 04 has been received. A software error has probably occurred. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging any FRUs.
2A005	**Backplane**	–	**Description:** Async code 05 has been received. This code indicates that a disk drive module has detected a loss of power. **Action:** Use the Link Verification service aid to determine if any devices are missing from the SSA link. • If a device is missing, go to the problem determination procedures in the User's Guide to isolate the problem. • If no device is missing, the problem might have been caused by a temporary, or partial, loss of power to the SSA Hot-Swap Disk Drive.
2A006	**Disk drive module** **Backplane**	70 30	**Description:** Async code 06 has been received. This code indicates that a disk drive module has detected the loss of one of its power inputs. **Action:** • If the failing device is an SSA Hot-Swap Disk Drive, exchange the disk drive module. • If the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.

Table 3-1 (Page 3 of 9). Service Request Numbers

SRN	FRU List	%	Problem
2A106	**Backplane assembly**	100	**Description:** Async code 06 has been received. This code indicates that multiple disk drive modules have detected the loss of one of its their power inputs. **Action:** • If the failing devices are SSA Hot-Swap Disk Drives, exchange the backplane. • If the failing devices are not SSA Hot-Swap Disk Drives, go to the service information for those devices.
2A206	**Disk drive module**	100	**Description:** A disk drive module has detected that one of its SSA links has failed the POSTs. **Action:** 1. Use the Link Verification service aid to determine where the SSA link is broken. 2. Run diagnostics in the system verification mode to the two disk drive modules that are nearest to, and on each side of, the place where the link is broken. The diagnostics show which disk drive module detected the problem.
2FFFF	None	–	**Description:** An async code that is not valid has been received. **Action:** Go to "Software and Microcode Errors" on page 3-4.
300C0	**Backplane**	100	**Description:** A disk drive module has detected the loss of one of its power inputs. **Action:** • If the failing device is an SSA Hot-Swap Disk Drive, exchange the backplane. • If the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.

Table 3-1 (Page 4 of 9). Service Request Numbers			
SRN	**FRU List**	**%**	**Problem**
301C0	**Backplane assembly**	100	**Description:** Multiple disk drive modules have detected the loss of one of their power inputs. **Action:** • If the failing devices are SSA Hot-Swap Disk Drives, exchange the backplane. • If the failing devices are not SSA Hot-Swap Disk Drives, go to the service information for those devices.
303FF	**Disk drive module**	100	**Description:** An SCSI status that is not valid has been received. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging any FRUs.
40000	**SSA adapter card**	100	**Description:** The SSA adapter card has failed. **Action:** Exchange the FRU for a new FRU.
43PAA	**Disk drive module** **SSA adapter card**	90 10	**Description:** An SSA device on the link is preventing the completion of the link configuration. **Action:** If the SSA service aids are available, run the Link Verification service aid to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)
44PAA	**Disk drive module**	100	**Description:** A disk drive module has failed. **Action:** If the SSA service aids are available, run the Link Verification service aid to find the failing disk drive module. Before you exchange the failing disk drive module, run diagnostics in the system verification mode to the module to determine the cause of the problem.

SRN	FRU List	%	Problem
	Table 3-1 (Page 5 of 9). Service Request Numbers		
45PAA	**Disk drive module External SSA Cables Backplane assembly**	40 40 20	**Description:** The SSA adapter has detected an open SSA link. This problem is caused either by a disk drive module that is failing, or by a disk drive module that has been switched off from another using system on the same SSA link. (That using system has itself been switched off.) **Action:** If the SSA service aids are available, run the Link Verification service aid to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)
48000	None	–	**Description:** The SSA adapter has detected a link configuration resource that is not valid. **Action:** See "SSA Loop Configurations That Are Not Valid" on page 3-14.
50000	**SSA adapter card**	100	**Description:** The SSA adapter failed to respond to the device driver. **Action:** Exchange the FRU for a new FRU.
50001	**SSA adapter card**	100	**Description:** A data parity error has occurred. **Action:** Exchange the FRU for a new FRU.
50002	**SSA adapter card**	100	**Description:** An SSA adapter direct memory access (DMA) error has occurred. **Action:** Exchange the FRU for a new FRU.
50004	**SSA adapter card**	100	**Description:** A channel check has occurred. **Action:** Exchange the FRU for a new FRU.
50005	**SSA adapter card**	100	**Description:** A software error has occurred. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging the FRU.
50006	**SSA adapter card**	100	**Description:** A channel check has occurred. **Action:** Exchange the FRU for a new FRU.

Table 3-1 (Page 6 of 9). Service Request Numbers

SRN	FRU List	%	Problem
50007	**SSA adapter card**	100	**Description:** The input/output channel controller (IOCC) detected an internal error. **Action:** Exchange the FRU for a new FRU.
50008	**SSA adapter card**	100	**Description:** Unable to read or write the POS registers. **Action:** Exchange the FRU for a new FRU.
50010	**SSA adapter card**	100	**Description:** An SSA adapter or device drive protocol error has occurred. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging the FRU.
50012	**SSA adapter card** (See the installation and service guide for the using system.)	100	**Description:** The SSA adapter microcode is in a suspended state. **Action:** Run diagnostics in System Verification mode to the SSA adapter. • If the diagnostics fail, exchange the FRU for a new FRU. • If the diagnostics do not fail, go to "Software and Microcode Errors" on page 3-4 before exchanging the FRU.
50100	None	–	**Description:** An attempt was made to log an error against a pdisk that is not available to the using system. **Action:** This problem has occurred for one of the following reasons: • A user has deleted a pdisk from the system configuration. In such an instance, the hdisk that is related to the pdisk continues to operate normally. If the disk drive module tries to log an error, however, this SRN (50100) is produced. Enter the **cfgmgr** command to return the pdisk to the system configuration. • A disk drive module has tried to log an error during system configuration. To find the failing disk drive module, run diagnostics to the disk drive modules that are connected to this SSA adapter.

Table 3-1 (Page 7 of 9). Service Request Numbers

SRN	FRU List	%	Problem
60000	**SSA adapter card**	100	**Description:** The SSA adapter is missing from the expected configuration. **Action:** Verify that the SSA adapter card is installed in the expected slot of the using-system. • If it is in the expected slot, exchange the FRU for a new FRU. • If it is not in the expected slot, enter the **diag -a** command, and answer the questions that are displayed.
7*xxxx*	**Disk drive module** **Backplane assembly**	80	**Description:** An SSA Hot-Swap Disk Drive module is missing from the expected configuration of the SSA loop. **Action:** Replace the FRUs one at a time. Go to "MAP 410: Repair Checkout" in *RS/6000 Diagnostic Information for Multiple Bus Systems* to verify each repair.
D0000	**Disk drive module**	100	**Description:** The using system cannot configure the disk drive module. This is probably a software problem. **Action:** 1. Try again to configure the disk drive module. 2. If the problem remains, go to "Software and Microcode Errors" on page 3-4 before exchanging the FRU.
D0100	**Disk drive module**	100	**Description:** Unable to clear a disk drive module reservation. **Action:** Exchange the FRU for a new FRU.
D0101	**Disk drive module**	100	**Description:** The disk drive module has been reserved since the diagnostics started. The disk drive module is in use. **Action:** Release the disk drive module, and run the diagnostics again.
D0200	**Disk drive module**	100	**Description:** The disk drive module timed out while the diagnostics were running. **Action:** Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.
D0300	**Disk drive module**	100	**Description:** The disk drive module failed the diagnostic test. **Action:** Exchange the FRU for a new FRU.

Table 3-1 (Page 8 of 9). Service Request Numbers			
SRN	**FRU List**	**%**	**Problem**
D0400	**Disk drive module**	100	**Description:** The disk drive module is not ready while the diagnostics are running. **Action:** Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.
D0450	None	–	**Description:** A format operation is in progress. The format operation that was started on this disk drive module has not yet finished. A format operation can take up to 30 minutes to run. **Action:** Wait for the format operation to finish before you run the diagnostics again. You can observe the progress of the Format operation by running the Format service aid again on this disk drive module.
D0460	None	–	**Description:** A format operation has been degraded. The format operation that was started on this disk drive module did not finish. Possibly, the disk drive module was switched off while the format operation was running. **Action:** Run the Format service aid to format this disk drive module.
D4000	**SSA adapter card**	100	**Description:** The diagnostics cannot configure the SSA adapter. **Action:** Exchange the FRU for a new FRU.
D4100	**SSA adapter card**	100	**Description:** The diagnostics cannot open the SSA adapter. **Action:** Exchange the FRU for a new FRU.
D4300	**SSA adapter card**	100	**Description:** The diagnostics have detected an SSA adapter POST failure. **Action:** Exchange the FRU for a new FRU.
D44xx	**SSA adapter card**	100	**Description:** The diagnostics have detected that the SSA adapter has corrupted the microcode, but cannot download a new version of the microcode. **Action:** Exchange the FRU for a new FRU. **Note:** In this SRN, an x represents a digit 0 through F.

Table 3-1 (Page 9 of 9). Service Request Numbers			
SRN	**FRU List**	**%**	**Problem**
DFFFF	**SSA adapter card**	100	**Description:** A command or parameter that has been sent or received is not valid. This problem is caused either by the SSA adapter or by an error in the microcode. **Action:** Go to "Software and Microcode Errors" on page 3-4 before exchanging the FRU.

SSA Loop Configurations That Are Not Valid

Note: This section is related to SRN 48000.

SRN 48000 shows that the SSA loop contains more devices or adapters than are allowed. The following condition exist: the loop contains more than 48 devices.

If the SRN occurred when either you or the customer switched on the using system:

1. Switch off the using system.

2. Review the configuration that you are trying to make, and determine why that configuration is not valid.

3. Correct your configuration by reconfiguring the SSA cables or by removing the excess devices or adapters from the loop.

4. Switch on the using system.

If the SRN occurred because additional devices or adapters were added to a working SSA loop:

1. Remove the additional devices or adapters that are causing the problem, and put the loop back into its original, working configuration.

   Note: It is important that you perform these actions, because they enable the configuration code to reset itself from the effects of the error.

2. Review the configuration that you are trying to make, and determine why that configuration is not valid.

3. Correct your system to a valid configuration.

SSA Maintenance Analysis Procedures (MAPs)

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

How to Use These MAPs

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

1. Use the system-management task menus to make the disk drive modules
   unavailable.

2. If the system unit has more than one SSA adapter, make the SSA Hot-Swap
   Disk Drive modules unavailable to the system for each of the paths to the SSA
   Hot-Swap Disk Drive.

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

- To isolate the FRUs associated with in the failing SSA Hot-Swap Disk Drive,
  perform the actions and answer the questions given in this MAP.

- When instructed to exchange two or more FRUs in sequence:

    1. Exchange the first FRU in the list for a new one.

    2. Verify that the problem is solved. For some problems, verification means
       running the diagnostic programs (see the using-system service procedures).

    3. If the problem remains:

        a. Reinstall the original FRU.

        b. Exchange the next FRU in the list for a new one.

    4. Repeat steps 2 and 3 until either the problem is solved, or all the related
       FRUs have been exchanged.

    5. Perform the next action indicated by the MAP.

MAP 2010: SSA Hot-Swap Disk Drive–Start

This MAP is the entry point to the MAPs for the SSA Hot-Swap Disk Drive. If you are not familiar with these MAPs, read "How to Use These MAPs" on page 3-15 first.

You might have been sent here because:

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

Step 2010-1

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

Yes Go to "Step 2010-2" on page 3-17.

No Go to "Step 2010-3" on page 3-18.

Step 2010-2

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

1. You have an hdisk that has no associated pdisk.

   a. Issue the system **cfgmgr** command.

   b. Retry the Configuration Verification service aid.

   c. If the problem remains, a software error has probably occurred. Call your support center for assistance.

2. You have a pdisk that has no associated hdisk.

   a. Run diagnostics (using system verification mode) to the pdisk.

   b. If you get an SRN, go to Table 3-1 on page 3-5 and follow the actions described.

   If you do not get an SRN, the disk formatting may be incompatible with the system (the disk was formatted on a different type of using system, that is, not an RS 6000).

      1) Format the pdisk.

      2) Issue the system **cfgmgr** command

      3) Retry the Configuration Verification service aid.

3. If the problem remains, a software error has probably occurred. Call your support center for assistance.

Step 2010-3

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

No Go to "Step 2010-4."

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

Step 2010-4

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

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

If the system diagnostics and stand-alone diagnostics are not available, go to "Step 2010-1" on page 3-16.

Step 2010-5

Run the diagnostics in the problem determination mode.

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

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

No Go to "Step 2010-6" on page 3-19.

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

Step 2010-6

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

Yes   Go to "Step 2010-7."

No   Go to step "Step 2010-9."

Step 2010-7

Are any power cables loose or in need of replacement?

No   Go to "Step 2010-8."

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

Step 2010-8

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

Step 2010-9

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

No   Go to step "Step 2010-10" on page 3-20.

Yes   Replace the the following FRU's:

          1. Backplane

          2. Disk drive assembly

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

Step 2010-10

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

No   Go to step "Step 2010-11."

Yes   Replace the the following FRU's:

     1. Backplane

     2. EPOW cable

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

Step 2010-11

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

Yes   Go to step "Step 2010-12."

No   Go to step "Step 2010-8" on page 3-19.

Step 2010-12

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

No   Go to step "Step 2010-13."

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

Step 2010-13

Replace the following:

1. Backplane

2. Disk drive with the second LED flashing

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

Chapter 4. Error Code to FRU Index

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

If the codes in the following tables indicate a device which is present more than once in the system unit, a location code is needed to specify which device generated the error. Go to "Step 1020-4" on page 2-8 to display the System Management Services error log and obtain a location code. Location code descriptions can be found under "Firmware Location Codes" on page 4-25.

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 "Firmware Location Codes" on page 4-25.

Notes:

1. Licensed programs frequently rely on network configuration or system board information to authorize program use. If the following tables indicate that the system board or network adapter should be replaced, notify the system owner that new keys for licensed programs may be required.

2. 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 may need to be changed in order to enable system startup.

If you replace FRUs and the problem is still not corrected, go to MAP 0030 in the *RS/6000 Diagnostic Information for Multiple Bus Systems* unless otherwise indicated in the tables.

POST Error Codes

Error Code	Description	Action/ Possible Failing FRU
M0BT0000	Speaker (audio) error	Record the code displayed on the operator panel. If the code is listed in "Firmware Checkpoints" on page 4-19 then perform the indicated action. If the code is not listed, go to "MAP 1540: Minimum Configuration" on page 2-14.
M0CON000	The system hung during POST.	Go to "MAP 1540: Minimum Configuration" on page 2-14.
M0CPU000	The CPU POST failed.	1. CPU Card 2. System Board. (See notes on page 2-1.)
M0CPU001	Checkstop occurred.	1. CPU card 2. System board. (See notes on page 2-1.)
M0FD0000	The system hung during diskette POST.	1. System board. (See notes on page 2-1.) 2. Diskette drive.
M0GA0000	Graphics adapter POST failed.	Graphics adapter
M0HD0000	The system hung during boot POST.	Go to "MAP 1540: Minimum Configuration" on page 2-14.
M0KBD000	The system hung during keyboard POST.	1. System board. (See notes on page 2-1.) 2. Keyboard
M0KBD001	The system did not respond to a keyboard entry.	Type 101 keyboard
M0KBD002	The system did not respond to a keyboard entry.	Type 102 keyboard
M0KBD003	The system did not respond to a keyboard entry.	Type 106 keyboard
M0MC0001	A machine check occurred.	Go to "MAP 1540: Minimum Configuration" on page 2-14.
M0MEM000	No good memory could be found.	1. Memory 2. System board. (See notes on page 2-1.) Note: If only one memory module is installed, replace it. If there are multiple memory modules installed, go to "MAP 1540: Minimum Configuration" on page 2-14.

Error Code	Description	Action/ Possible Failing FRU
M0MEM001	No good memory could be found.	1. Memory 2. System board. (See notes on page 2-1.)
M0MEM002	The system hung during memory POST.	Go to "MAP 1540: Minimum Configuration" on page 2-14.
M0NET000	Network error	Record the code displayed on the operator panel. If the code is listed in "Firmware Checkpoints" on page 4-19, then perform the indicated action. If the code is not listed, go to "MAP 1540: Minimum Configuration" on page 2-14.
M0PS0000	Power failure.	Go to "MAP 1520: Power" on page 2-9.
M0SCSI00	Unable to load diagnostics.	Go to "MAP 1540: Minimum Configuration" on page 2-14.
M0SCSI01	Unable to load diagnostics.	Go to "MAP 1540: Minimum Configuration" on page 2-14.
M0SPK000	A continuous beep is heard from the system.	System board. (See notes on page 2-1.)
M0SPK001	The system does not beep.	1. Speaker 2. System board. (See notes on page 2-1.)

Firmware Error Codes

If you replace FRUs and the problem is still not corrected, go to MAP 0030 in the *RS/6000 Diagnostic Information for Multiple Bus Systems* unless otherwise indicated in the tables.

Error Code	Description	Action/ Possible Failing FRU
20100xxx	Power Supply	
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 4-19 table using code **F74**.
20A80003	Cannot get server hardware address	Refer to "Firmware Checkpoints" on page 4-19 table using code **F74**.
20A80004	Bootp failed	Refer to "Firmware Checkpoints" on page 4-19 table using code **F75**.
20A80005	File transmission (TFTP) failed.	Check network connection, try again.
20D0000F	Selftest failed on device, no SRN/location code information available	Check the System Management Services error log entry (if present) for the location code of the failing device. The error log is described in "Step 1020-4" on page 2-8.
20D00010	Selftest failed on device, can't locate package	Contact you service support representative for assistance.
20E00000	Power on Password entry error.	The password has been entered incorrectly. Retry installing the password.
20E00001	Privileged-access password entry error.	The password has been entered incorrectly. Retry installing the password.
20E00002	Privileged-access password jumper not enabled.	The privileged-access password jumper is not in the correct position for password initial entry. Consult the system's User's Guide for jumper location and position.
20E00003	Power on Password must be set for Unattended mode	Unattended mode requires the setting of the Power On password before it is enabled.
20E00004	Battery drained or needs replacement	1. Replace battery. 2. Replace system board. (See notes on page 2-1.)

Error Code	Description	Action/ Possible Failing FRU
20E00005	EEPROM locked	1. Turn off, then turn on system unit. 2. Replace the system board. (See notes on page 2-1.)
20E00008	CMOS corrupted or tampering evident, CMOS initialized	Check your machine for evidence of tampering. If no tampering evident: 1. Replace battery, restore NVRAM data (passwords, startup data). 2. Replace system board. (See notes on page 2-1.)
20E00009	Invalid password entered - system locked	The password has been entered incorrectly 3 times. Turn off, then turn on the system unit, then enter the password correctly.
20E0000A	EEPROM lock problem	If for privileged-access password install, is jumper in correct position? Consult the system's User's Guide for jumper location and position. 1. Turn off, turn on system unit. 2. Replace system board. (See notes on page 2-1.)
20E0000B	EEPROM write problem	1. Turn off, turn on system unit. 2. Replace system board. (See notes on page 2-1.)
20E0000C	EEPROM read problem	1. Turn off, turn on system unit. 2. Replace system board. (See notes on page 2-1.)
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
20EE0004	Invalid IP parameter	Enter valid IP parameter. Example: 000.000.000.000
20EE0005	Invalid IP parameter (>255)	Enter valid IP parameter. Example: 255.192.002.000
20EE0006	No SCSI controllers present	The system board should always have (at least) an integrated PCI SCSI controller; replace system board. (See notes on page 2-1.)
20EE0007	Keyboard not found	1. Plug in keyboard 2. Replace system board. (See notes on page 2-1.)

Error Code	Description	Action/ Possible Failing FRU
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 riser card 3. Replace system board (See notes on page 2-1.)

21A00xxx	SCSI disk drive	**Notes:**
		
		1. Before replacing any system components:
		
		   a. Ensure that the controller and each device on the SCSI bus is assigned a unique SCSI ID.
		   b. Ensure SCSI bus is properly terminated: SCSI cable plugged into system board internal SCSI port.
		   c. Ensure SCSI signal and power cables are securely connected and not damaged.
		
		2. The location code information is required to identify the ID of SCSI device failures as well as to indicate the location of the controller to which the device is attached.

xxx = 001	Test Unit Ready Failed - hardware error	1. SCSI device 2. SCSI cable 3. SCSI backplane 4. SCSI controller
xxx = 002	Test Unit Ready Failed - sense data available	1. Media (Removable media devices) 2. SCSI device
xxx = 003	Send Diagnostic Failed	SCSI device
xxx = 004	Send Diagnostic Failed - DevOfl cmd	SCSI device
21E00xxx	SCSI Tape	Refer to 21A00xxx (SCSI disk drive) for xxx definitions.
21ED0xxx	SCSI Changer	Refer to 21A00xxx (SCSI disk drive) for xxx definitions.
21EE0xxx	Other SCSI device type	Refer to 21A00xxx (SCSI disk drive) for xxx definitions.

Error Code	Description	Action/ Possible Failing FRU
21F00xxx	SCSI CDROM	Refer to 21A00xxx (SCSI disk drive) for xxx definitions.
21F20xxx	SCSI Read/Write Optical	Refer to 21A00xxx (SCSI disk drive) for xxx definitions.
25010xxx	Flash	
xxx = 000	No diskette in drive	Insert diskette containing firmware image.
xxx = 001	Diskette seek error	1. Retry function. 2. Replace diskette drive. 3. Replace diskette cable. 4. Replace system board. (See notes on page 2-1.)
xxx = 002	Diskette in drive does not contain an *.IMG file.	Insert diskette with firmware update file.
xxx = 003	Cannot open OPENPROM package	Replace system board. (See notes on page 2-1.)
xxx = 004	Cannot find OPENPROM node	Replace system board. (See notes on page 2-1.)
xxx = 006	System id does not match image system id	Make sure correct firmware update diskette is being used with this system.
xxx = 007	Image has bad CRC	Replace firmware updated diskette.
xxx = 008	Flash is write protected, update cancelled	1. Turn off, turn on system unit and retry. 2. Replace system board. (See notes on page 2-1.)
xxx = 009	Flash module is unsupported or not recognized	Make sure correct firmware update diskette is being used with this system.
xxx = 00A	Flash write protected.	1. Turn off, turn on system unit, retry. 2. Replace system board. (See notes on page 2-1.)
25A0xxy0	Cache L2 controller failure	Refer to Error code 2B2xxyrr for a description of the "xx" and "y" values. 1. CPU card 2. System board.(See notes on page 2-1.)

Error Code	Description	Action/ Possible Failing FRU
25A1xxy0	Cache L2 SRAM failure	Refer to Error code 2B2xxyrr for a description of the "xx" and "y" values. 1. CPU card 2. System board. (See notes on page 2-1.)
25A80xxx	NVRAM	**Note:** Errors reported against NVRAM can be caused by low Battery voltage and (more rarely) power outages that occur during normal system usage. With the exception of the 25A80000 error, these errors are warnings that the NVRAM data content had to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, any system customization (eg. boot device list) information has been lost, the system may need to be re-configured. If the error is persistent, replace the battery. If the error is persistent after battery replacement, or the error code is 25A80000, replace the system board. (See notes on page 2-1.)
xxx = 000	Initialization failed, device test failed	
xxx = 001	Init-nvram invoked, all of NVRAM initialized	
xxx = 002	Init-nvram invoked, GE area preserved, remaining areas initialized	
xxx = 011	Data corruption detected, ALL of NVRAM initialized	
xxx = 012	Data corruption detected, GE area preserved, remaining areas initialized	
xxx = 100	NVRAM data validation check failed.	Turn off, turn on system unit and retry the operation.

Error Code	Description	Action/ Possible Failing FRU
25AA0xxx	EEPROM	**Note:** Ensure that the EEPROM Security jumper is in the correct position if doing a privileged-access password install. Consult the system's User's Guide for jumper location and position. Retry the operation. If retries do not solve the problem, replace the system board. (See notes on page 2-1.)
xxx=000	Unable to unlock EEPROM	
xxx=001	Read-Recv error	
xxx=002	Read-Trans error	
xxx=003	Write-enable error	
xxx=004	Write-recv error	
xxx=005	Write-disable error	
xxx=006	Write-Trans error	
xxx=007	Unable to lock EEPROM	

Error Code	Description	Action/ Possible Failing FRU
25Cyycsr	Memory	See "Memory PD Bits" on page 4-18 for definition of "yy". c = Memory card number (Always 0 for DIMM sockets on system planar.) s = DIMM socket number (hex 0 through F).
r = 1	DIMM fails memory test.	For more information: 1. Use the location code obtained from the SMS Error Log utility (described in "Step 1020-4" on page 2-8) to identify which DIMM is defective. 2. The "yy" values specify type of memory causing error. See "Memory PD Bits" on page 4-18 for definition of "yy." **Note:** There may be 2 DIMM related memory errors reported to indicate a DIMM pair. One of the 2 indicated DIMMs may be good, when replacing memory on this system replace 1 DIMM at a time, not both.
r = 2	DIMM is not supported.	1. Remove unsupported DIMM. 2. The "yy" values specify type of memory causing error. See "Memory PD Bits" on page 4-18 for definition of "yy." **Note:** Memory DIMMs must be installed/removed in pairs.

