SA23-2708-01

7015

Models R10, R20, and R21 CPU Drawer Installation and Service Guide

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Second Edition (July 1995)

This edition notice applies to the *7015 Models R10, R20, and R21 CPU Drawer Service Guide*.

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Documentation owner: Gary Hiemke

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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.

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.

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.

International Electrotechnical Commission (IEC) Statement

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

European Union (EU) Statement

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

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

This product has been tested and found to comply with the limits for Class 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.

Warning: 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.

電波障害自主規制　届出装置の記述

この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。
従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをしてください。

VCCI Statement

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 Klasse 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)

Hinweis:

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

Safety Notices

Note: For a translation of danger and caution notices, see *System Unit Safety Information*, order number SA23-2652.

Definitions of Safety Notices

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

Danger notices appear on the following pages:

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

Caution notices appear on the following pages:

About This Book

How to Use This Book

This book provides maintenance information that is specific to the 7015 models R10, R20, and R21 CPU drawers. It also contains maintenance analysis procedures (MAPs) that are unique to these systems. MAPs that are common to all systems are contained in *POWERstation and POWERserver Common Diagnostics Information Manual*.

This guide is used by the service technician to repair system failures. It assumes that the service technician has had training on the 7015 system.

Related Publications

The *7015 Models R10, R20, and R21 CPU Drawer Operator Guide*, order number SA23-2707.

The *POWERstation and POWERserver Common Diagnostics Information Manual*, order number SA23-2765, contains the maintenance information and procedures that are common to all systems. The information and procedures in this book apply to any system unit that uses the diagnostic programs.

Adapters, Devices, and Cable Information, order number SA23–2764, contains reference information about adapters, devices, and cabling for the system units. This book also contains the removal and replacement procedures for the logic boards on the disk drives and provides the service representative pin-out lists and cabling information to use in isolating problems with customer cabling.

System Unit Safety Information, order number SA23-2652, contains translated versions of the danger and caution notices.

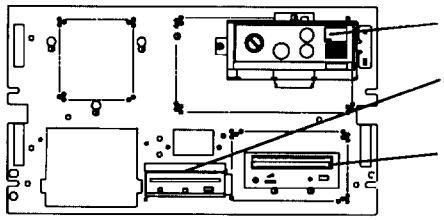
Chapter 1. Reference Information

Note: The power supply has electric power any time the power supply cord is plugged into a working electrical outlet (even when the Power Off button has been pressed).

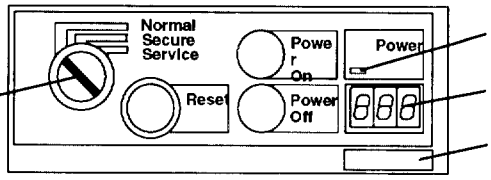
System Unit Features

The 7015 Models R10, R20, and R21 CPU Drawer standard configuration contains the following: CPU planar, I/O planar with integrated SCSI, two serial ports, and one parallel port (the keyboard port, mouse port, and tablet port are not supported), standard I/O flex cable, two 64MB memory cards, 1GB disk drive, remote reset interface card, power supply, operator panel, 3.5-inch diskette drive, and a CD-ROM2 or later CD-ROM drive. Other configurations contain additional devices or adapters.

Front View



Operator Panel



Power On Button Used to start the system unit.

Power Light Indicates that the system unit is receiving power from the power supply.

3-Digit Display Displays up to three 7-segment characters.

Serial Number Label Contains the serial number of the system unit.

Power Off Button Used to turn off on the system unit. Use this button only in Service mode after you enter the **shutdown** command.