Error Code	Description	Action/ Possible Failing FRU
28030xxx	RTC	**Note:** Errors reported against the Real Time Clock can be caused by low Battery voltage and (more rarely) power outages that occur during normal system usage. These errors are warnings that the Real Time Clock 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. If the error is persistent, replace the battery. If the error is persistent after battery replacement, replace the system board. (See notes on page 2-1.)
xxx = 001	RTC not updating	RTC initialization required
xxx = 002	Bad time/date values - Set Time/Date	Set Time/Date
29000002	Keyboard/Mouse controller failed self-test	System Board. (See notes on page 2-1.)
29A00003	Keyboard not present/detected	1. Keyboard 2. System Board. (See notes on page 2-1.)
29a00004	Keyboard stuck key test failed	1. Keyboard 2. I/O board
29B00004	Mouse not present/detected	1. Mouse 2. System Board. (See notes on page 2-1.)
2B200042	Unknown processor type	Contact your service support representative.

Error Code	Description	Action/ Possible Failing FRU

2B2xxyrr	Bad Processor/CPU	**Note:** Processor and Cache type combinations are identified by the **xx** and **y** fields as follows:
		
		xx Processor type/speed
		
		    21 166 Mhz 604+
		
		    22 200 Mhz 604+
		
		    31 233 Mhz 604++
		
		y Cache information
		
		    0 Integrated cache or cache information unavailable
		
		    5 512KB
		
		    6 1MB
		
		    7 256KB
		
		    D ICBM 1MB

rr = 22		1. Processor (card) **Note:** Go to the System Management Services error log (described in "Step 1020-4" on page 2-8) and use the location code for this error. 2. System board. (See notes on page 2-1.)
rr = 31		1. Processor (card) **Note:** Go to the System Management Services error log (described in "Step 1020-4" on page 2-8) and use the location code for this error. 2. System board. (See notes on page 2-1.)
2BA00000	Service processor POST failure	1. Service processor, if present 2. System board. (See notes on page 2-1.)

Error Code	Description	Action/ Possible Failing FRU
2BA00001	CPU card or power supply failure	1. CPU card 2. Power supply
2BA00006	Service processor incorrectly reports slow or stuck fan	1. Fans 2. Service processor, if present 3. System board. (See notes on page 2-1.)
2BA00007	Service processor reports over temperature	1. Check for cool air flow obstructions to the system 2. System board if the problem persists. (See notes on page 2-1.)
2BA00008	Service processor system board over temperature	1. Check for cool air flow obstructions to the system 2. System board if the problem persists. (See notes on page 2-1.)
2BA00009	CPU card over temperature	1. Check for cool air flow obstructions to the system 2. Replace CPU card if problem persists 3. System board. (See notes on page 2-1.)
2BA00010	Service processor reports fast shutdown condition pending	1. Power supply 2. System board. (See notes on page 2-1.)
2BA00011	Service processor reports power supply or CPU failure	1. Power supply 2. System board. (See notes on page 2-1.)
2BA00012	Service processor reports self test failure	1. Service processor; if present 2. System board. (See notes on page 2-1.)
2BA00013	Service processor reports bad NVRAM CRC	1. If problem persists, replace battery 2. System board. (See notes on page 2-1.)
2BA00014	Service processor reports bad service processor firmware.	Use service processor firmware diskette to re-program firmware.
2BA00015	Service processor reports bad service processor VPD.	1. Service processor; if present 2. System board. (See notes on page 2-1.)
2BA00016	Service processor reports firmware failure.	1. Retry service processor firmware update 2. Service processor; if present
2BA00017	Service processor reports bad or low battery.	1. Battery 2. Service processor; if present 3. System board. (See notes on page 2-1.)

Error Code	Description	Action/ Possible Failing FRU
2BA00018	EPOW test failure.	1. Service processor; if present 2. System board. (See notes on page 2-1.)
2BA00019	IRQ13 test failure.	1. System board. (See notes on page 2-1.) 2. Service processor; if present
2BA00020	Service processor reports VPD access failure.	1. Service Processor. 2. System board. (See notes on page 2-1.) 3. If problem persists, swap new VPD module onto operator panel control assembly (also see step 4). 4. If customer has protected licensed software installed, advise customer to contact all protected software suppliers for a licensed update.
2BA00022	Service processor reports bad CRC error-CMOS/NVRAM	System board. (See notes on page 2-1.)
2BA00023	Error occurred during the processor test.	CPU card
2BA00100	Service processor firmware recovery information could not be written to diskette.	1. Check diskette media write protect tab 2. Diskette drive
2BA00101	Service processor is not installed, update cancelled.	1. Install the service processor 2. Retry operation
2BA00102	No service processor diskette in drive.	Insert the diskette
2BA00103	Service processor firmware update file is corrupted, update cancelled.	1. Obtain new firmware file 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 firmware 2. Retry operation
2BA00200	Service processor firmware update error occurred, update not completed.	Error occurred during service processor flash write operation. Service processor firmware update recovery procedure: 1. Turn the system Off 2. Unplug power cable and then plug power cable back in 3. Turn the system On 4. Retry operation. If problem persists, replace optional service processor.

Error Code	Description	Action/ Possible Failing FRU
2BA00201	Service processor firmware update error occurred, update not completed.	Error occurred while reading service processor CRC See error code 2BA00200 for recovery procedure.
2BA00202	Service processor firmware update error occurred, update not completed.	Error occurred while verifying service processor CRC See error code 2BA00200 for recovery procedure.
2BA00203	Service processor firmware update error occurred, update not completed.	Error occurred while reading service processor CRC after updating service processor firmware See error code 2BA00200 for recovery procedure.
2BA00204	Service processor firmware update error occurred, update not completed.	Error occurred while calculate CRC write See error code 2BA00200 for recovery procedure.
40100005	A loss of system power detected.	Possible main power loss. If not, replace power supply.
40111002	An unknown power problem detected.	1. Power supply 2. System board. (See notes on page 2-1.) 3. Service processor, if present
40111022	A high 5.0 voltage reading detected.	1. Power supply 2. CPU card
40111032	A high 3.3 voltage reading detected.	1. CPU card 2. Power supply
40111042	A high 2.5 voltage reading detected.	1. CPU card 2. Power supply
40111052	A high +12 voltage reading detected.	1. Power supply 2. System board. (See notes on page 2-1.)
40111062	A high −12 voltage reading detected.	1. Power supply 2. System board. (See notes on page 2-1.)
40111082	A low 5.0 voltage reading detected.	1. Power supply 2. CPU card
40111092	A low 3.3 voltage reading detected.	1. CPU card 2. Power supply
401110A2	A low 2.5 voltage reading detected.	1. CPU card 2. Power supply

Error Code	Description	Action/ Possible Failing FRU
401110B2	A low +12 voltage reading detected.	1. Power supply 2. System board. (See notes on page 2-1.)
401110C2	A low −12 voltage reading detected.	1. Power supply 2. System board. (See notes on page 2-1.)
40200001	An unknown cooling problem detected.	Cooling problem; check system fans.
40200021	A CPU temperature warning detected.	Over temperature on CPU card.
40200023	A critical CPU temperature condition detected.	Critical temperature on CPU card.
40200031	An I/O planar temperature warning detected.	Over temperature on system board.
40200033	A critical I/O planar temperature condition detected.	Critical temperature on system board.
40200041	A memory temperature warning detected.	Over temperature on system board.
40200043	A critical memory temperature condition detected.	Critical temperature on system board.
40210011	A slow fan detected.	Check: 1. Room operating temperature 2. System fans
40210014	A stopped fan detected.	Failing fan.
40A00000	System firmware IPL failure.	1. Surveillance mode control is from the Service Processor (SP) Menus. 2. Go to "MAP 1540: Minimum Configuration" on page 2-14. 3. If the problem persists, call the support center for assistance.
40B00000	The operating system surveillance interval exceeded.	1. Surveillance mode control is from the Service Processor(SP) Menus. 2. Verify that the Operating System (OS) Heartbeat Utility is installed and has been activated. 3. Check for errors or unusual conditions that might prevent the OS from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the error log. 4. System board. (See notes on page 2-1.) 5. Service processor 6. If the problem persists, call the support center for assistance.

Error Code	Description	Action/ Possible Failing FRU
40D00003	An unknown slow shutdown commanded.	Critical cooling problem.
40D00004	An unknown fast shutdown commanded.	Locked fan failure detected.
4B201000	Checkstop.	1. CPU 2. System board (See notes on page 2-1.) 3. Go to "MAP 1540: Minimum Configuration" on page 2-14. 4. Software problem 5. Firmware problem 6. If the problem persists, call the support center for assistance.
4B201010	Machine check.	1. CPU 2. System board (See notes on page 2-1.) 3. Software problem 4. Firmware problem 5. If the problem persists, call the support center for assistance.
4B201020	TEA (transfer error acknowledge).	1. CPU 2. System board (See notes on page 2-1.) 3. Software problem 4. Firmware problem 5. If the problem persists, call the support center for assistance.

Memory PD Bits

The following table expands the firmware error code **25Cyyxxx** on page 4-10, where **yy** is the PD values in the table below. Use these values to identify the type of memory that generated the error.

If you replace FRUs and the problem is still not corrected, go to MAP 0030 in the *RS/6000 Diagnostic Information for Multiple Bus Systems* unless otherwise indicated in the tables.

PD value	Size	Speed (nsecs)	Parity/ECC	Single/Dual
64	8MB	60	ECC	Single
69	16MB	60	ECC	Single
6B	32MB	60	ECC	Single
6D	64MB	60	ECC	Single
6F	128MB	60	ECC	Single

Firmware Checkpoints

The following Fxx code checkpoints occur during system startup, and can be used for diagnostic purposes.

If you replace FRUs and the problem is still not corrected, go to MAP 0030 in the *RS/6000 Diagnostic Information for Multiple Bus Systems* unless otherwise indicated in the tables.

Checkpoint	Description	Action/ Possible Failing FRU
A11	CPU reset failure	Replace in the following order: 1. CPU card 2. Service Processor 3. System board. (See notes on page 2-1.)
F05	Transfer control to Operating System (normal boot).	See "Fxx Code Boot Problems" on page 4-22.
F22	No memory detected (system lockup) Note: Disk drive light is on continuously.	1. Memory modules 2. System board. (See page 2-1.)
F4D	Loading boot image	See "Fxx Code Boot Problems" on page 4-22.
F4F	NVRAM initialization	Refer to error code 25A80xxx in "Firmware Error Codes" on page 4-4.
F51	Probing primary PCI bus	1. PCI Adapters 2. System board. If a network adapter or system board is replaced, see page 2-1.
F52	Probing for adapter FCODE, evaluate if present	1. PCI Adapters 2. System board. If a network adapter or system board is replaced, see page 2-1.
F55	Probing PCI bridge secondary bus	1. PCI Adapters 2. System board. If a network adapter or system board is replaced, see page 2-1.
F5B	Transferring control to Operating System (service mode boot)	See "Fxx Code Boot Problems" on page 4-22.

Checkpoint	Description	Action/ Possible Failing FRU
F5F	Probing for adapter FCODE, evaluate if present	1. PCI Adapters 2. System board. If a network adapter or system board is replaced, see page 2-1.
F74	Establishing host connection	Refer to "Fxx Code Boot Problems" on page 4-22 for general considerations.
F75	BootP request	Refer to "Fxx Code Boot Problems" on page 4-22 for general considerations. 1. Turn off then on, and retry the boot operation. 2. Verify the network connection (network could be down). 3. Have network administrator verify the server configuration for this client.
F9E	Real time clock (RTC) initialization	Refer to error code 28030xxx in "Firmware Error Codes" on page 4-4.
FDC	Dynamic console selection.	Refer to "Fxx Code Console Problems" on page 4-24.
FDD	Processor exception	System board (See notes on page 2-1.)
FDE	Alternating pattern of FDE and FAD indicates a processor exception has been detected.	System board (See notes on page 2-1.)
FEA	Firmware flash corrupted, load from diskette.	Ensure that the diskette installed contains recovery image appropriate for this system unit. The System Management Services recovery procedure for the flash EEPROM should be executed. See "Update" on page 6-22. If the diskette is installed with the correct recovery image, then suspect: 1. Diskette 2. Diskette drive 3. Diskette cable 4. System board. (See notes on page 2-1.)

Checkpoint	Description	Action/ Possible Failing FRU
FEB	Firmware flash corrupted, load from diskette.	Ensure that the diskette installed contains recovery image appropriate for this system unit. The System Management Services recovery procedure for the flash EEPROM should be executed. See "Update" on page 6-22. If the diskette is installed with the correct recovery image, then suspect: 1. Diskette 2. Diskette drive 3. Diskette cable 4. System board. (See notes on page 2-1.)
FF2	Power-On Password prompt.	If a console is attached but nothing is displayed on it, go to the "Entry MAP" on page 2-1 with the symptom "All display problems."
FF3	Privileged-Access Password prompt	If a console is attached but nothing is displayed on it, go to the "Entry MAP" on page 2-1 with the symptom "All display problems."
FFD	The operator panel alternates between the code FFD and another Fxx code, where Fxx is the point at which the error occurred.	If the Fxx is not listed in this table, go to "MAP 1540: Minimum Configuration" on page 2-14.
Fxx	Problem not listed here	Go to "MAP 1540: Minimum Configuration" on page 2-14.

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

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

1. Restart the system and get to the Firmware SMS utilities. In the utilities check:
    - Is the intended boot device correctly specified in the boot sequence?
    - For network boot attempts:
        - Are the IP parameters correct?
        - Attempt to "Ping" the target server using the SMS "Ping" utility.
2. If the checkpoint F05 or F5B is displayed for an extended time, there may be a problem with the integrity of the boot image.
    - Try to boot and run standalone diagnostics against the system, particularly against the intended boot device. If the diagnostics are successful, it may be necessary to perform an operating system specific recovery process, or reinstall the operating system.
3. If attempting to boot from a disk drive, CDROM, or tape drive:
    a. Try a different CD/Tape (unless booting from disk drive)
    b. Verify proper SCSI bus termination
    c. Replace SCSI cable
    d. It is possible that another attached SCSI device is causing the problem.

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

       Remove all installed adapters except the one the boot device is attached to, try to boot the standalone diagnostics from a CDROM drive attached to the SCSI controller on the system board, and run the diagnostics against the system.

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

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

      Remove all installed adapters except the one you are trying to boot, and try to boot the standalone diagnostics from a CDROM drive attached to the SCSI controller on the system board. If this is successful, run the diagnostics against the system, particularly against the target network boot controller/adapter.

      If this is successful, re-install adapters (and attached devices as applicable) that were removed, one at a time, and run the diagnostics against the system. If problem recurs, replace the last installed device or adapter.
   i. Replace system board (if not replaced in previous step)
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".

Fxx Code Console Problems: If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the "Entry MAP" on page 2-1. If the console selection screens can be seen on the terminals but there is no response to attempts to select the console:

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 2-1.)
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 (See notes on page 2-1.) 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

Firmware Location Codes

These codes can be found in the System Management Services error log as described in "Step 1020-4" on page 2-8.

Location codes vary in length depending on the device being referenced. In general, if a location code is referring to an adapter or controller, the location code is 4 digits (eg. 04-01 identifies the device/controller /adapter on the PCI bus, in physical slot 1). If a device is optional and plugs into an adapter/controller, it is normally 8 digits (eg. 01-C0-00-00 is identifying the first diskette drive).

Location Code format

The basic format of the location code is:

- For non-SCSI devices/drives
    AB-CD-EF-GH
- For SCSI devices/drives (not controllers/adapters)
    AB-CD-EF-G,H

    "G" is the SCSI bus ID (PUN) of the device and "H" is the Logical Unit Number (LUN).

The "AB" value identifies the bus type as follows:

```
00          Processor bus
01          ISA bus
04          PCI bus
05          PCMCIA bus
```

The "CD" value depends on whether the device is integrated or a plug in adapter. For plug in adapters, the value is a decimal number in the range of 01 to 99 that identifies the system slot. For integrated devices (eg. the integrated PCI Ethernet controller), the value of "G" is an uppercase alphabetic character in the range from A to Z and is generated based on the device "discovery" order as specified in the Open Firmware 1275 specification for the "probe" process which translates into "Device Tree" order.

The "EF" value, as generated by the firmware, is always 00.

The "GH" value (except for SCSI devices) is a subsystem dependent "index" value indicating subordinate devices of the parent identified by the "AB-CD-EF" value.

Examples:

Note:　The values used in the examples are representative of the format and relationships described above.

00-00	System board
00-00-00-00	Memory SIMM/DIMM in socket 1
01-A0	ISA bus Diskette Controller
01-A0-00-01	2nd ISA bus Diskette drive
00-00	2nd ISA bus Serial Port (Error code differentiates between 1st and 2nd)
04-01	PCI Adapter in system slot 1
04-01-00-13,0	SCSI device at SCSI bus ID 13 (decimal) attached to the PCI SCSI controller in system slot 1
04-D0	Integrated PCI Ethernet controller
04-E0	1st Integrated PCI SCSI controller
04-C0-00-13,0	SCSI device at SCSI bus ID 13 (decimal) attached to the first PCI SCSI controller integrated on the system board.
00-00	1st Processor (Proc 0)
00-01	2nd Processor (Proc 1)
04-F0	2nd Integrated PCI SCSI controller

Chapter 5. Loading the System Diagnostics

If no keys are pressed after the system unit power is turned on, the system unit searches a list of devices (the **default boot list**) for a bootable image. If a bootable image is found, then the system unit loads and starts the operating system. This is called a **normal boot**.

The system unit can also be booted from a **custom boot list**, which can be changed through the System Management Services.

If certain keys are pressed during system startup, the system unit searches the default or custom boot list for a bootable image to start in **service mode** instead of normal mode. After a successful service mode boot, the diagnostic programs are started automatically.

The following pages describe the default and custom boot lists, and how to boot from these in either normal or service mode.

Default Boot List

The **default boot list** is composed of the first device found of each of the following types:

1. Diskette drive

2. CD-ROM drive

3. Disk Drive

4. Network device

If this default boot list is used during system startup, the system unit attempts to boot from the diskette drive, then the first CD-ROM drive encountered, then the first disk drive encountered, and finally the first network connection encountered.

Custom Boot List

The contents of the **custom boot list** can be defined by using the graphical System Management Services (see "Boot" on page 6-7) or the text-based System Management Services (see "Select Boot Devices" on page 6-27). When the custom boot list is utilized during system startup, system unit attempts to boot in turn from each specific device in the custom boot list.

Note: Only the specific devices contained in the custom boot list are checked for a bootable image. Other devices of the same type are **not** searched for a bootable image unless they are also specified in the custom boot list.

If no bootable image is found in the custom boot list, then the system restarts and attempts to boot again.

If the custom boot list is discovered to be corrupted, the system rebuilds the custom boot list according to the default boot list.

Service Mode Boot: Loading Diagnostics

The system unit can be booted in **service mode** (instead of **normal mode**) from either the default boot list or custom boot list. After a successful service mode boot, the diagnostic programs are started automatically.

Booting in Service Mode from the Default Boot List

To boot in service mode from the **default** boot list, do the following:

1. Verify with the system administrator and users that all programs will be stopped, then do so.

2. Insert the diagnostic CD-ROM into the CD-ROM drive, if you intend to run standalone diagnostics.

3. Turn off the system.

4. Wait 30 seconds, then turn on the system.

5. When the keyboard indicator appears during startup, press the **F5** key if the system console is a directly-attached keyboard, or the **5** key if the system console is an ASCII terminal.

6. Enter any passwords.

Diagnostics loaded from CD-ROM are called **standalone** diagnostics. Since the default boot list checks the CD-ROM drive before the disk drive, this procedure is used to start standalone diagnostics.

Booting in Service Mode from the Custom Boot List

To boot in service mode from the **custom** boot list, do the following:

1. Verify with the system administrator and users that all programs will be stopped, then do so.

2. Turn off the system.

3. Wait 30 seconds, then turn on the system.

4. When the keyboard indicator appears during startup, press the **F6** key if the system console is a directly-attached keyboard, or the **6** key if the system console is an ASCII terminal.

5. Enter any passwords.

Diagnostics loaded from a disk drive or network are called **online** diagnostics. (Online diagnostics can be used only if AIX is installed.) Since the custom boot list should list the disk drive or network device before the CD-ROM drive, this procedure is used to start online diagnostics. To ensure that using the custom boot list starts online diagnostics, do not insert the diagnostics CD-ROM.

Standalone vs. Online Diagnostics

When the system unit attempts to boot in service mode (from either the default or custom boot list) and locates a diagnostics CD-ROM before any other bootable image, then the system unit starts **standalone diagnostics**.

Standalone diagnostics can be used on system units installed with any supported operating system.

When the system unit attempts to boot in service mode (from either the default or custom boot list) and first locates a bootable image on disk drive or network connection, then the system unit starts **online diagnostics**.

Online diagnostics can only be used on system units installed with the AIX operating system.

Because the type of diagnostics started (standalone or online) depends on the source from which they are loaded, changing the boot list used during system startup can affect which diagnostics are run.

Recommended Boot Options

The procedures under "Service Mode Boot: Loading Diagnostics" on page 5-2 produce the following recommended results:

- Default boot list (F5 or 5 key) with diagnostics CD-ROM inserted loads **Standalone Diagnostics**.
- Custom boot list (F6 or 6 key) without diagnostics CD-ROM inserted loads **Online Diagnostics**, if AIX is installed on a device in the custom boot list.

Summary: Boot Options and Control Keys

The following keys can be pressed when the keyboard POST indicator appears.

Key	Result
F1 (display keyboard)	Normal mode boot, graphical System Management Services starts.
1 (ASCII keyboard)	Normal mode boot, text-based System Management Services starts.
F5 (display keyboard)	Service mode boot, default boot list.
5 (ASCII keyboard)	Service mode boot, default boot list.
F6 (display keyboard)	Service mode boot, custom boot list.
6 (ASCII keyboard)	Service mode boot, custom boot list.
F8 (display keyboard)	Normal mode boot, Open Firmware command line.
8 (ASCII keyboard)	Normal mode boot, Open Firmware command line.

Chapter 6. System Management Services

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

If you have chosen a graphical display as your system console, you can use the graphical System Management Services described below. If you are using an ASCII display as your system console, see "Text-Based System Management Services" on page 6-24.

Graphical System Management Services

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

The firmware version installed in your system unit is displayed at the bottom right-hand corner of the initial logo screen. Please note the version number; processor upgrades may require a specified 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 displays, initialization icons appear across the bottom of the screen.

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

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

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

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

Note: If you do not press the **F1** key prior to the tone, the Sysystem Management Services screen will not appear. If this happens, turn off the system and re-start this process.

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

The System Management Services screen contains the following choices.
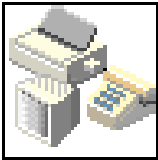
Config: Enables you to view your system configuration.

Boot: Allows you to set the sequence in which devices are searched for operating system startup code.
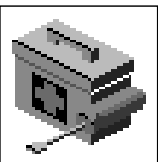
Utilities: Enables you to set and remove passwords, control the playing of system tones, enable the unattended start mode, set and view the addresses of your system's SCSI controllers, select the active console, and view or clear the error log.
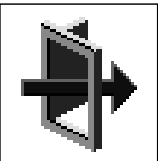
Exit: Returns you to the previous screen.

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

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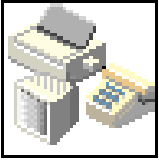
Selecting this icon makes it possible for you to view information about the setup of your system unit. A list similar to the following appears when you select the **Config** icon.

```
<Device Name>

PowerPC, 604
L2-Cache, 0512K
Memory
      slot A=8 MB
      slot B=8 MB
LPT
      addr=3BC
IDE
      addr=1F0
COM
      addr=3F8
COM
      addr=2F8
Audio
Keyboard
Mouse
Diskette
      addr=3F0
Integrated Ethernet
      addr=9999FF111B
Video
      enhanced graphics
```
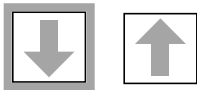

Exit

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

The following screen appears if you DO NOT have a service processor in your system.
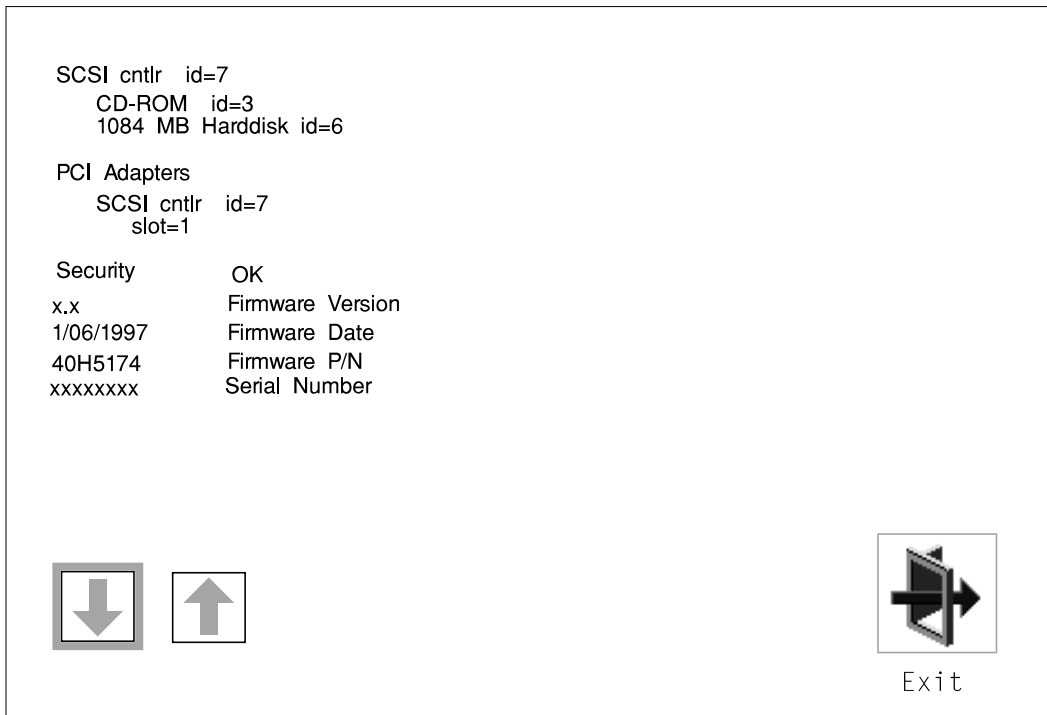
```
    SCSI cntlr   id=7
        CD-ROM    id=3
        1084  MB  Harddisk id=6

    PCI  Adapters
        SCSI cntlr   id=7
            slot=1

    Security          OK

    x.x               Firmware  Version
    1/06/1997         Firmware  Date
    40H5174           Firmware  P/N
    xxxxxxxx          Serial  Number
```

Exit

The following screen appears if you have a service processor in your system.

```
SCSI cntlr   id=7
    CD-ROM   id=3
    1084  MB  Harddisk  id=6

PCI  Adapters
    SCSI cntlr   id=7
        slot=1

Security          OK
<System  Information>
x.x              Firmware  Version
1/06/1997        Firmware  Date
40H5174          Firmware  P/N
xxxxxxxx         Serial  Number

<IO  Information>
xxxxxxxx         Serial  Number
xxxxxxxx         Part  Number
xxxxxxxx         EC  Number
xxxxxxxx         FRU  Number

<Service  Processor  Information>
xxxxxxxx         Serial  Number
xxxxxxxx         Part  Number
xxxxxxxx         EC  Number
xxxxxxxx         FRU  Number
```

Exit

Boot

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

```
    New            List of Boot Devices

     -      [1]     Diskette

     1      [2]     SCSI CD-ROM id=3 (slot=1)

     3      [3]     SCSI 2168 MB Harddisk id=6 (slot=1)

     2      [4]     Ethernet (Integrated)









          Save     Default                        Exit
```

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

The default boot sequence is:

- The primary diskette drive
- CD-ROM drive
- Hard disk drive
- Network device.

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

You can choose 1 to 4 devices for the custom boot list. To change the boot sequence back to the default values, select **Default**. (The default sequence is automatically saved.)

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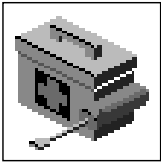
Selecting this icon enables you to perform various tasks and view additional information about your computer.

The following describes the choices available on this screen.
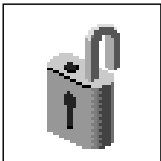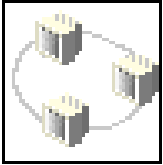
Password: Enables you to set password protection for turning on the computer and for using system administration tools.

Audio: Enables you to turn on or off the system tones heard when the system is turned on.
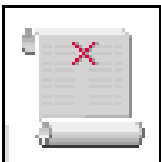
Error Log: Enables you to view and clear error log information for your computer.

RIPL (Remote Initial Program Load): Allows you to select a remote system from which to load programs via a network adapter when your system unit is first turned on. This option also allows you to configure network adapters which require setup.
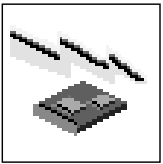
Update: Allows you to update the firmware programs on your computer.
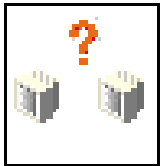
Console: If you have more than one keyboard and display attached to your system unit, or if you have an ASCII terminal attached to your system unit in addition to a keyboard and display, this tool allows you to define which one is active.

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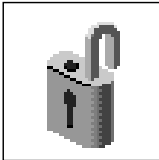
When you select this icon, the following screen is displayed.
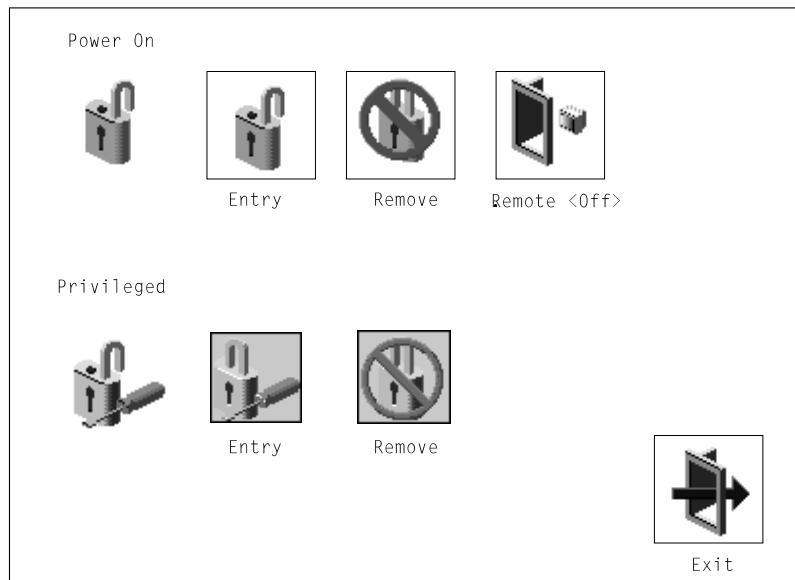
Power-On Password: Setting a power-on password helps protect information stored in your computer. If a power-on password is set for your computer, the Power On icon is shown in the locked position; if a power-on password is not set, then the Power On icon is shown in the unlocked position (as in the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

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

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

```
Verify Password

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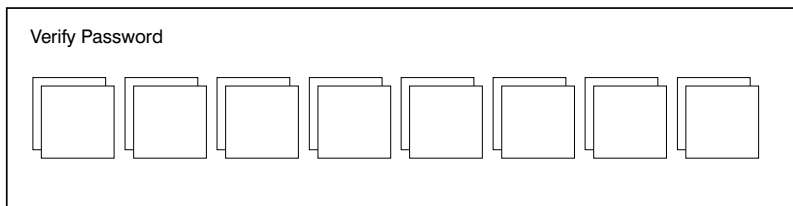
If you make a mistake, press the **Esc** key and start again.

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

If you previously had set a power-on password and want to remove it, select the Remove icon.
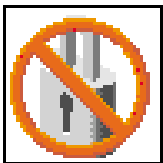
Note: If you *forget* the power-on password, you must remove the battery for at least 30 seconds to disable this password. See "Battery" on page 7-46 for details.

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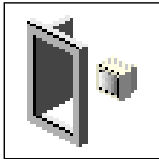
Remote Mode: The remote mode, when enabled, allows the system to start from the defined boot device. This mode is ideal for network servers and other computers that operate unattended. You *must* set a power-on password before you can enable the remote mode. When the remote mode is set, the icon changes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

If you remove the power-on password, the remote mode is automatically reset, and the icon returns to **Remote <Off>**.
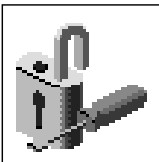
Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

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

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

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

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

Note: If you *forget* the privileged-access password, you must remove the battery for at least 30 seconds to disable this password. See "Battery" on page 7-46 for details.

Audio

This icon enables you to turn on or off the system tones heard at power-on time. To change the audio status, use the arrow keys to highlight the audio icon, then press the Enter key.

Error Log
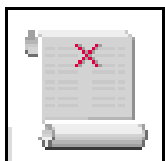
Selecting this icon displays the log of the first and the last errors your computer has encountered during operations.

```
                            System Error Log


        Date       Time      Error Code      Location
    1. 00/04/13   00:51:32    25C38005        P1-M1.10
    2. No entry




        [Clear icon]                          [Exit icon]

        Clear                                 Exit
```

Selecting the Clear icon erases the entries in this log.

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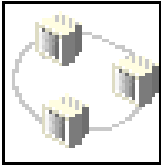
Selecting the Remote Initial Program Load (RIPL) icon above gives you access to the following selections.

Set Address   Ping   Config
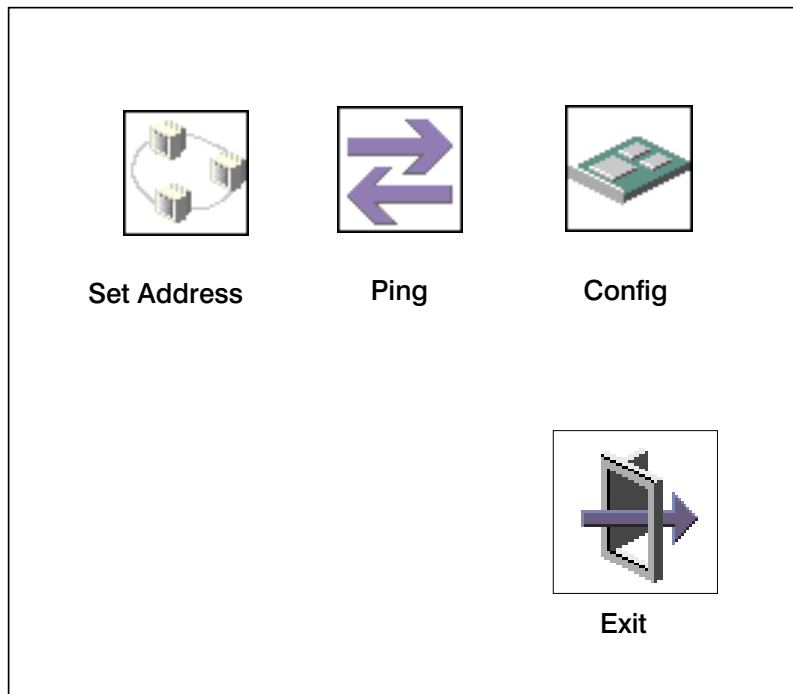
Exit

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

```
                    Remote  IPL  Setup


        Client  Addr          000.000.000.000     *
        Server  Addr          000.000.000.000     *
        Gateway  Addr         000.000.000.000
        Subnet  Mask          000.000.000.000




            [Save icon]                    [Exit icon]

            Save                           Exit
```

Notes:

1. Those addresses indicated with an (*) are required.

2. Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 123.132.004.020. If you are using the NIM application, do not specify leading zeroes in the IP parameters section. Leading zeroes can cause subsequent attempts to initiate a network boot to fail.

If any of the addresses is incomplete or contains a number other than 0 to 255, an error message is displayed when you select the Save icon. To clear this error, change the improper address and select Save again.
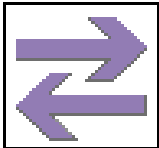
The Ping icon allows you to confirm that a specified address is valid by sending a test transmission to that address.

After choosing the Ping option, you may be asked to indicate which communications adapter (Token Ring or Ethernet) should be used to send the test transmission.
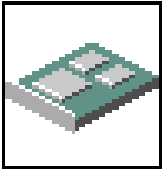
The Config icon allows you to configure network adapters which require setup.
Selecting the Config icon presents a list of the adapters requiring configuration. Use
the arrow keys to highlight an adapter, press the spacebar to select the adapter, then
highlight the OK icon and press the Enter key.

```
   ▣    10/100 Ethernet slot=1

   ☐    10/100 Ethernet slot=2




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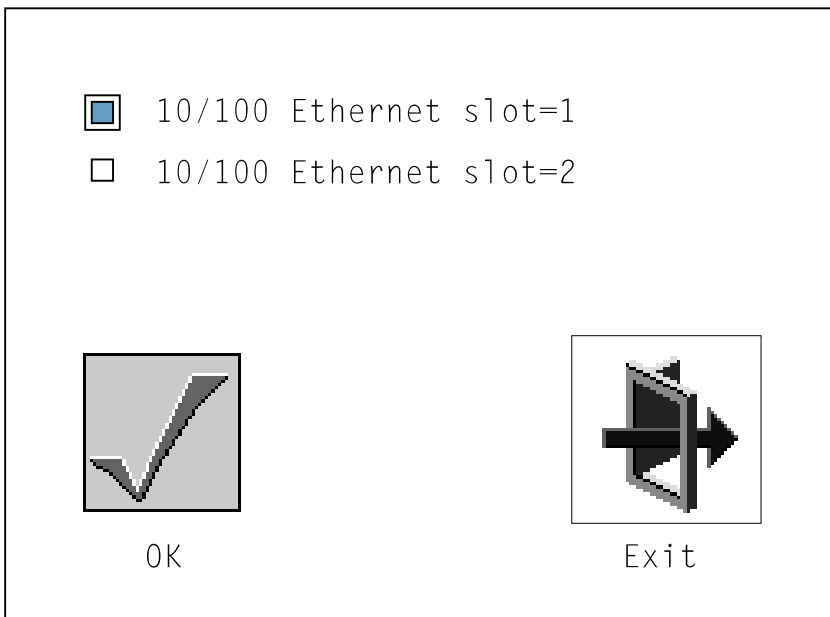
The next screen allows you to select the type of adapter you have just chosen (or
allow the system to select the type automatically). You can also select the
communications mode of the chosen adapter (or allow the system to select the
communications mode automatically). As on the previous screen, use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

After choosing the adapter to configure, you can select the communications mode of
the chosen adapter (or allow the system to select the communications mode
automatically). As on the previous screen, use the arrow keys or mouse to highlight,
then press the spacebar to select. When you have selected the communications
mode, highlight the OK icon and press the Enter key.

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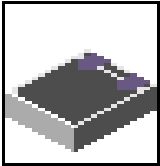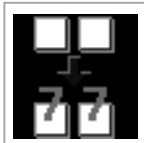
This selection allows you to view and change the addresses (IDs) of the SCSI controllers attached to your system unit. To change an ID, highlight the entry by moving the arrow keys, then enter another number. After you have entered the new address, use the arrow keys to highlight the Save icon and press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

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

Change SCSI ID

Type	Slot	ID	Max ID
Fast	5	7	7
Fast/Wide	7	7	15

Save   Default   Exit

Update

System Without Service Processor
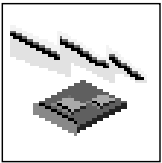
System With Service Processor
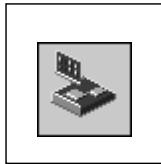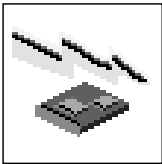
This selection allows you to update the firmware in your system unit from an image on a 3.5 inch diskette.

In order to create a firmware diskette with the latest level of firmware available, see

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

After choosing the Update option in the System Management Services, and confirming this choice, you must insert the diskette containing the firmware image.

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

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

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

Firmware Recovery

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

To perform a firmware recovery, do the following:

1. Locate your firmware update diskette.

2. Using another system unit, rename the ***.img** file on the firmware update diskette to **precover.img**.

3. Make sure your system unit is turned off.

4. Insert the firmware recovery diskette into your system unit.

5. Turn on your system unit.

6. When the keyboard indicator appears, press the **1** key if the system console is an ASCII terminal, or the **F1** key if the system console is a directly-attached keyboard.

7. When the System Management Services appear, choose Utilities and perform a Firmware Update as described under "Update" on page 6-22.

Text-Based System Management Services

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

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

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

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

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

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

The firmware version installed in your system unit is displayed at the top of each screen in the text-based System Management Services. Please note the version number; processor upgrades may require a specified 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.)

```
System Management Services


 1.  Display Configuration
 2.  Select Boot Devices
 3.  Utilities
 4.  Select Language


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


 ====>
```

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

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

Display Configuration

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

```
    Device

    PowerPC 604
    L2-Cache, 0512K
    Memory
        slotA=8MB
        slotB=8MB
    LPT
        addr=3BC
    COM
        addr=3F8
    COM
        addr=2F8
    Audio
    Keyboard
    Mouse
    Diskette
        addr=3F0
    Integrated Ethernet
        addr=80005AF67BD
    SCSI cntlr id=7

    PCI Adapters

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

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

Select Boot Devices

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

```
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


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

 ====>
```

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

```
Current Boot Sequence

 1. Diskette
 2. Ethernet (Integrated)
 3. SCSI CD-ROM           id=3   (slot=1)
 4. SCSI 500MB Hard Disk  id=6   (slot=1)




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

 ===>
```

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

```
    Configure Nth Boot Device

    Device Number        Current Position        Device Name

         1                    1                  Diskette
         2                    2                  Ethernet
         3                    3                  SCSI CD-ROM
         4                    4                  SCSI 500MB Hard Disk
         5                    -




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


===>
```

Utilities

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

The following screen appears if you DO NOT have a service processor installed in your system:

```
Utilities

 1. Set Password and Unattended Start Mode
 2. Audio <ON>
 3. Display Error Log
 4. Remote Initial Program Load Setup
 5. Change SCSI id
 6. Update System Firmware
 7. Select Console




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

The following screen appears if you have a service processor installed in your system:

```
Utilities

 1. Set Password and Unattended Start Mode
 2. Audio <ON>
 3. Display Error Log
 4. Remote Initial Program Load Setup
 5. Change SCSI id
 6. Update System Firmware
 7. Update Service Processor
 8. Select Console



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

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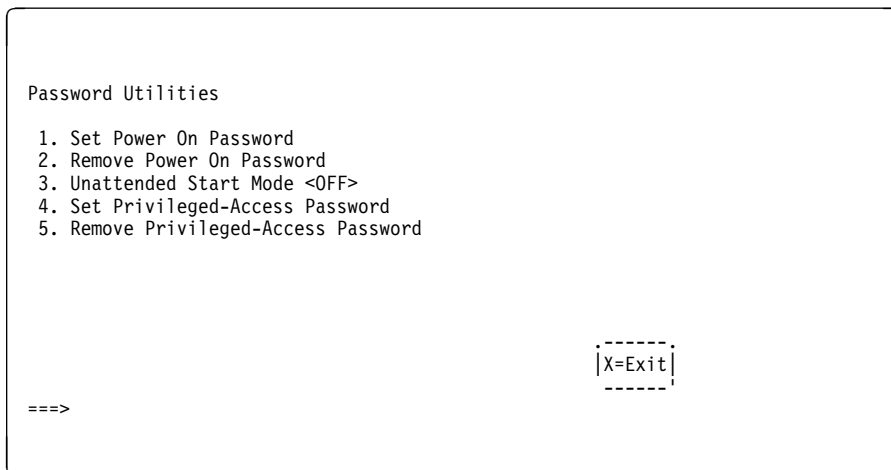
```
Password Utilities

 1. Set Power On Password
 2. Remove Power On Password
 3. Unattended Start Mode <OFF>
 4. Set Privileged-Access Password
 5. Remove Privileged-Access Password




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

```

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

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

Note: If you *forget* your password, you must shut down the computer and remove the battery for at least 30 seconds to disable the password. See "Battery" on page 7-46 for details.

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

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

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

Note: If you *forget* your password, you must shut down the computer and remove the battery for at least 30 seconds to disable the password. See "Battery" on page 7-46 for details.

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

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

```
Network Parameters

 1. IP Parameters
 2. Adapter Parameters
 3. Ping




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

 ===>
```

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

Selecting the IP Parameters option displays the following screen.

```
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          000.000.000.000




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


 ===>
```

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

```
Adapter Parameters

     Device              HW Address

 1. 3Com,3C905           80005AFC67BD
 2. Token-Ring           800032E54A12




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

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

```
3Com Etherlink Fast XL


1. Media Type          fflAuto"
2. Full Duplex         fflAuto"




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

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

```
              .----------------.
              | MEDIA TYPE     |
              | 1. 10 BaseT    |
              | 2. 100 Base TX |
              | 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        |
              '----------------'
```

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

```
Interface

 1. Ethernet (Integrated)
 2. Token Ring (Slot=3)




===>
```

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

```
Ping

 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|
        ----------'                                  ------'

 ===>
```

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

```
        .------------------------------------------------------.
        |                    Error Log                         |
        |                                                      |
        |        Date        Time       ErrorCode     Location |
        | Entry 1. 96/04/01   12:13:22   25A80011       00-00  |
        | Entry 2. no error logged                             |
         ------------------------------------------------------'




        .------------------.                         .------.
        |C=Clear Error Log |                         |X=Exit|
         ------------------'                          ------'
```
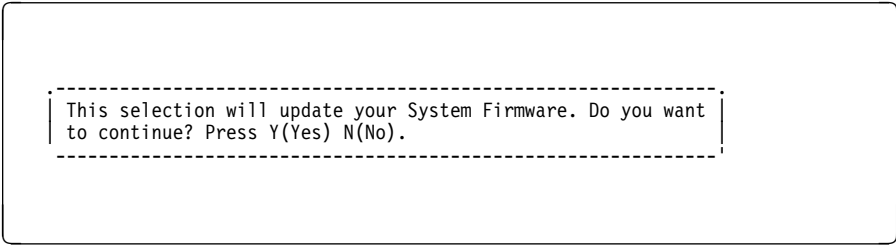
Change SCSI ID: This option allows you to view and change the addresses of the SCSI controllers attached to you computer.

Update System Firmware: This selection allows you to update the firmware in your system unit from an image on a 3.5 inch diskette.

In order to create a firmware diskette with the latest level of firmware available, see

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

After choosing the Update option in the System Management Services, you must insert the diskette containing the firmware image after you see the following prompt.

```
 .--------------------------------------------------------------.
 | This selection will update your System Firmware. Do you want |
 | to continue? Press Y(Yes) N(No).                             |
 '--------------------------------------------------------------'
```

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

To perform a firmware recovery, do the following:

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

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

Select Language

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

```
  SELECT LANGUAGE

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


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

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

Chapter 7. Removal and Replacement Procedures

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

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**
>
> **Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.**
>
> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
>
> **Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **During an electrical storm, do not connect cables for display stations , printers, telephones, or station protectors for communications lines.**

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

Handling Static–Sensitive Devices

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

Take the following precautions:

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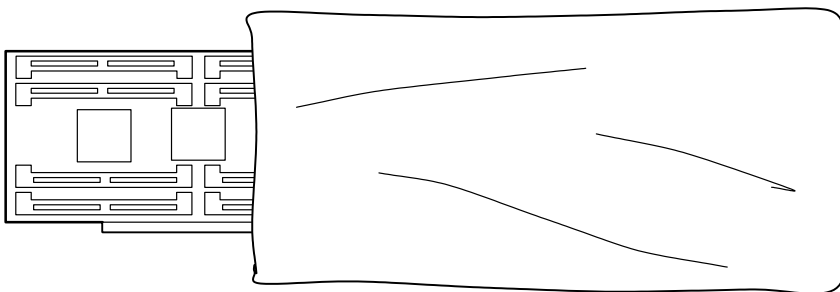
Covers

Removal

1. Open the door.
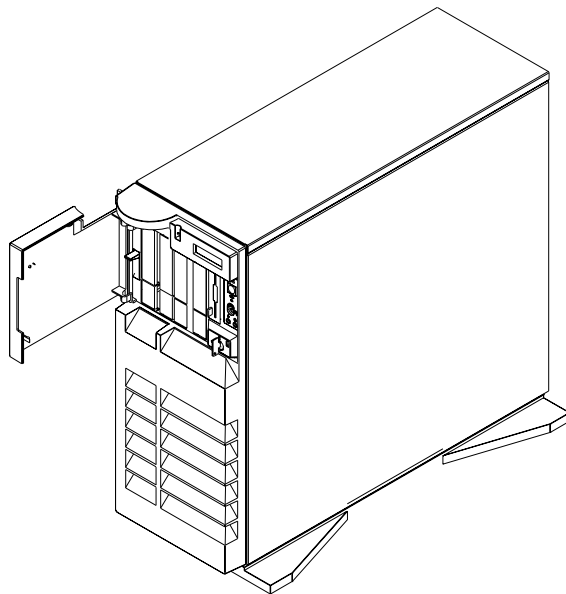
2. Remove the door by carefully lifting it up and off the hinges. Store it in a safe place.
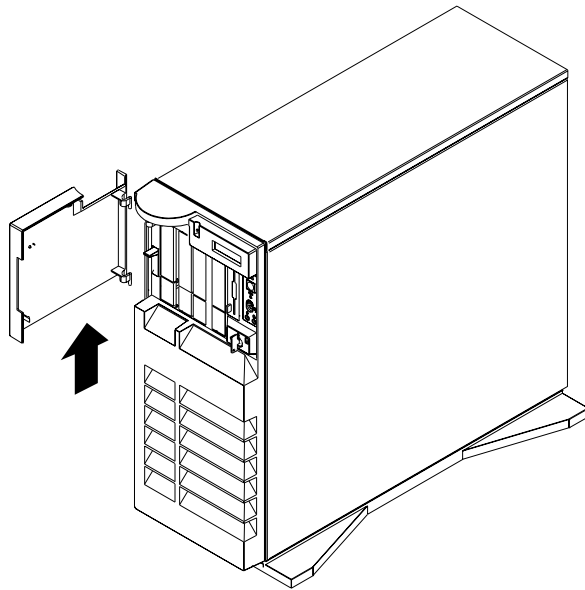
3. Remove all media (diskettes, CDs, optical discs, or tapes) from drives; then turn the power off to the system and all attached devices.

4. Shutdown the operating system.

5. Turn off power to the system and all attached options.

6. If you have a modem or fax machine attached to the system, disconnect the telephone line.
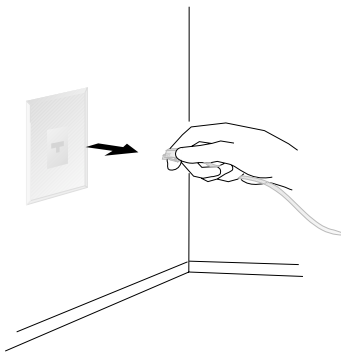
7. Unplug all power cords (cables) from electrical outlets.

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

- Power cord
- Display cable
- Keyboard cable
- Any other cables and cords
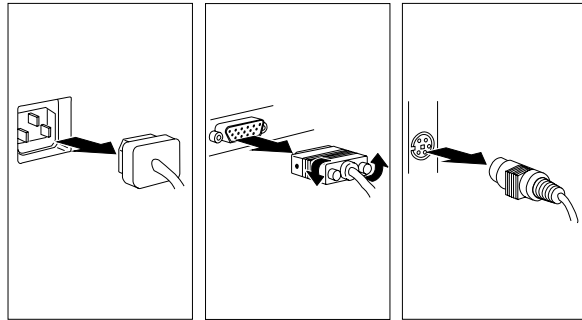
8. Remove the front cover:

    a. Unlock the keylock on the front cover.

    b. Lift up on the latch on the left side of the front cover.

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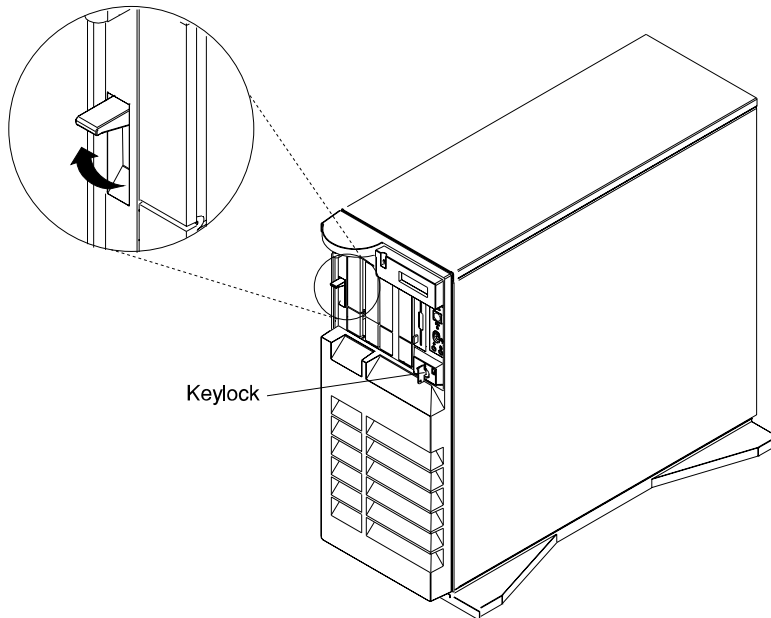
c. Grasp the sides of the front cover near the top of the system and pull it forward. (The front cover is held in place by two spring detented ball studs.)

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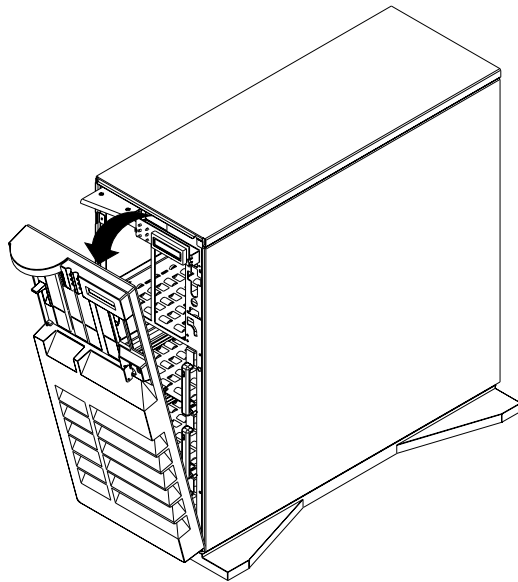
9. Remove the side cover:

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

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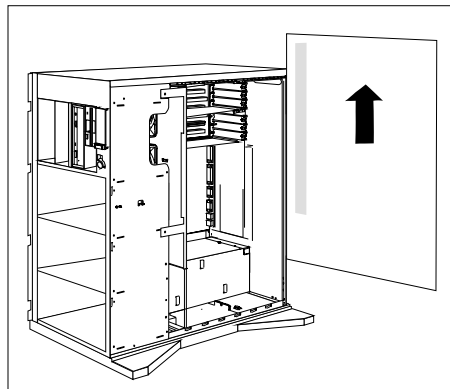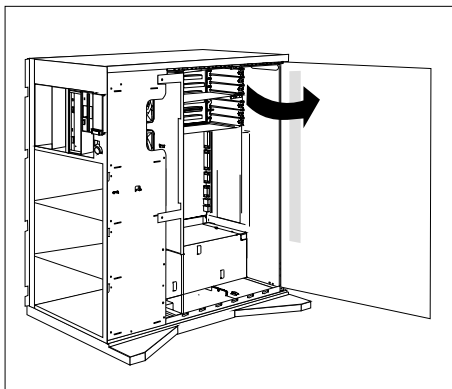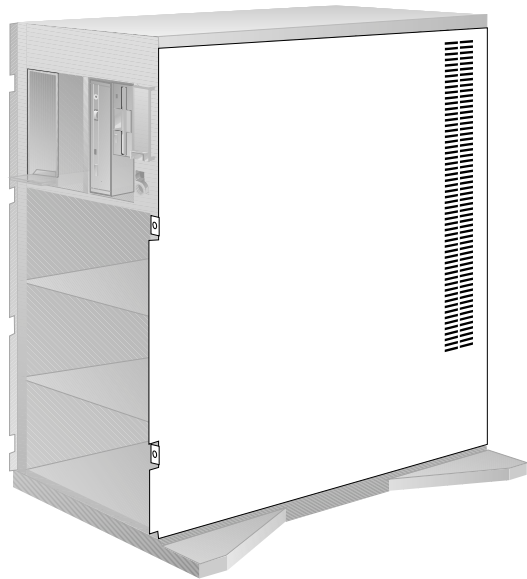
Replacement

1. Reinstall the side cover:

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

    b. Slide the side cover down.

    c. Push the side cover to close it.
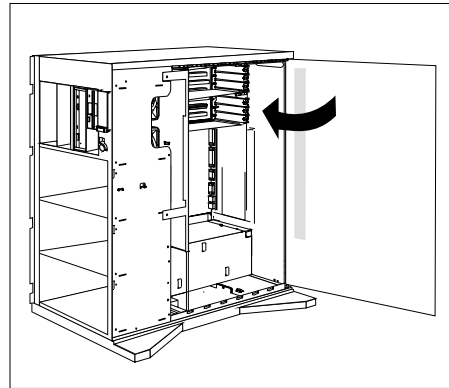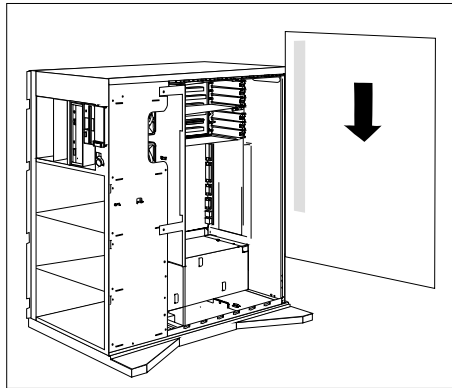
2. Reinstall the front cover:

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

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

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

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

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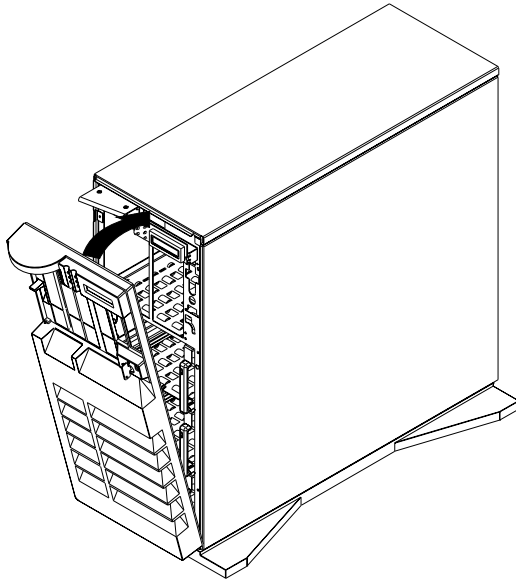
e. Latch the cover latch located on the left side of the front cover.

Keylock
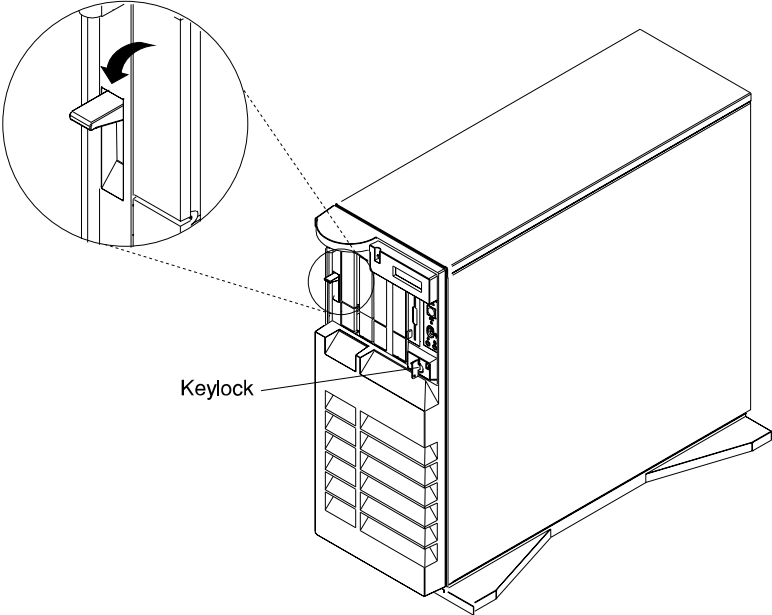
3. Reinstall the door at the front of the system by aligning the pins with the hinges, and sliding the door down.
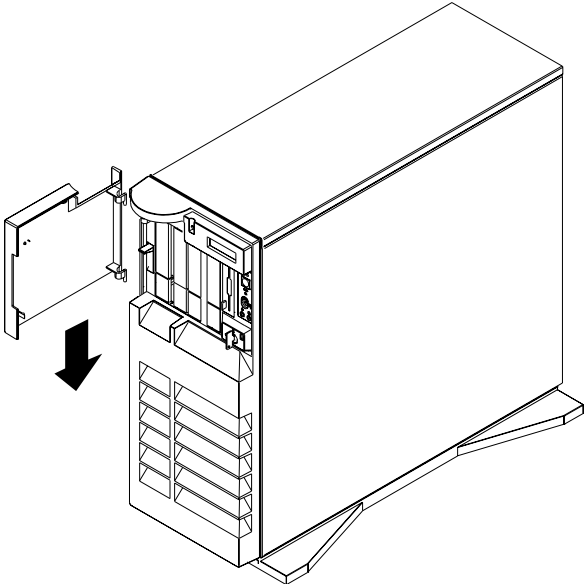
4. Close the door.
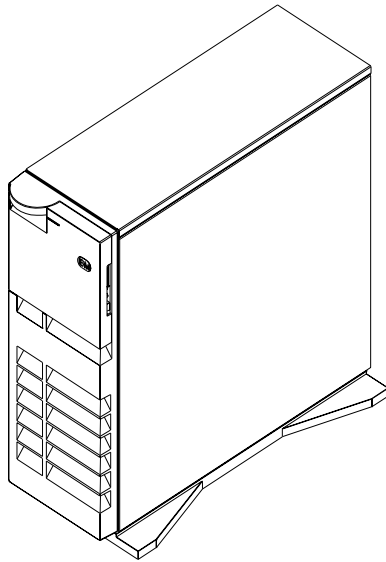
Power Supply

DANGER

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

Note: The power supply assembly may consist of one or two power supplies, a base supply and an optional supply. You can replace either supply separately.

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. If your system has only a base supply installed, complete steps 1 through 7 only. If your system has both the base and optional supplies installed, complete all of the removal steps.

3. Disconnect the four cables from system board connectors J1, J16, J17 and J30.
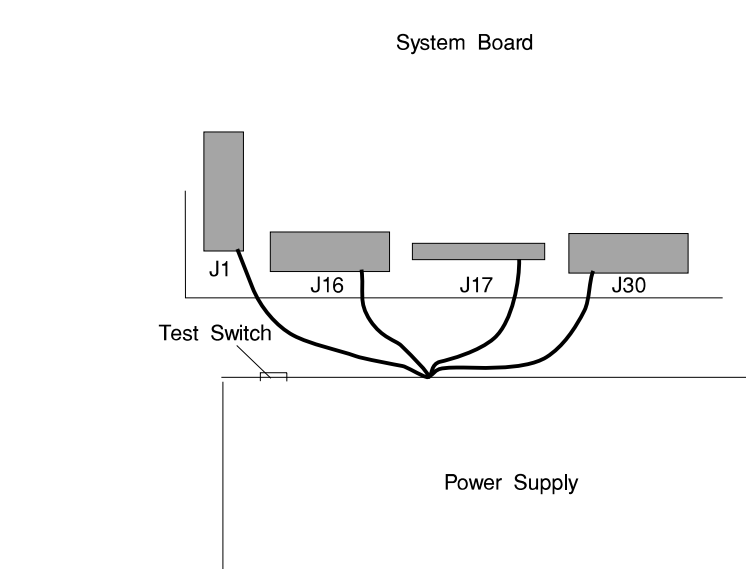
4. Disconnect the power cables at the power supply (located on the top of the power supply. These cables are connected to the backplanes.
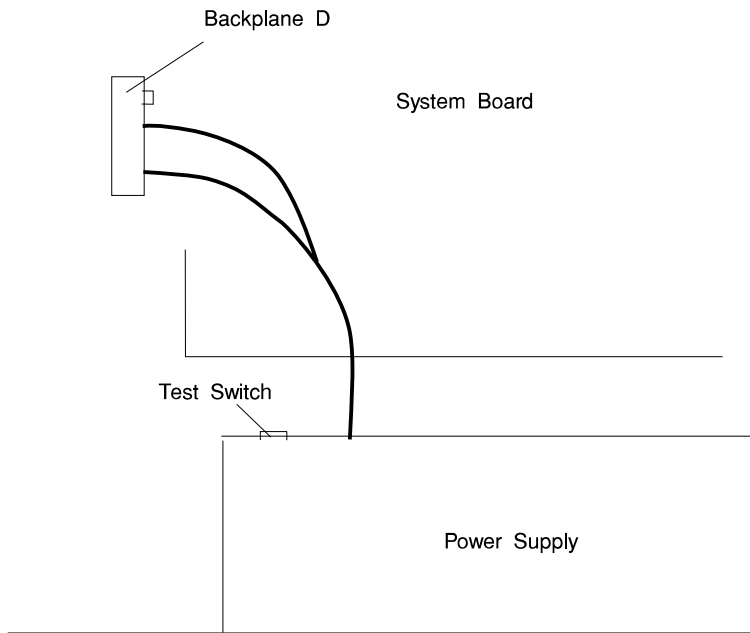
5. Disconnect the power cord from rear of the power supply.

6. Remove the five screws from the power supply.
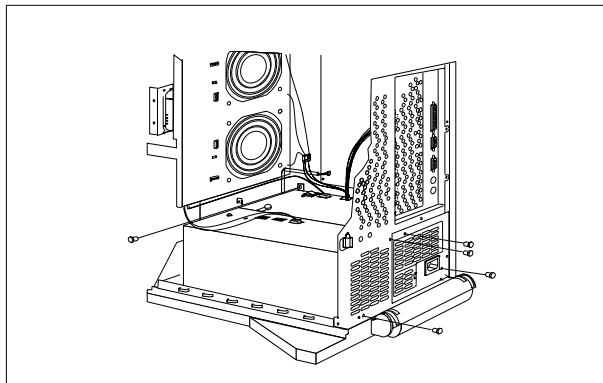
7. Remove the power supply from the system. Slide the power supply forward, toward the front. Lift it up and out of the system.

8. Place the power supply on a sturdy, flat surface next to the system. Remove the small metal plate from the top right side of the power supply. Locate and disconnect the 3-pronged plug.
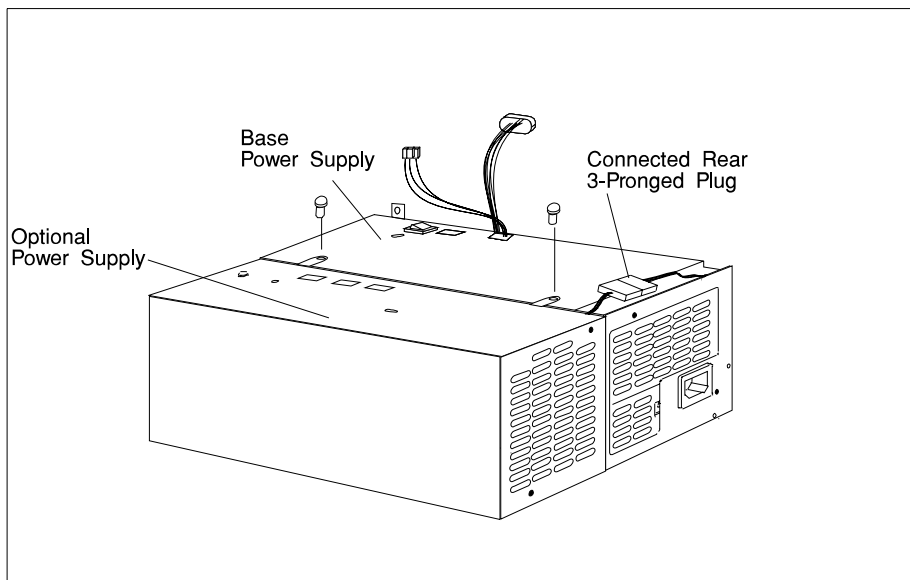
9. Remove the screws from the top of the power supplies.

10. Unlatch the optional power supply from the base power supply.

11. Disconnect the small cable between the power supplies.

Replacement

1. If your system had only the base supply installed, go to step 9 on page 7-22. If your system has both the base and optional supplies installed, go to the next step.

2. Replace the defective power supply.

3. Rotate the base power supply so that the latching hooks are facing up.
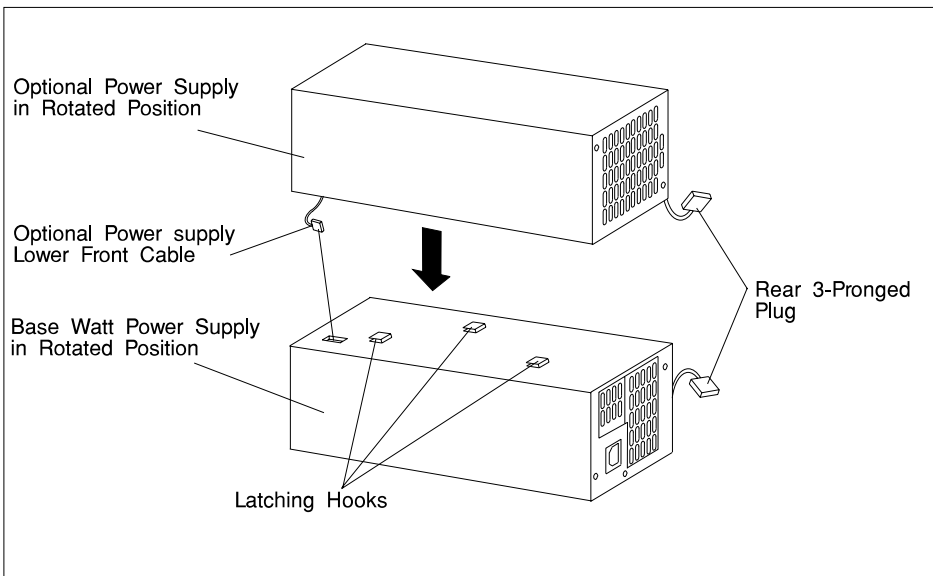
4. Locate the optional power supply.

5. Connect the lower front cable from the optional power supply to the left lower side of the base power supply.

   Attention: Push the excess cable into the side cavity of the optional power supply. This prevents the cable from pinching and allows the two power supplies to connect properly.

Optional Power Supply
in Rotated Position

Excess Cable Wire
Tucked into Side Cavity

Connected Lower
Front Cable

Base Power Supply
in Rotated Position
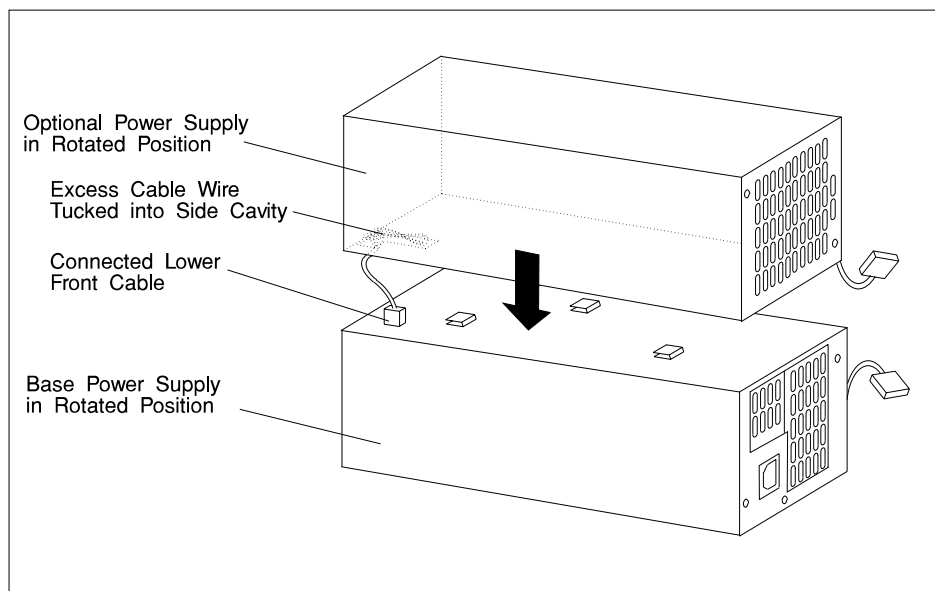
6. Connect the power supplies to each other by sliding the latching hooks on the optional power supply into the matching slots on the base power supply.

Optional Power Supply
in Rotated Position

Excess Cable Wire
Tucked into Side Cavity

Base Watt Power Supply
in Rotated Position
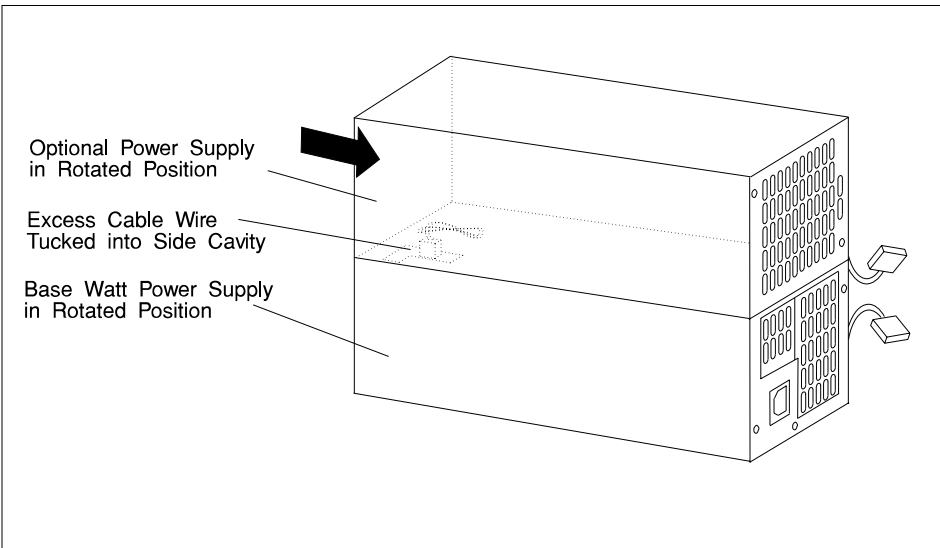
Rotate the two power supplies back to their normal position for installing into the bottom of the system.

  a. Install the screws connecting the power supplies as shown.

  b. Connect the rear three-prong plug from the optional power supply to the base power supply.
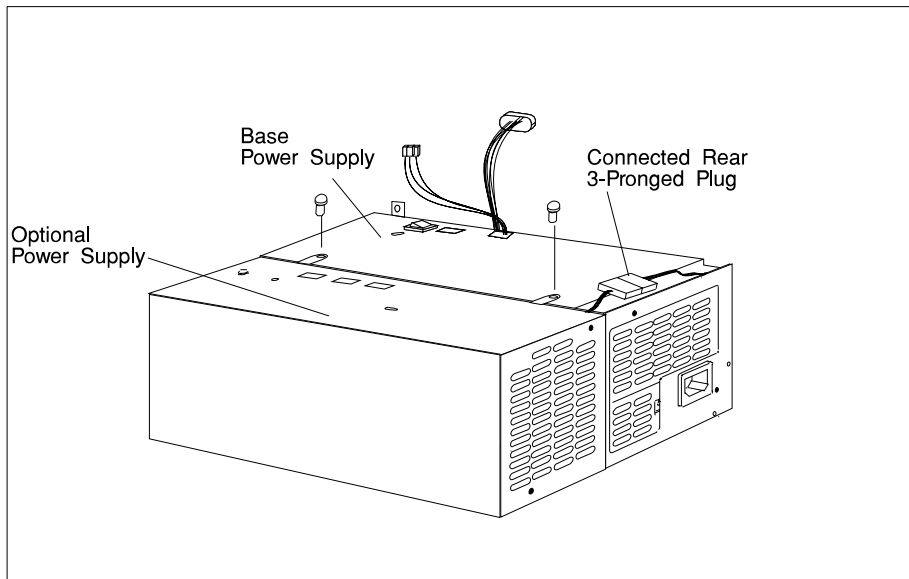
7. Install the small metal plate that you removed in step 8 on page 7-15.

Rest Tab Against the Inside
Edge of the Power Supply

Rear Cable Cover Plate

Tab
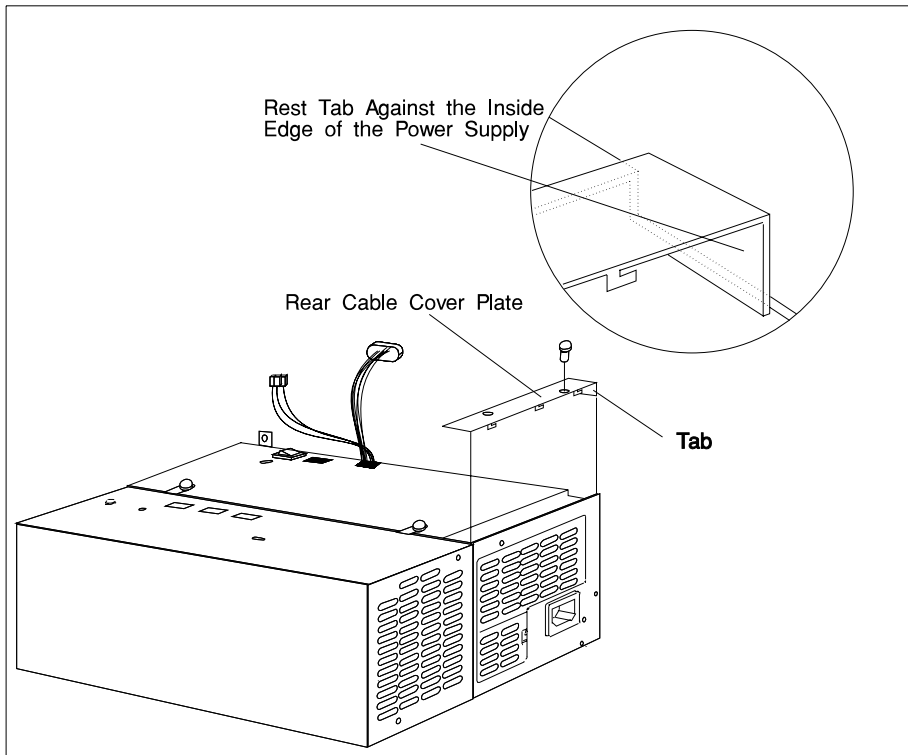
8. Test the new power supply.

   a. Connect the power cord to the power supply.

   b. Plug the power cord into a wall outlet.

   c. Push and hold the button on the standard power supply and confirm that the LEDs illuminate on both power supplies. If both LEDs illuminate, the two power supplies have been installed correct.

   d. If you do not see the two LEDs illuminate, recheck your previous steps and connections.

   e. Disconnect the power cord from the outlet and the power supply. Go to the next step.
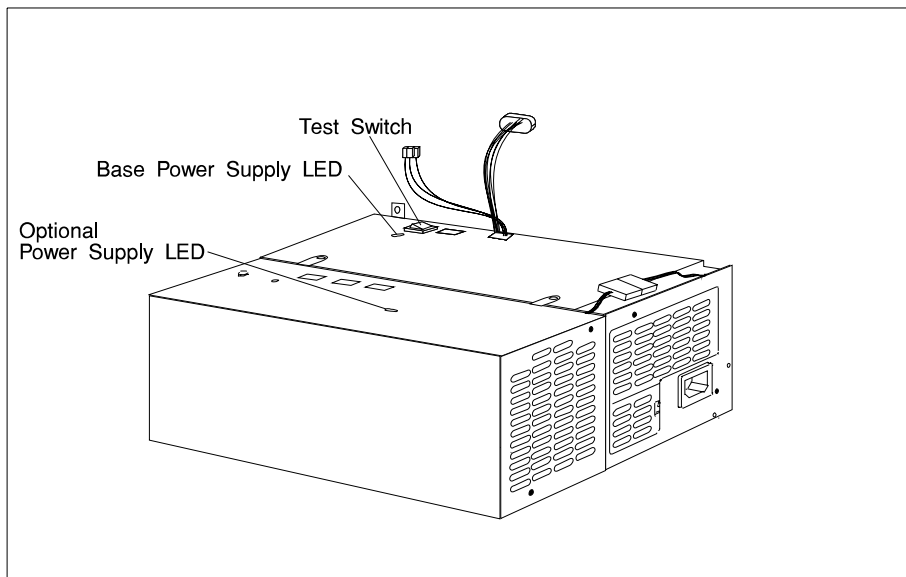
9. Place the power supply assembly in the bottom of the system. Slide the power supply backward, toward the rear of the system.

10. Secure the power-supply assembly by installing the five screws that you removed in step 6 on page 7-14.
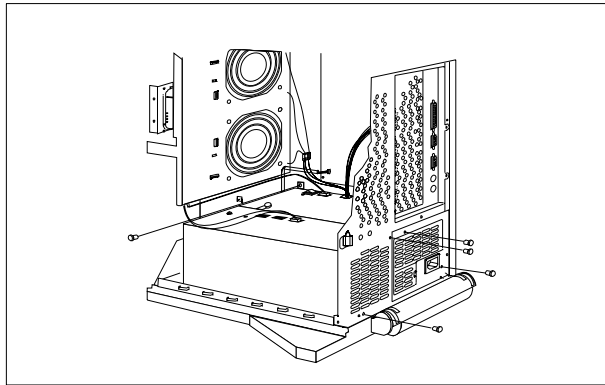
11. Reconnect the cables.

   a. Reconnect the power supply cables between the power supplies and backplanes that were removed in step 4 on page 7-14.

Backplane D

System Board

Test Switch

Power Supply
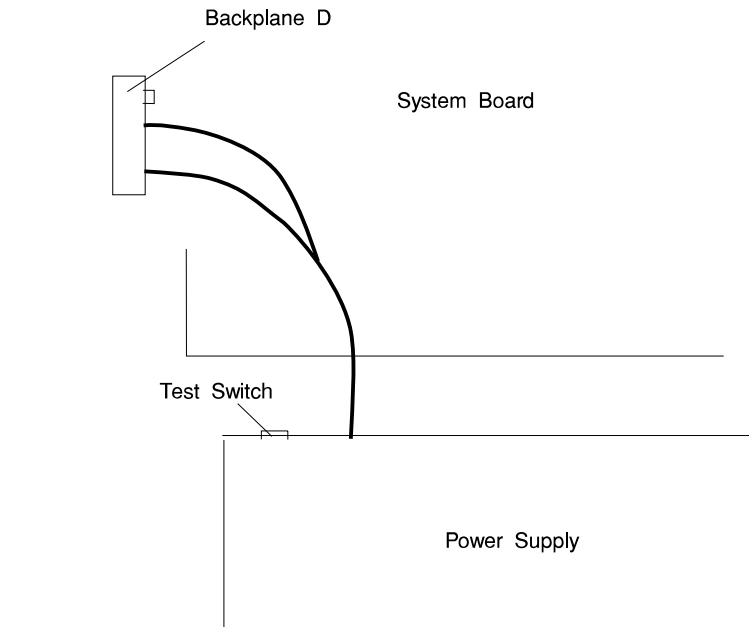
b. Reconnect the cable labeled P13b to system board connector J1.

c. Reconnect the cable labeled P13a to system board connector J16.

d. Reconnect the cable labeled P2 to system board connector J17.

e. Reconnect the cable labeled P1 to system board connector J30.

System Board

J1

Test Switch

J16   J17   J30

Power Supply
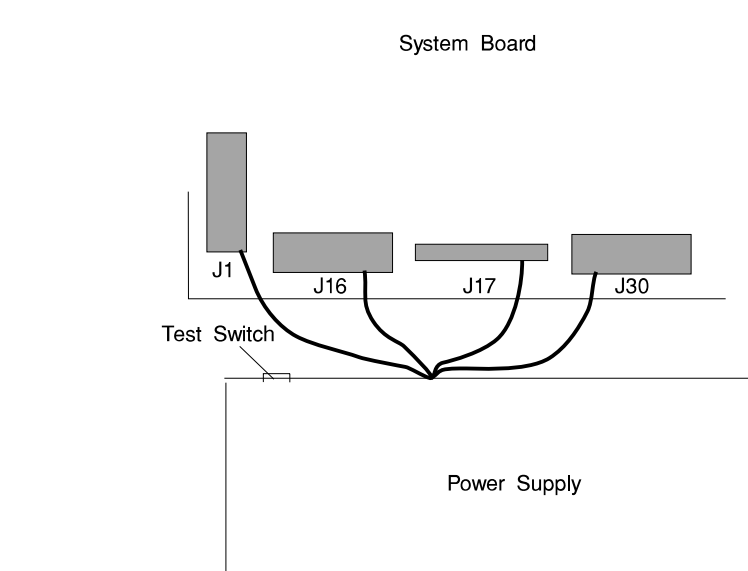
CD-ROM Drive, Tape Drive, Diskette Drive

⚠

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

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. Disconnect the power and signal cables to the drive you are removing.

3. Slide the drive forward to remove.

Replacement

Replace in reverse order.

Non Hot Swap Disk Drive

Removal

Attention: You must turn power Off before removing a non hot swap disk drive.

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. Remove the screw from the retaining bar and remove the bar.

Retaining Bar ——— ——— Screw
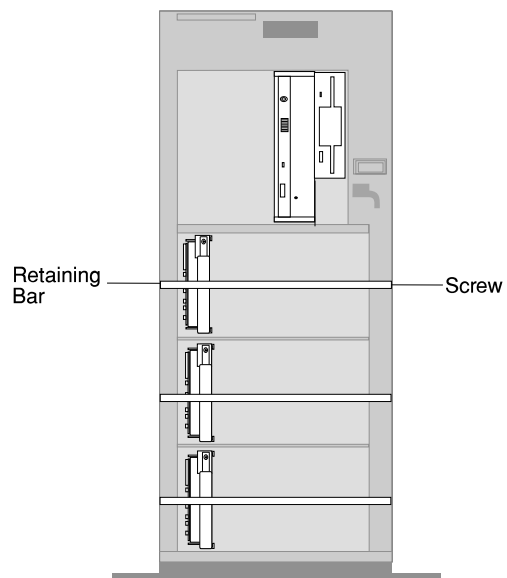
3. Locate the drive you want to remove.

4. Ensure that you have selected the correct drive.

5. Unlock the drive by turning the carrier latch 90 degrees clockwise to the open position.

Amber
Green
Spin Down
Button

Locked Position

Open Position
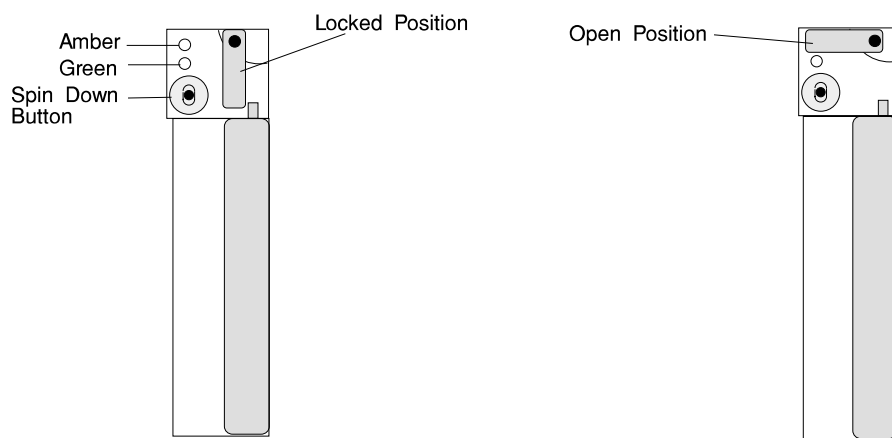
6. Disconnect the drive from the connector on the backplane, by grasping the handle on the drive tray and carefully pulling the drive out of the system. Store the drive in a safe place.

Attention: Handle the disk drive with care as it is very fragile and can be easily damaged if exposed to shock, ESD, or rough handling.
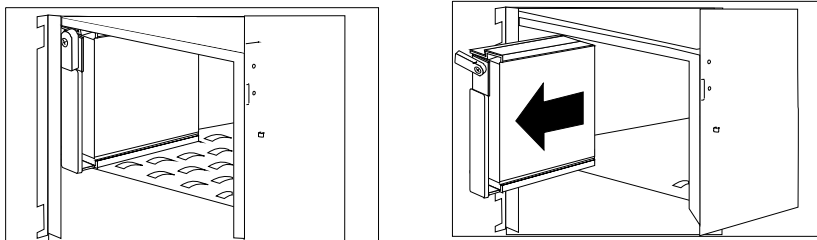
Replacement

Attention: Handle the disk drive with care as it is very fragile and can be easily damaged if exposed to shock, electrostatic discharge, or rough handling.

Attaching SCSI address jumpers on the drive rather than using the automatic ID furnished by the backplane is not advised. Attaching jumpers can cause service problems, multiple drives at the same address, or confusion locating the correct drive.

1. Rotate the carrier latch to the open position.
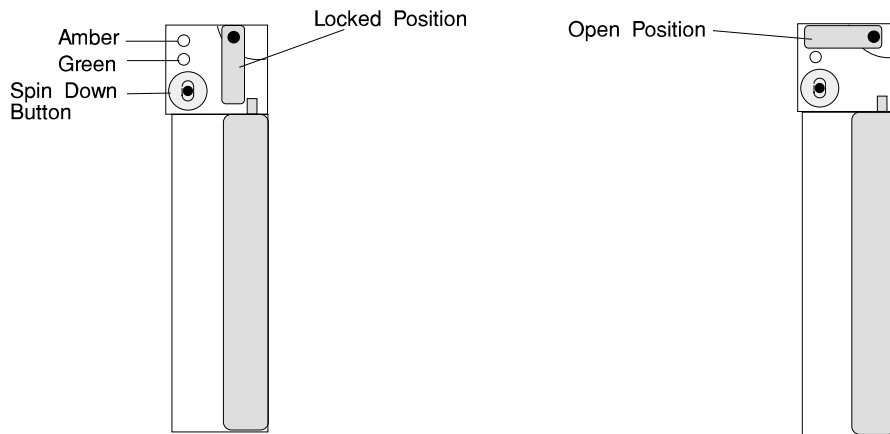
2. Position the drive carrier assembly vertically, with the connector facing the rear of the system.

3. Align the side of the carrier with the raised guides on the bottom of the bay.

4. Slide the carrier into the bay gently to keep from damaging the disk drive. Slide the carrier to the rear of the bay until it stops.
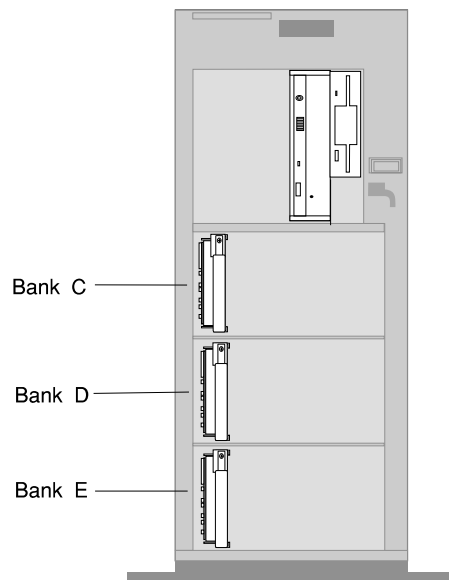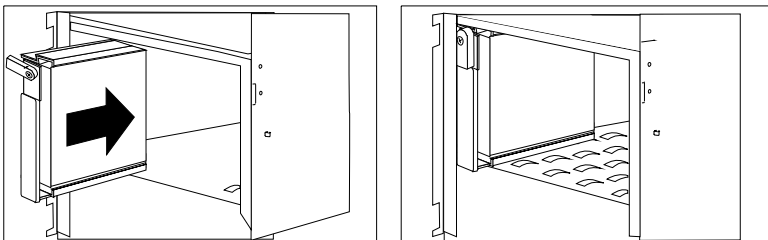
5. Move the carrier latch to the locked position. If the carrier will not lock, check that the drive carrier is fully seated in the backplane. When the drive carrier is fully seated and power is turned on, the green LED on the drive carrier will illuminate.

Backplane

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.
2. Remove the screw from the backplane.
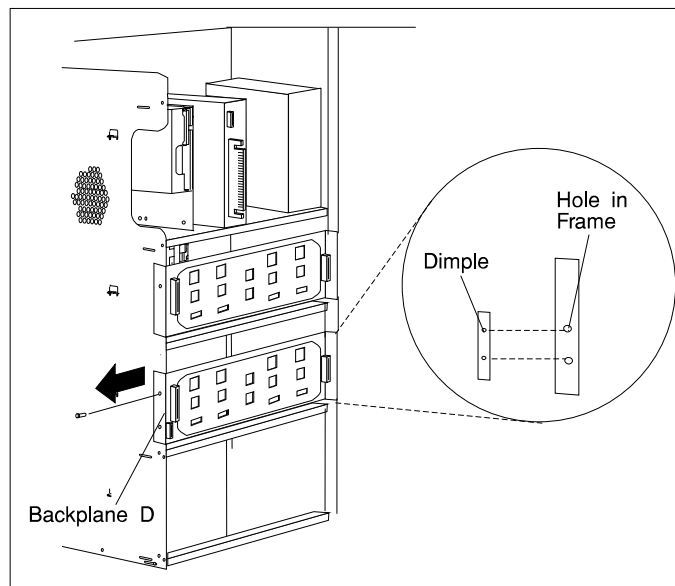
3. Slide the backplane out to gain cable access.
4. Disconnect the signal cable and the power cable from the backplane.
5. Remove the backplane.

Replacement

Check the jumpers on the new backplane for proper setting. The jumpers should be set the same as on the backplane you removed.

Replace in reverse order.

System Board Cover

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. Loosen the three screws (2 turns) on the system board cover and unlatch the cover.

Latches
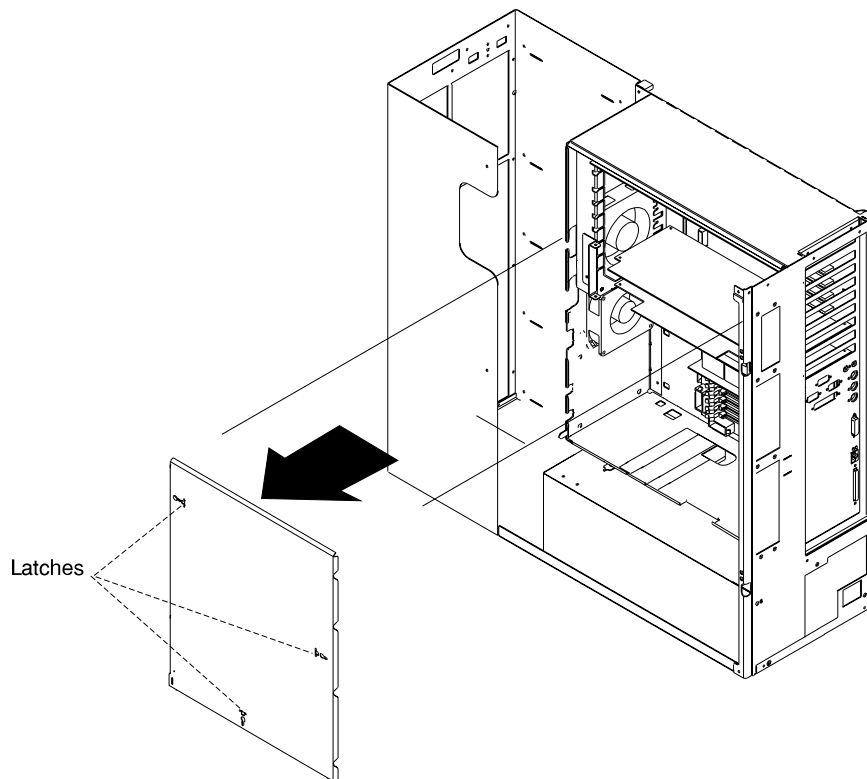
3. Remove the system board cover.

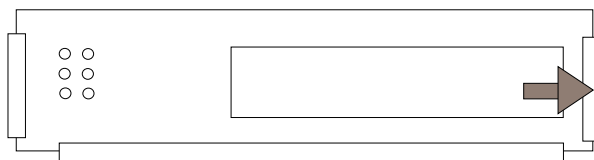### Replacement

Replace in reverse order.

Adapters

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. If a POWER GXT1000 is installed, go to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.

3. Remove the system board cover as described in "System Board Cover" on page 7-31.

4. Locate the adapter connectors and determine which adapter you want to remove.
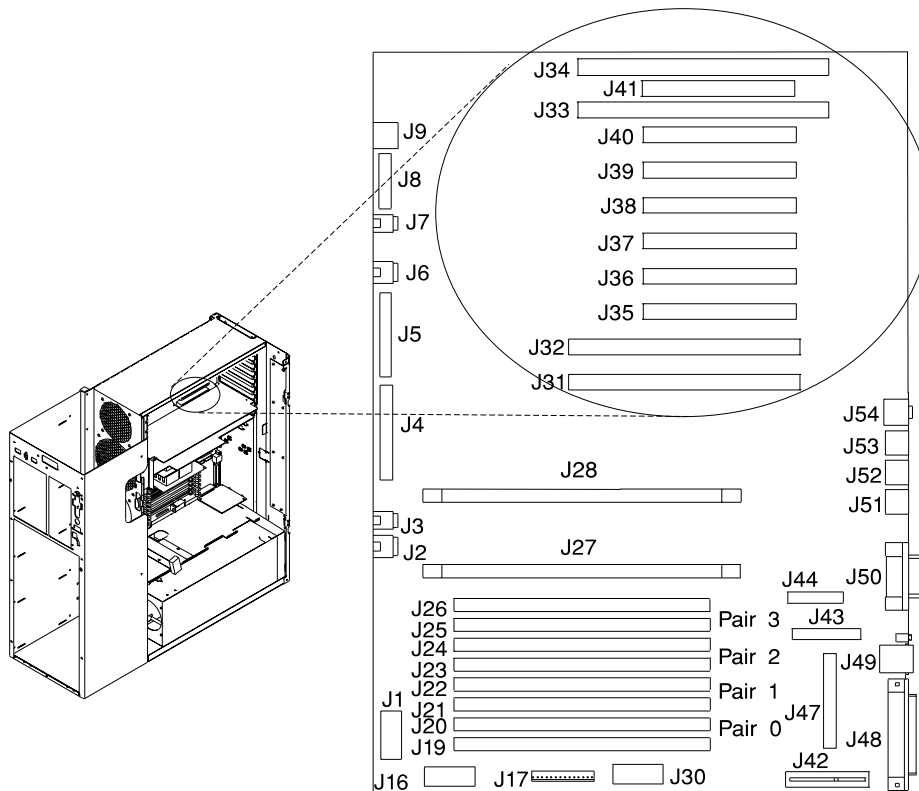
5. Remove the screw holding the adapter.
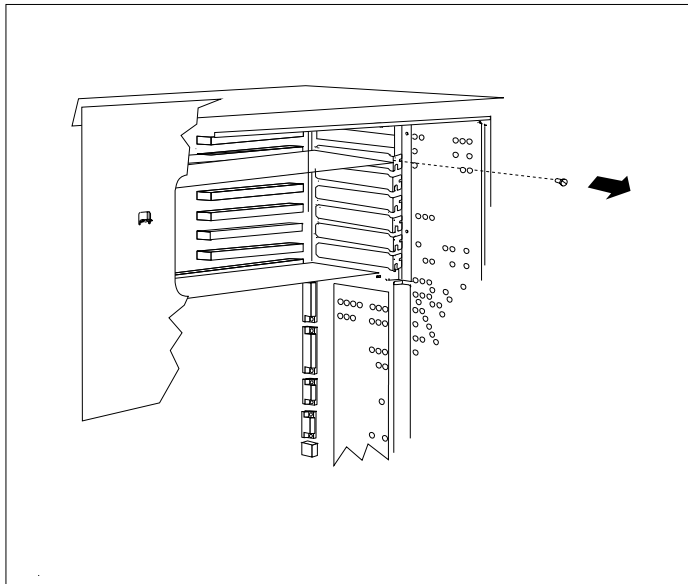
6. Remove the adapter.
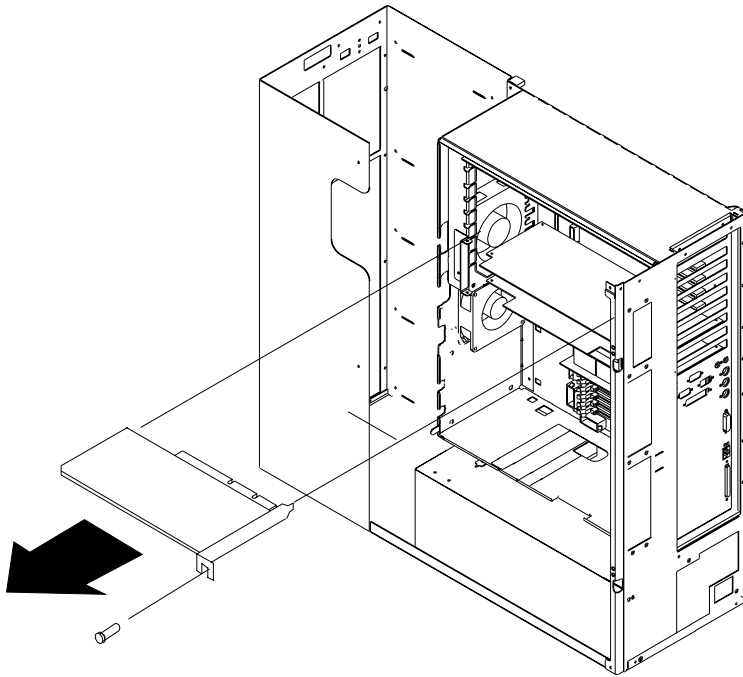
Replacement

1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up the adapter.

2. Locate the adapter connector location on the system board.

3. Install the new adapter.
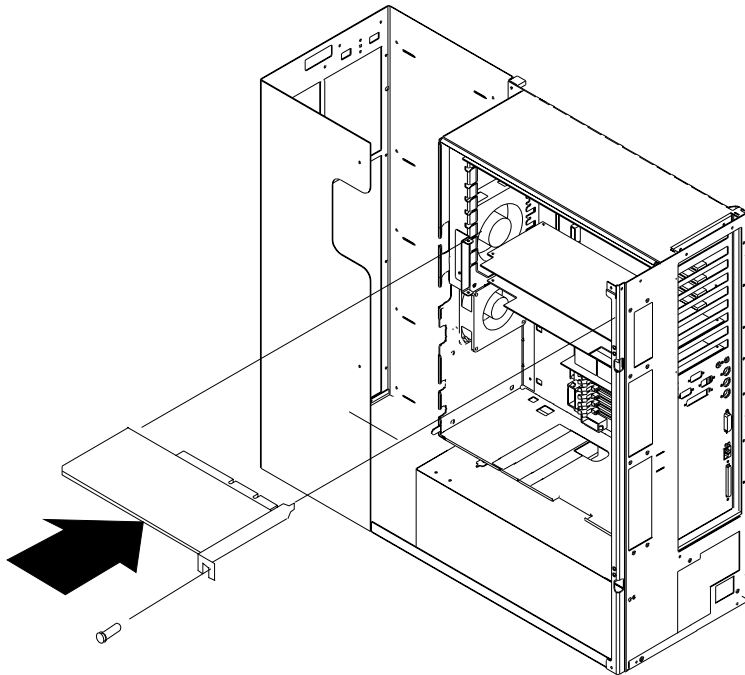
4. Replace any parts previously removed in reverse order.

5. Replace the covers as described in "Covers" on page 7-3.

Memory Module

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. If a POWER GXT1000 is installed, go to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.

3. Remove the system board cover as described in "System Board Cover" on page 7-31.

4. Locate the memory module connectors and determine which module you want to remove.
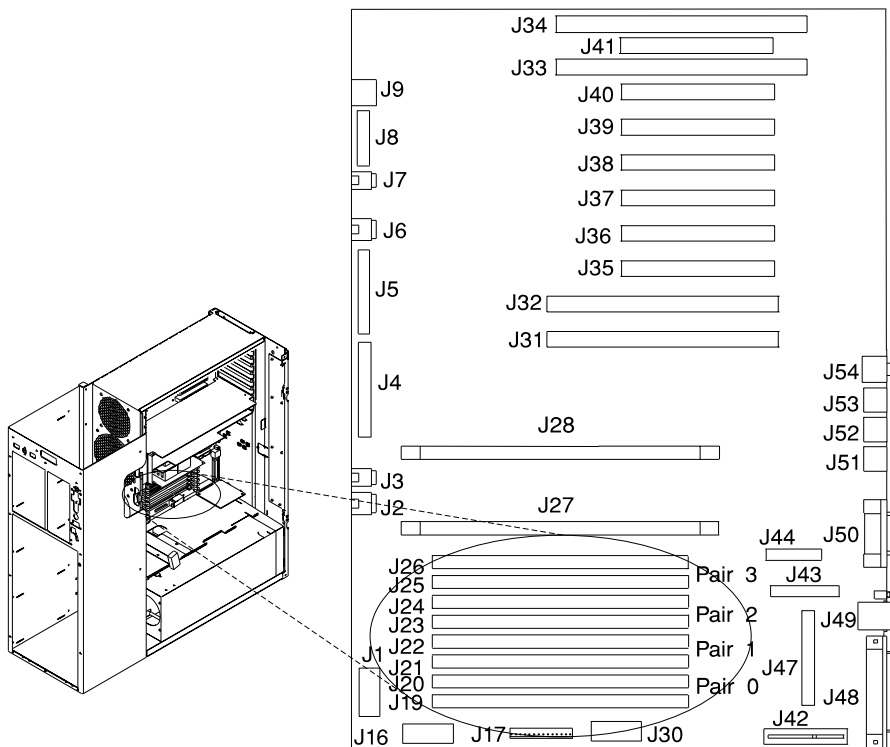
5. Remove the memory module by pushing the tabs out on the memory connectors.
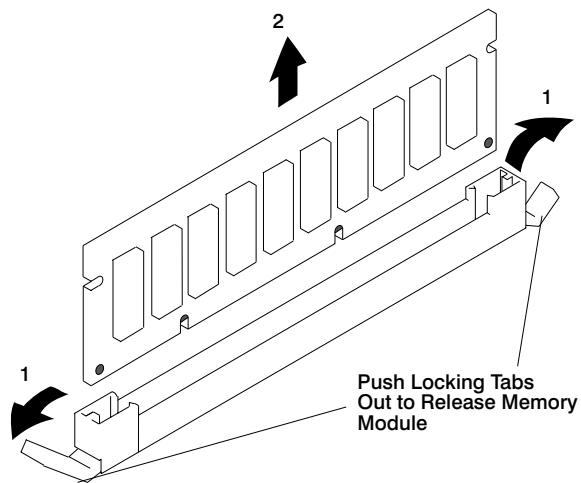
2

1

1

Push Locking Tabs
Out to Release Memory
Module

Replacement

1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up a memory module.

2. Locate the memory module connector location on the system board.

3. Install the new memory module.

Locking Tabs
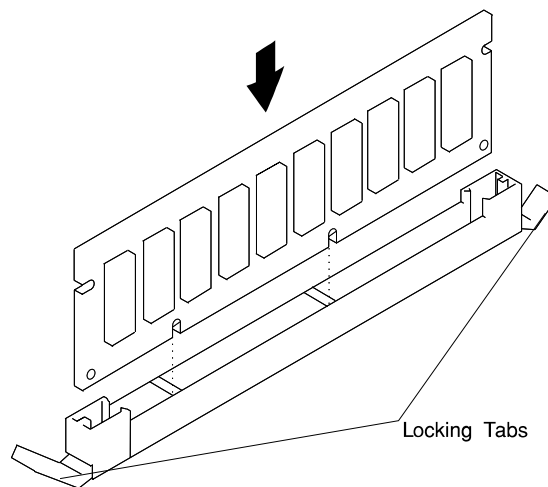
4. Replace the covers as described in "Covers" on page 7-3.

System Board

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. If a POWER GXT1000 is installed, go to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.

3. Remove the system board cover as described in "System Board Cover" on page 7-31.

   Note: Adapter cables should be labeled to insure correct installation of cables to adapters slots. Rearranging the order of the SCSI slots to the disk drive banks will cause errors.

4. Remove all adapter cards.
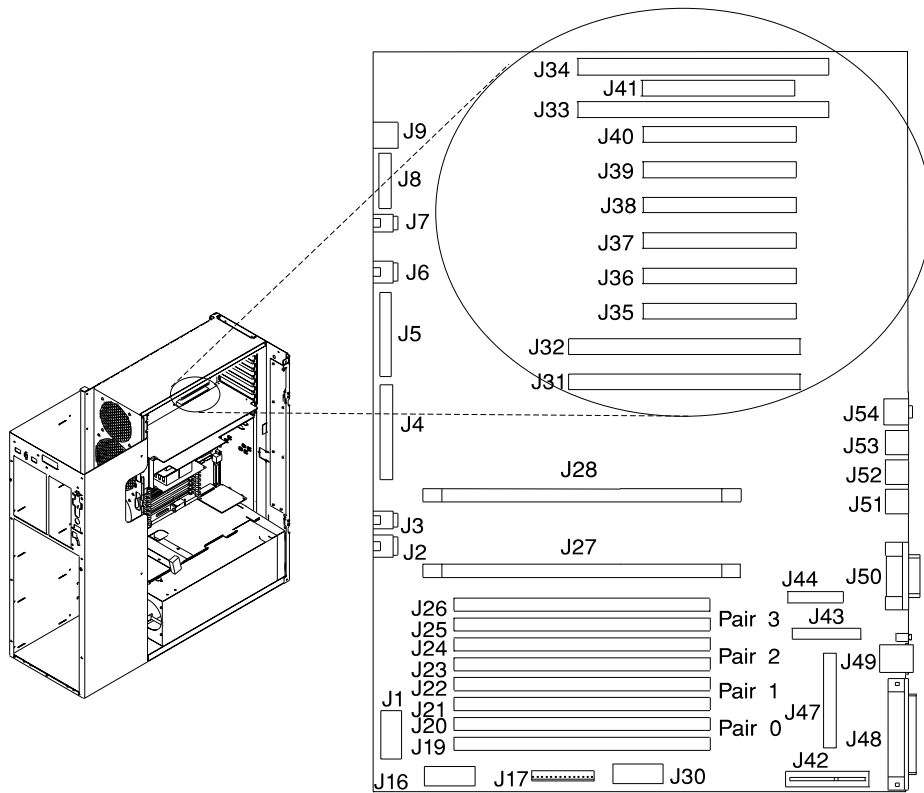
5. Remove the CPU card(s).
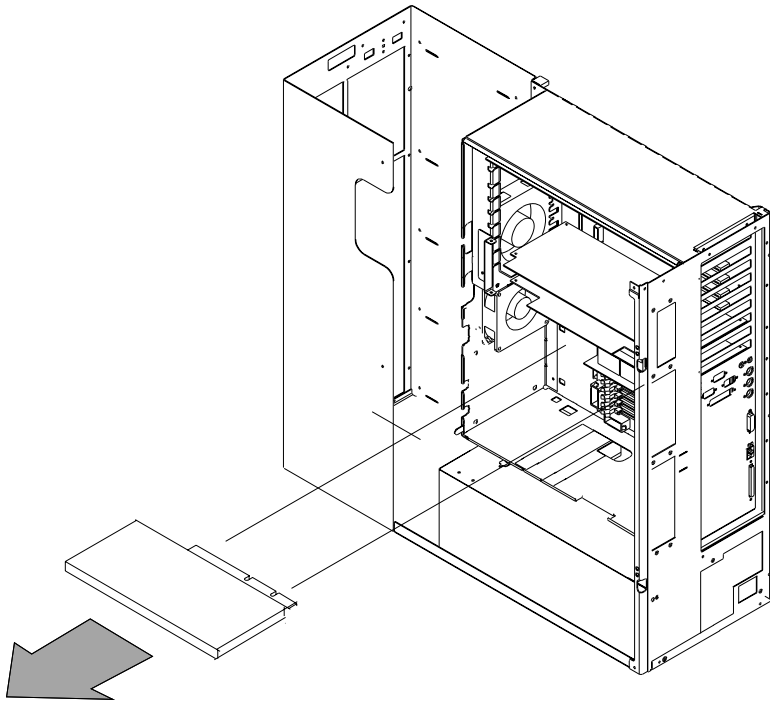
6. Remove all memory modules.
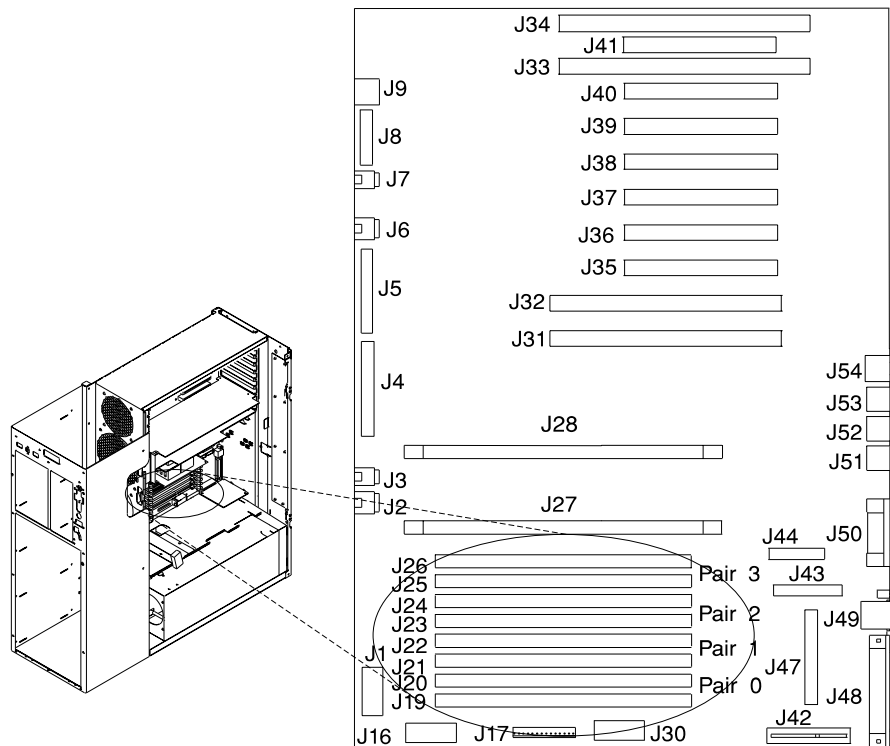
7. Disconnect all cables from the connectors on the system board.

8. Remove eight screws connecting the system board to the rear of the system. Note that the screws in the SCSI connector are black.

9. Remove 13 screws from the system board.

10. Remove system board.

Replacement

Replace in reverse order.

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

Verify that the security jumpers (J46) are in the correct position (same as the replaced system board.

CPU Card

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. If a POWER GXT1000 is installed, go to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.

3. Remove the system board cover as described in "System Board Cover" on page 7-31.

   Attention: Make sure the power cord is unplugged and the power (Power LED) is OFF before removing the CPU card.

4. Remove the CPU card.
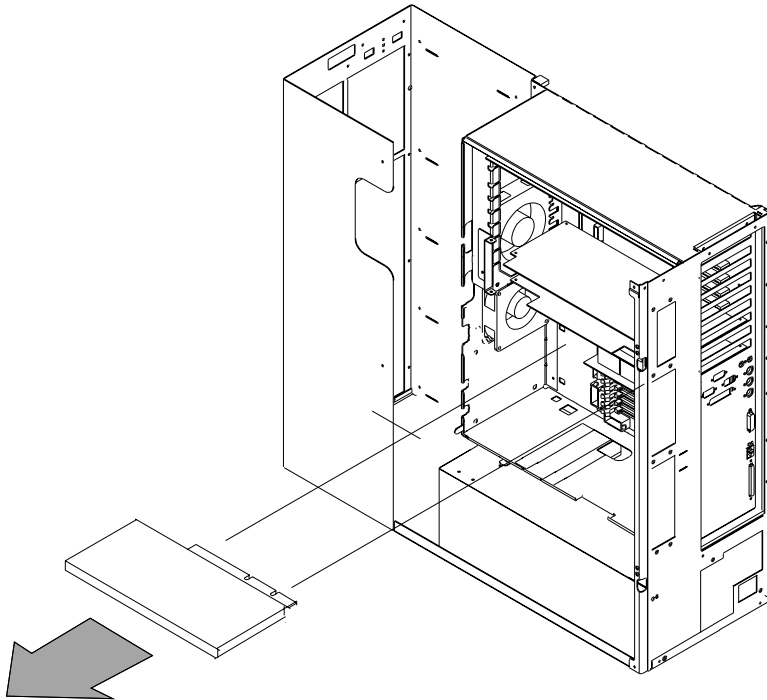
Replacement

1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up the CPU card.

2. Install the new CPU card.

3. Replace any parts previously removed in reverse order.

4. Replace the covers as described in "Covers" on page 7-3.

Service Processor

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. If a POWER GXT1000 is installed, go to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.

3. Remove the system board cover as described in "System Board Cover" on page 7-31.

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

4. Remove the service processor.

J34
J41
J33
J9
J40
J8
J39
J7
J38
J6
J37
J5
J36
J35
J32
J31
J54
J53
J4
J52
J51
J28
J3
J2
J27
J44 J50
J26
Pair 3 J43
J25
J24
Pair 2 J49
J23
J22
Pair 1
J1
J21
J47
J20
Pair 0
J48
J19
J42
J16   J17   J30
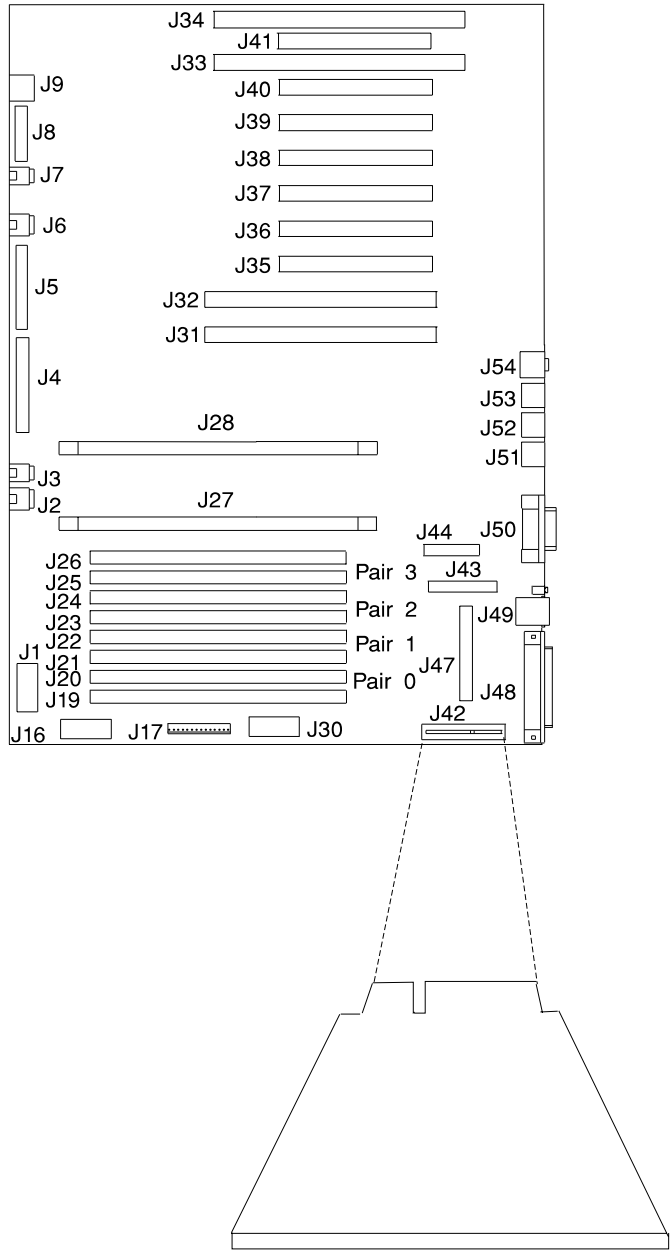
Replacement

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

Battery

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

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

Dispose of the battery according to local regulations.

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.
2. If a POWER GXT1000 is installed, go to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.
3. Remove the system board cover as described in "System Board Cover" on page 7-31. unlatch the cover.
4. Locate the battery on the system board.

J34
J41
J33
J9
J40
J8
J39
J7
J38
J6
J37
J5
J36
J35
J32
J31
J4
J54
J53
J52
J51
J28
J3
J2
J27
J44 J50
J26 Pair 3
J25 J43
J24 Pair 2
Battery J23 J49
J22 Pair 1
J1 J21 J47
J20 Pair 0 J48
J19
J16 J17 J30 J42
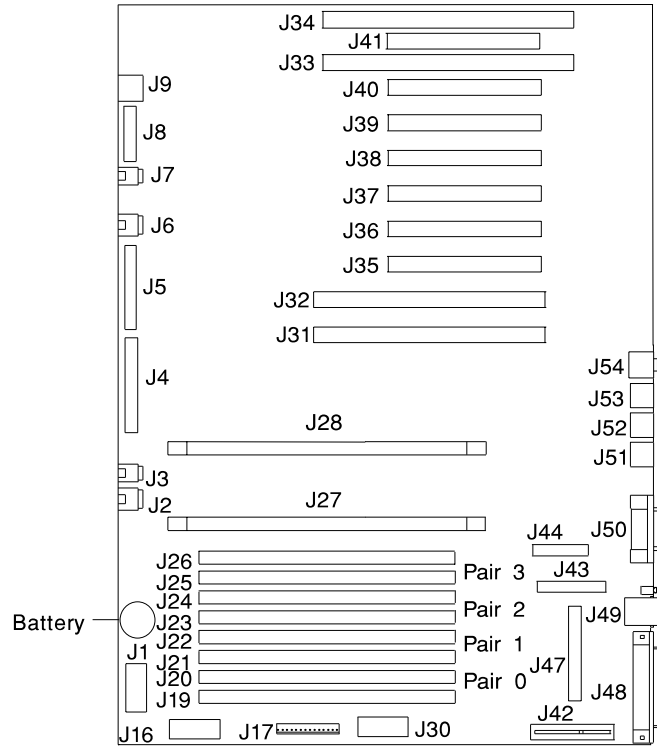
5. Use one finger to slightly slide the battery toward the bottom of the server. (The spring mechanism behind the battery will push it out toward you as you slide it forward.) Use your thumb and index finger to hold the battery as it pushes out of the socket.
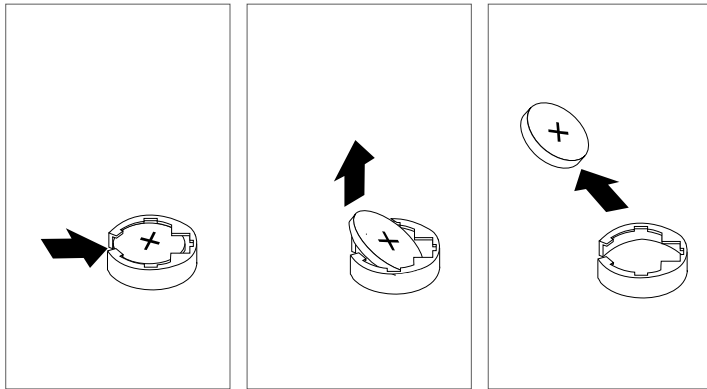
Replacement

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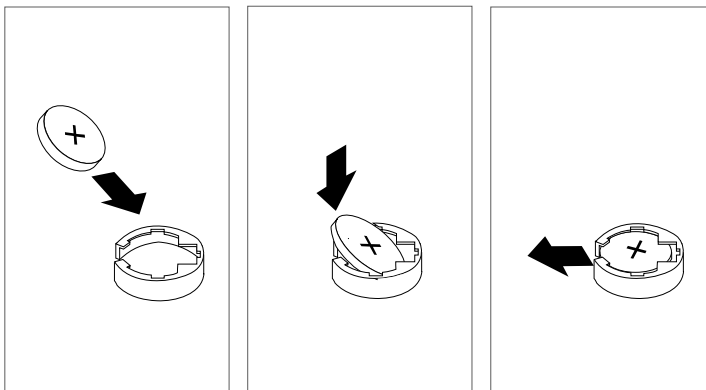
Notes:

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

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

Fans

Removal

1. Do the cover removal procedure in "Covers" on page 7-3.

2. If removing one of the two upper fans, remove the three screws from the adapter card bracket and remove the bracket.
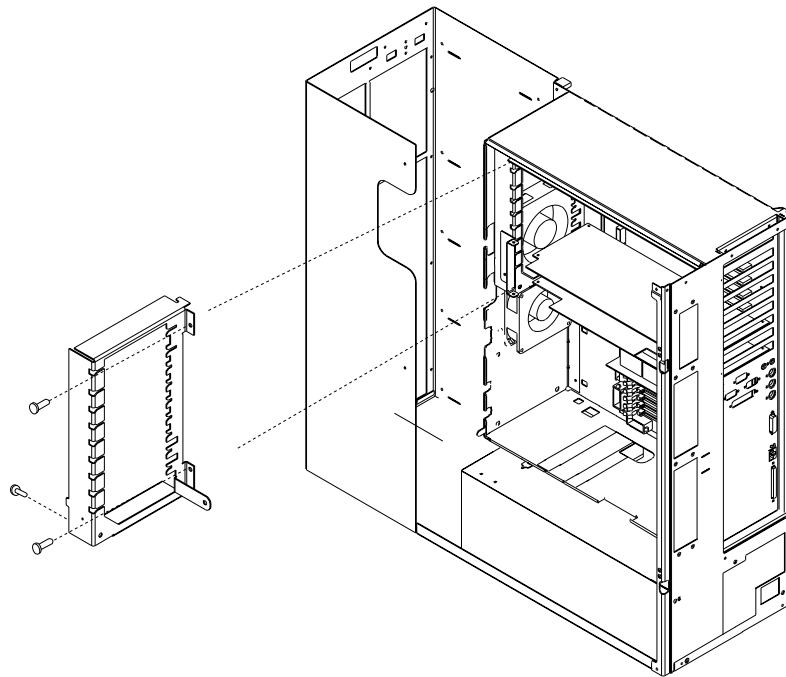
3. Disconnect the fan cable from the system board.

4. Pull the shock mounts out of their mounting holes.

5. Remove the fan.
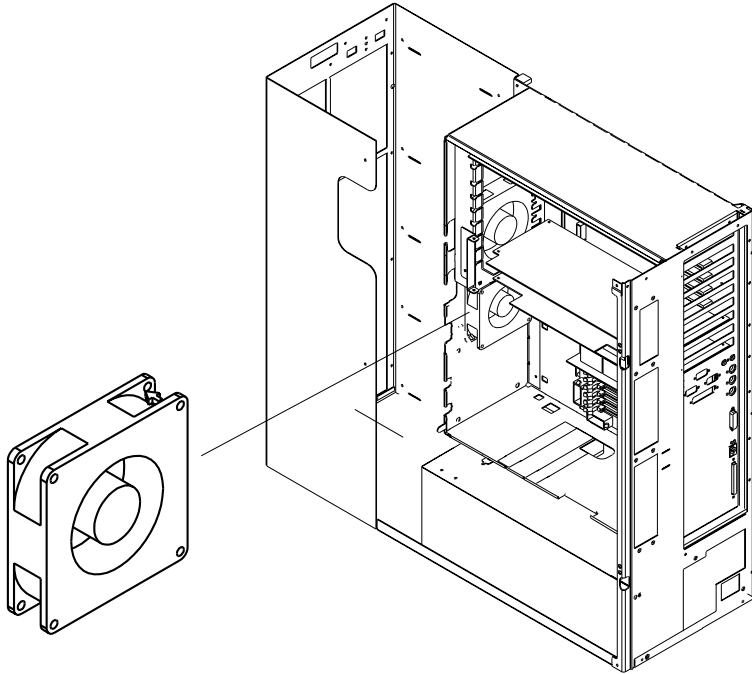
Replacement

Replace in reverse order.

Operator Panel Display

Removal

1. If you have not already done so, remove the front covers as described in "Covers" on page 7-3.

2. Press the snap in detent on the right side of the display card mounting bracket and remove the display card.

3. Rotate the display forward and out of the mounting bracket.

Operator Panel Display

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

Replacement

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

Operator Panel Control Assembly

Removal

1. Do the cover removal procedure in "Covers" on page 7-3.

2. Remove the assembly by compressing the spring clip at the top and bottom of the assembly and pulling out toward the rear of the system.

3. Unplug the LCD cable from the assembly.

4. Unplug the audio cable from the system board.

5. Unplug the control card cable from the system board.

Replacement

Replace in reverse order.

Serial Cable

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. Remove the serial cable from the system board connector J44.

3. Remove the four screws from the S1 and S2 connectors on the rear of the system.

Replacement

Replace in reverse order.

Connect the serial cables as follows:

P1	J44 (system board)
P2	S1 connector
P3	S2 connector

Parallel Cable

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. Remove the parallel cable from the system board connector J43.

3. Remove the two screws from the parallel connector on the rear of the system.

Replacement

Replace in reverse order.

POWER GXT1000 Internal Graphics Accelerator

Attention: Your POWER GXT1000 enclosure is very sensitive. Handle it very carefully.

Removal

1. If you have not already done so, remove the covers as described in "Covers" on page 7-3.

2. Unplug the external cables attached.
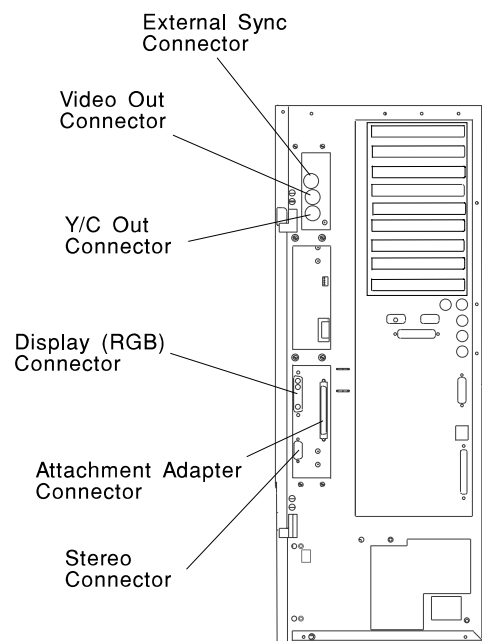
3. Remove the four POWER GTX1000 mounting screws from the rear of the
   system. Place the screws in a safe place, you need them when you reinstall the
   enclosure.

Mounting
Screws
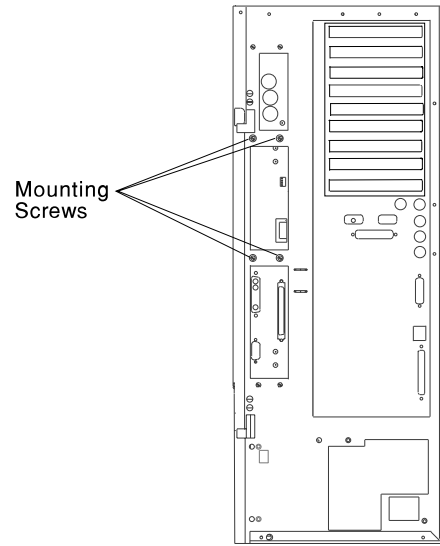
4. Remove the three screws that hold the support bracket to the POWER GTX1000 and the system unit.

Support Bracket
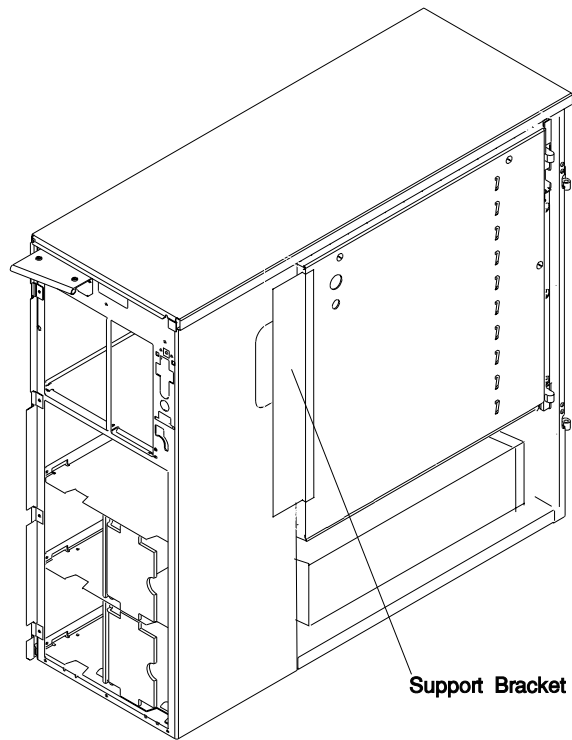
5. There are two fasteners that hold the enclosure inside the system. The upper fastener is accessed through the enclosure cover. The lower fastener is attached to a tab beneath the enclosure. Insert a screw driver, as shown, and loosen the enclosure fasteners.
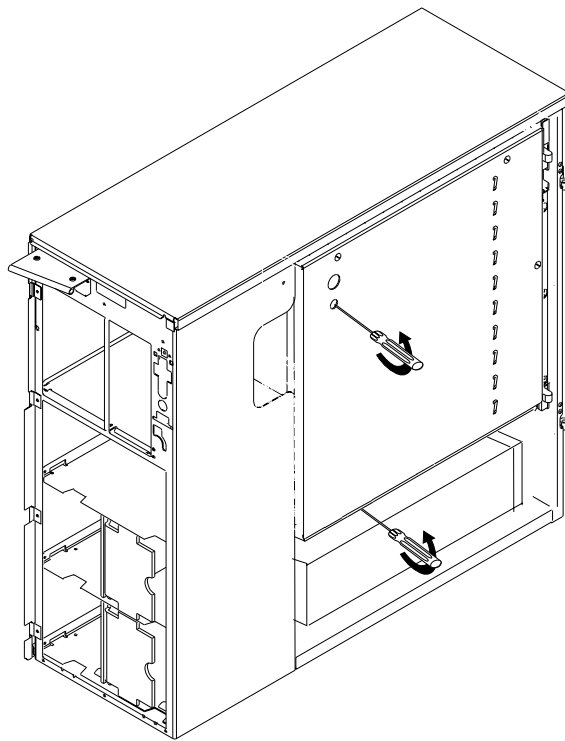
> **Attention:** Make sure all of the external cables are disconnected before you pivot the enclosure.

6. Pivot the enclosure 90 degrees away from the system.
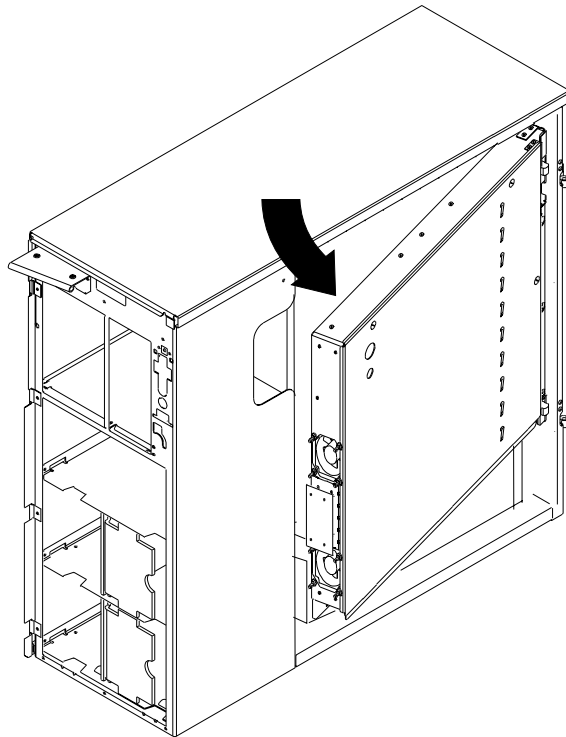
7. Disconnect cables that are attached to the bottom on the enclosure:

   a. Disconnect the 2 fan cables.

   b. Disconnect the 2 power supply cables.

8. The power supply cables are attached to the bottom on the enclosure. Disconnect the 2 power supply cables and the 2 fan cables.

Fan Cable

Power Supply Cable
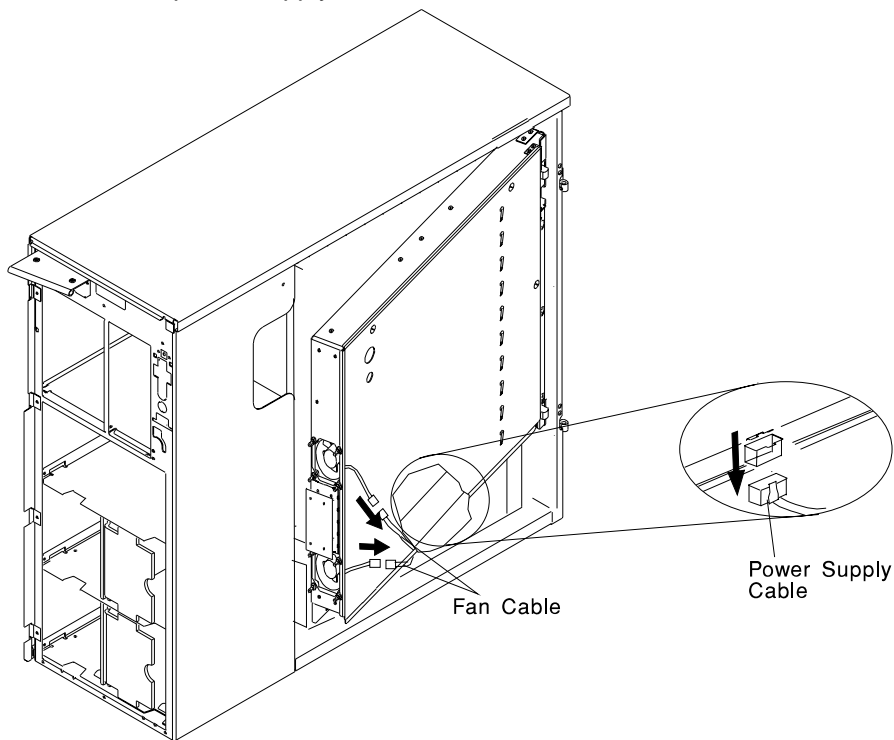
9. Carefully lift the POWER GTX1000 enclosure up and out of the system. Store the enclosure in a safe place.
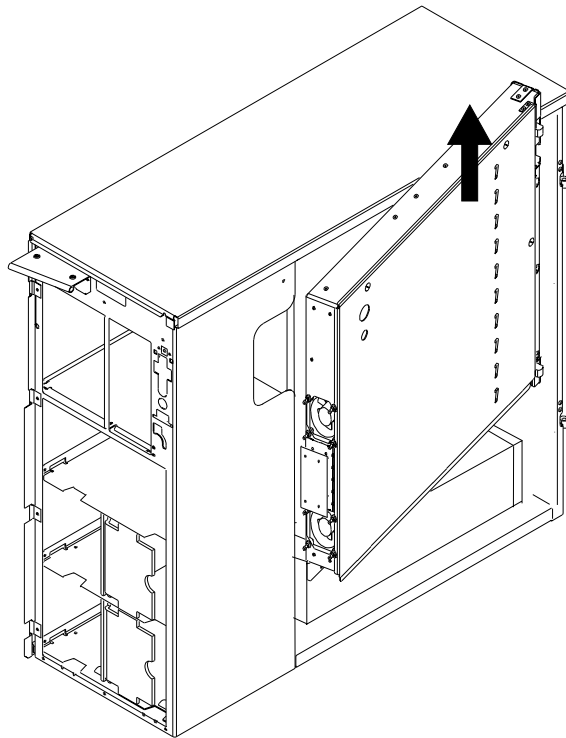
Replacement

Attention: Your POWER GTX1000 enclosure is very sensitive. Handle it very carefully.

1. Align the hinges on the rear of the enclosure with the two pins on the rear of system. Open the enclosure to a 90 degree angle.
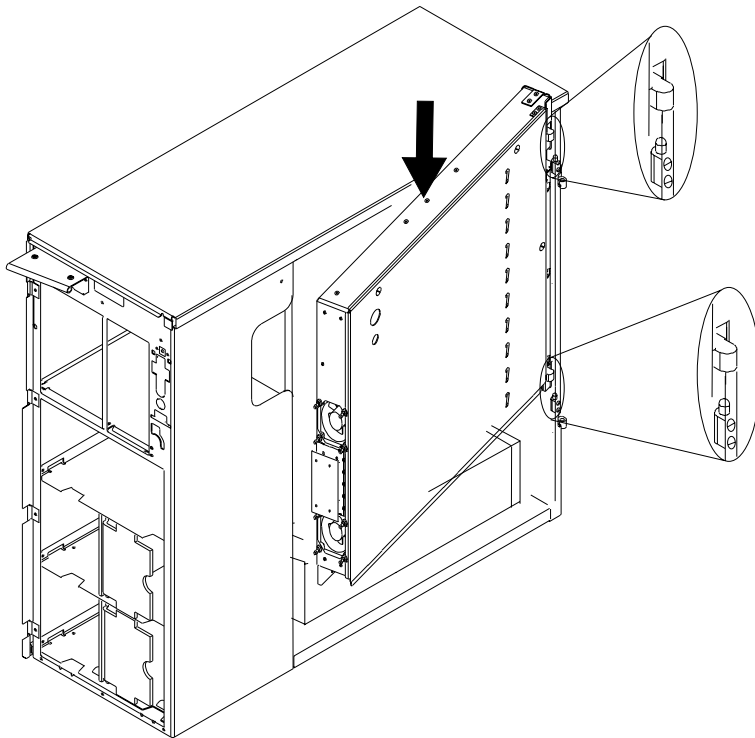
2. Slide the enclosure down on the pins.

3. Reconnect the power supply cables and the fan cables on the bottom of the enclosure.

Fan Cable

Power Supply Cable
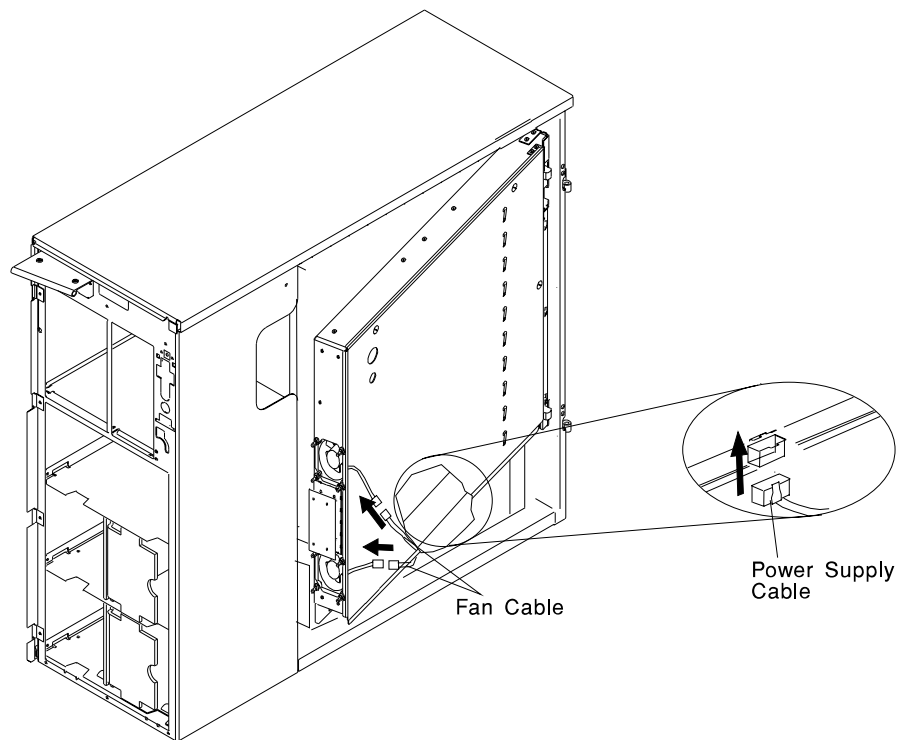
4. Carefully push the enclosure into the system.
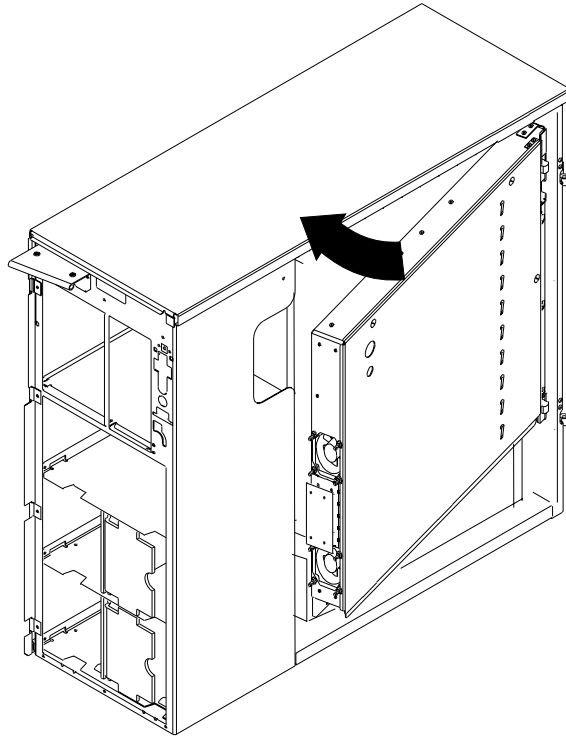
5. Tighten the 2 screws inside the system that secure the enclosure.
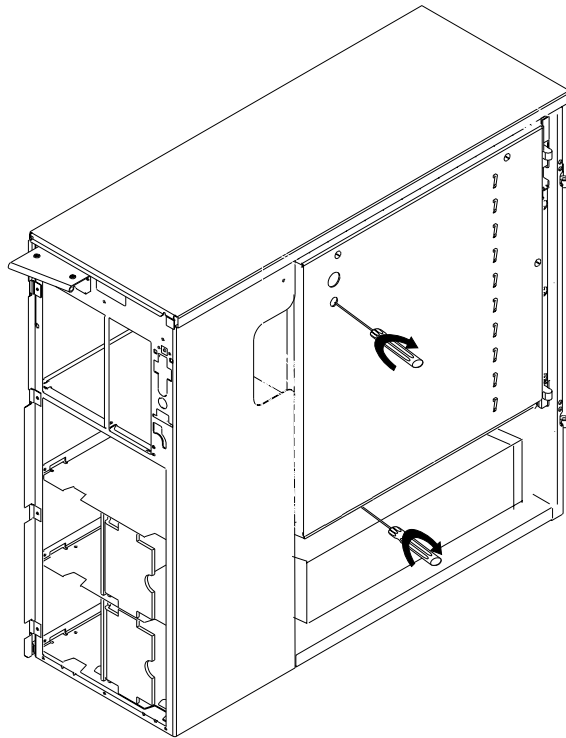
6. Install the four mounting screws on the rear of the system.

Mounting
Screws
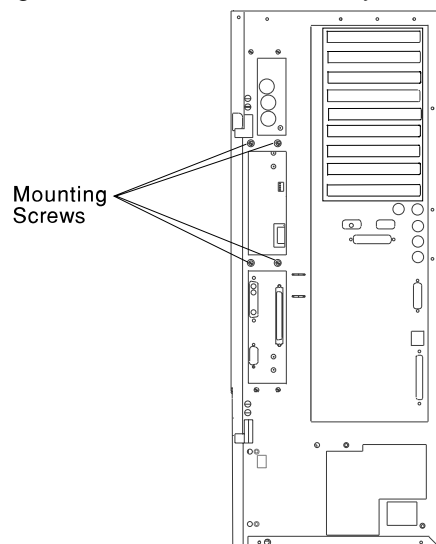
7. Reconnect the external cables that you removed in Step 2 on page 7-55.

External Sync
Connector

Video Out
Connector

Y/C Out
Connector

Display (RGB)
Connector

Attachment Adapter
Connector

Stereo
Connector
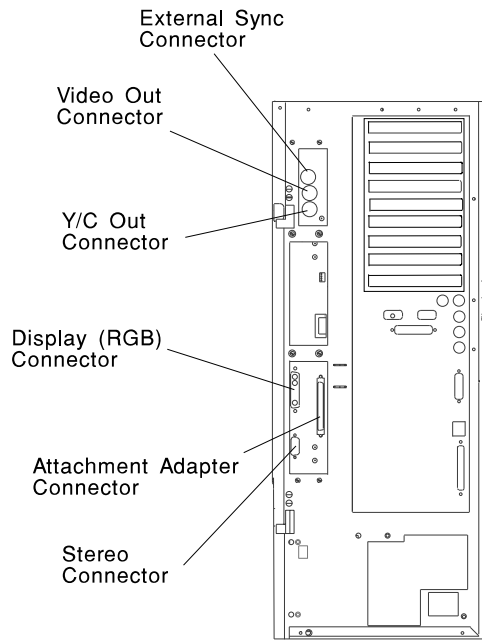
8. Replace the covers as described in "Covers" on page 7-3.

Enclosure Covers

1. Remove the enclosure from the system, refer to "POWER GXT1000 Internal Graphics Accelerator" on page 7-55.

2. Loosen the three cover screws.

3. Lift the cover off.
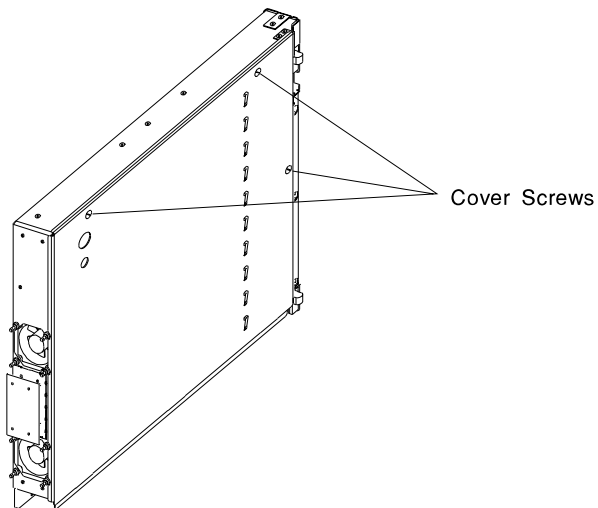
Cover Screws

Replacement

1. Place the cover on top of the POWER GTX1000 and secure it with the cover screws.

Fan Assembly

Removal

1. Remove the enclosure cover, refer to "Enclosure Covers" on page 7-67.

2. Remove the Cross-Over card and Shield. Grasp the cross-over at both sides and pull toward the front of the enclosure.

3. Remove the five screws securing the fan assembly and lift out.

Replacement: Replace the fan assembly in reverse order.
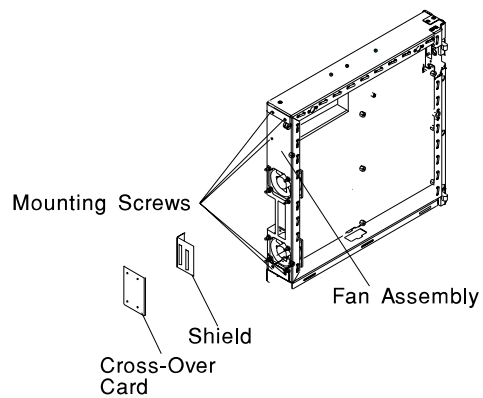
Logic Boards and RSS Memory

Refer to "Handling Static–Sensitive Devices" on page 7-2 before removing or installing logic boards.

VOO Board

Removal

1. Remove the enclosure cover, refer to "Enclosure Covers" on page 7-67.

2. Remove the two VOO mounting screws securing it to the card cage assembly.

3. Remove the VOO/RSS cable from the VOO board. Squeeze both cable side clips to release the cable from the board.

4. Pull the VOO board toward the front of the POWER GTX1000 to remove it from the card cage assembly.

Replacement: Replace the VOO board in reverse order.

VOO Card
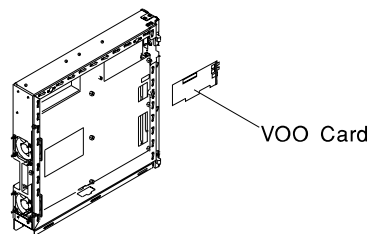
RSS Board

Attention Board components can be damaged when removing or replacing the board if they come in contact with anything, or if the board is flexed.

Removal

1. Remove the enclosure cover, refer to "Enclosure Covers" on page 7-67.
2. If the VOO feature was installed, remove the RSS/VOO Cross-Over cable from J1 on the RSS board. Squeeze both cable side clips to release the cable from the board.
3. Remove the Cross-Over card and Shield. Grasp the cross-over assembly at both sides and pull toward the front of the POWER GTX1000.
4. Remove the fan assembly, refer to "Fan Assembly" on page 7-68.
5. Remove the nine RSS mounting screws.
6. Lift the board from the card cage assembly.
7. If the GXT1000 RSS board being replaced is defective and has feature SIMMs installed, they will have to be installed on the new board. Complete the removal procedure in "RSS Full-Up Memory" on page 7-71.

Replacement: Replace the RSS board in reverse order.
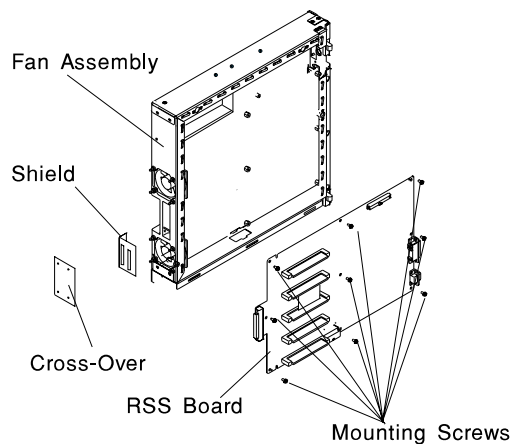
RSS Full-Up Memory

Removal

1. Remove the enclosure cover, refer to "Enclosure Covers" on page 7-67.

2. Do the removal procedure in "RSS Board" on page 7-70.

3. Remove the SIMM by pulling up on the release tab and at the same time pulling up on the end of the SIMM closest to the release tab.
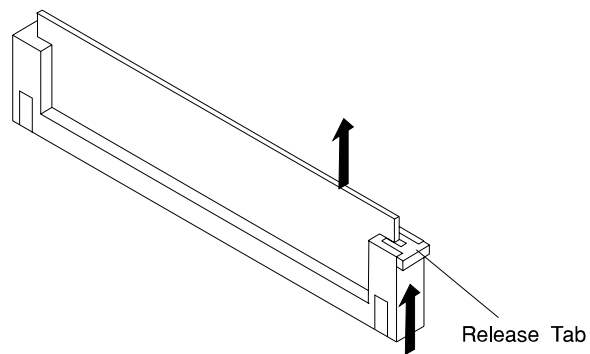
Release Tab

Replacement

1. Ensure the RSS board is on a flat, level surface.

2. Install the SIMM with the notch closest to the release tab.

3. Push down on both ends of the SIMM until it is firmly seated in the socket.

Notch

Release Tab
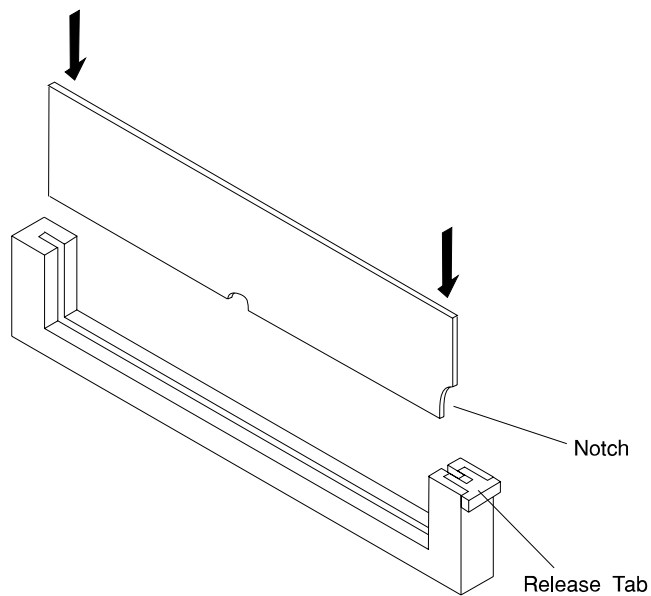
4. Replace any components you removed in reverse order.

GPSS Board

Attention Board components can be damaged when removing or replacing the board if they come in contact with anything, or if the board is flexed.

Removal

1. Remove the enclosure cover, refer to "Enclosure Covers" on page 7-67.

2. Remove the card support brace which is located directly under the RSS/VOO crossover cable connector, between the cards.

3. Remove the nine mounting screws.

4. Lift the board out of the board cage assembly.

Replacement: Replace the GPSS board in reverse order.
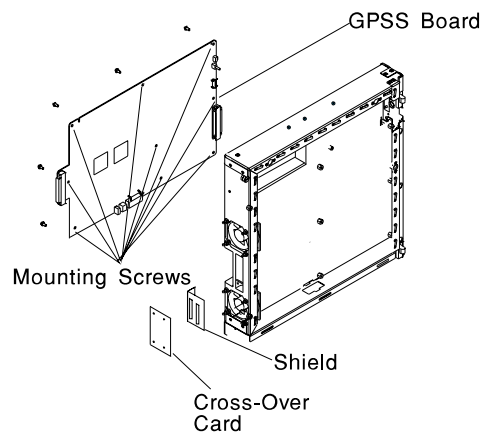
Chapter 8. Parts Information
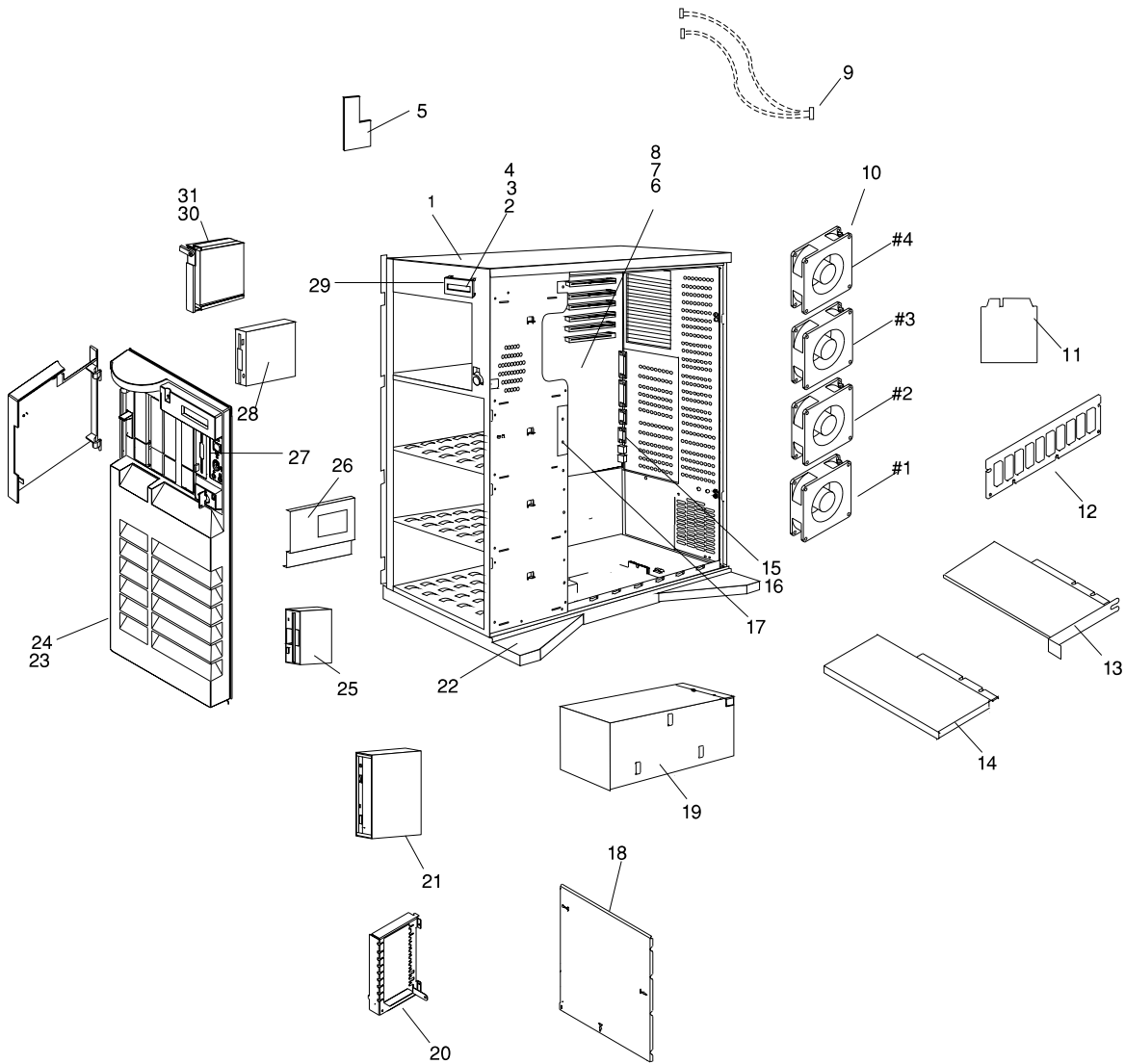
Index	Part Number	Units Per	Description
1	93H8544	1	Chassis assembly (includes covers and side door)
2	73H0898	1	EMC clip
3	82G3614	1	Display panel
4	93H1816	1	Cable (Display)
5	93H8494	1	Operator panel control assembly
6	93H8652	1	System board
7	06H7697	13	Standoff
8	33F8354	1	Battery
9	93H6280	1	Cable (EPOW)
10	40H1424	2	Fan (#1 and #3)
	40H1423	1	Fan (#2)
	40H1433	1	Fan (#4)
11	40H2247	1	Service processor
12	42H2771	Up to 8	8MB memory module
	42H2772	Up to 8	16MB memory module
	42H2773	Up to 8	32MB memory module
	42H2774	Up to 8	64MB memory module
	93H6821	Up to 8	128MB memory module
13	See note	Up to 10	Adapter card
14	11H7517	1	CPU card (166 Mhz)
	93H5163	1	CPU card (233 Mhz)
15	93H3144	1	EMC gasket (I/O connectors)
16	93H3145	1	EMC gasket (Ext. SCSI connector)
17	40H0114	1	SCSI backplane (Hot swap)
	40H1432	1	SCSI backplane (Non hot swap)
	93H6321	1	SSA backplane
18	40H4937	1	System board cover
19	40H5023	1	Base power supply (575 watts)
	06H3237	1	Optional DASD power supply (220 watts)
	40H3137	1	Optional POWER GXT1000 power supply (226 watts)
20	40H4936	1	Adapter card bracket
21	See note	1	CD-ROM drive
22	11H8156	1	Pedestal and wheel
23	73H1881	1	Front cover
24	93H2490	1	Logo
25	See Note	1	Diskette drive
26	06H2792	1	Plate assembly
27	40H4941	1	Bezel (Operator panel)
28	See note	Up to 2	Media device
29	06H7946	1	Bracket (Display panel)
30	See note	Up to 18	Disk drive
31	See note	Up to 18	Disk drive carrier assembly

Note: See *RS/6000 Diagnostic Information for Multiple Bus Systems* for part numbers.
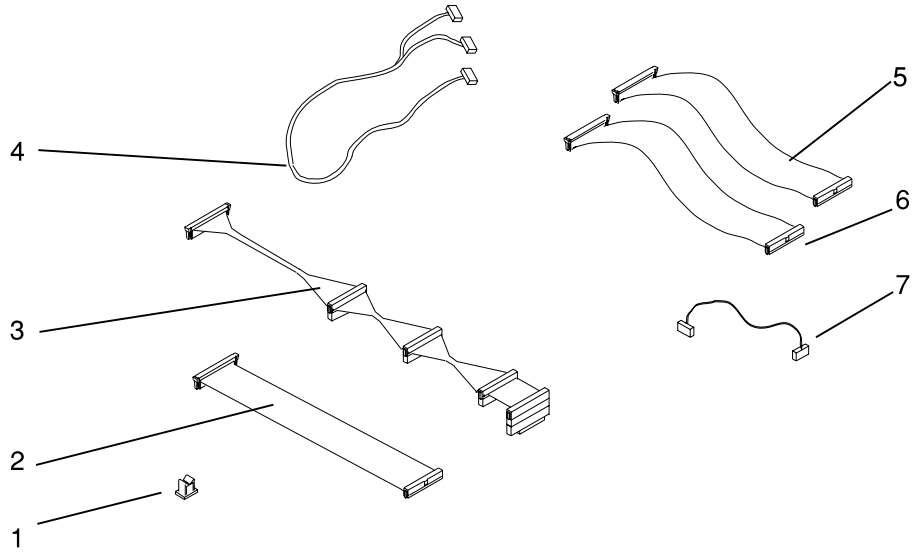
Index	Part Number	Units Per	Description
1	2596293	3	Cable clamp
2	73H1894	1	Cable (diskette)
3	93H3490	1	Cable (SCSI 4-drop)
4	39H9994	1	Cable (Power 2-drop)
5	82G4799	1	Cable (Serial)
6	8185219	1	Cable (Parallel)
7	93H3580	1	Cable (CD-ROM audio)
	92F1294	A/R	Screw (3.5 x 6)
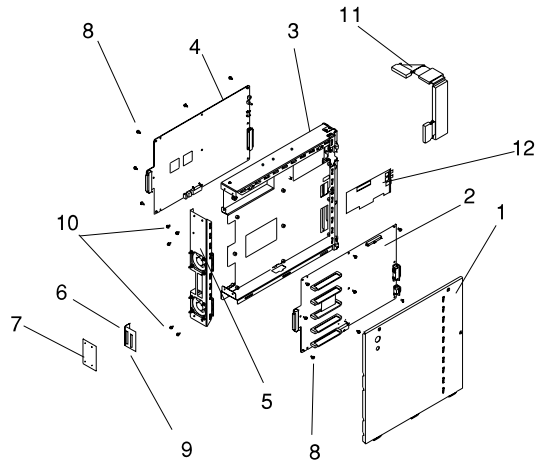
Index	Part Number	Units Per	Description
1	73H1960	1	Top Cover
2	11H8490	1	RSS base memory
	11H4436	1	RSS Full Memory (AG Option)
3	73H1888	1	Base
4	73H4034	1	GPSS Board
5	73H1958	1	Fan Assembly
6	73H1962	1	Shield
7	40H3160	1	Cross-over Card
8	32G1547	18	Mounting Screw
9	33G3907	4	Mounting Screw
10	92F1294	5	Mounting Screw
11	73H1887	1	Attachment Adapter Signal Cable
12	65G4887	1	VOO Board
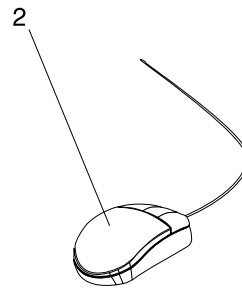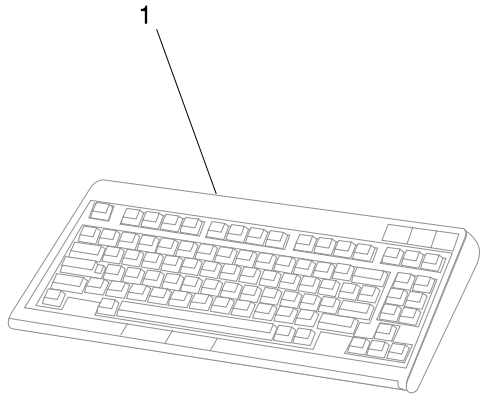
Index	Part Number	Units Per	Description
1	82G3278	1	Keyboard, United States English
	1391402	1	Keyboard, French
	1393395	1	Keyboard, Italian
	1391403	1	Keyboard, German/Austrian
	1391406	1	Keyboard, United Kingdom English
	1391405	1	Keyboard, Spanish
	79F0167	1	Keyboard, Japanese
	64F7707	1	Keyboard, Brazilian Portuguese
	82G3279	1	Keyboard, Canadian French
	1391526	1	Keyboard, Belgian French/Dutch
	1391411	1	Keyboard, Finnish
	1391407	1	Keyboard, Danish
	1399583	1	Keyboard, Bulgarian
	1395881	1	Keyboard, Swiss French
	1385882	2	Keyboard, Swiss German
	1391409	1	Keyboard, Norwegian
	1391511	1	Keyboard, Dutch
	1391410	1	Keyboard, Portuguese
	1399046	1	Keyboard, Greek
	1391408	1	Keyboard, Hebrew
	1399581	1	Keyboard, Hungarian
	1391407	1	Keyboard, Icelanic
	1399580	1	Keyboard, Polish
	1399582	1	Keyboard, Romanian
	1399571	1	Keyboard, Slovakian
	1399570	1	Keyboard, Czechoslovakian
	1393286	1	Keyboard, Turkish (ID 179)
	8125409	1	Keyboard, Turkish (ID 440)
	8131596	1	Keyboard, Arabic
	06H5286	1	Keyboard, Korean
	1393990	1	Keyboard, Chinese
	006H3048	1	Keyboard, United States (OEM)
2	11H4878	1	Mouse, 3-button

Power Cables

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

Index	Part Number	Country
8	14F0051	Liechtenstein, Switzerland
9	14F0069	Chile, Ethiopia, Italy
10	14F0087	Israel
11	6952291	Paraguay, Colombia, Uruguay

Appendix A. Service Processor Progress Codes

SSA Hot-Swap Disk Drive Reported Errors

The following progress codes may be displayed as the Service Processor is initialized during system startup.

A0A	Service Processor detected hardware error; attempting Call-out.
A01	Setting up default Service Processor values
A02	Service Processor configuring NVRAM parameters
A04	Service Processor detected environmental failure; attempting Call-out.
A05	Service Processor disconnecting modem
A07	Service Processor configuring modem
A08	Service Processor detected system firmware surveillance failure; attempting Call-out
A09	Service Processor detected operating system surveillance failure; attempting Call-out

Index

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Part Number: 93H5364
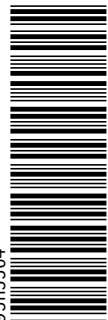
Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

93H5364

+++ Duplicate ID CAUT3 was ignored on SPOT tag. (Page 7-1 File: A4AI3RRR)
'.EDF@ID' WAS IMBEDDED AT LINE 100 OF '.EDFSPOT'
'.EDFSPOT' WAS IMBEDDED AT LINE 59 OF 'A4AI3RRR'
'A4AI3RRR' WAS IMBEDDED AT LINE 64 OF 'A4AI3BAS'
STARTING PASS 2 OF 4.
STARTING PASS 3 OF 4.
STARTING PASS 4 OF 4.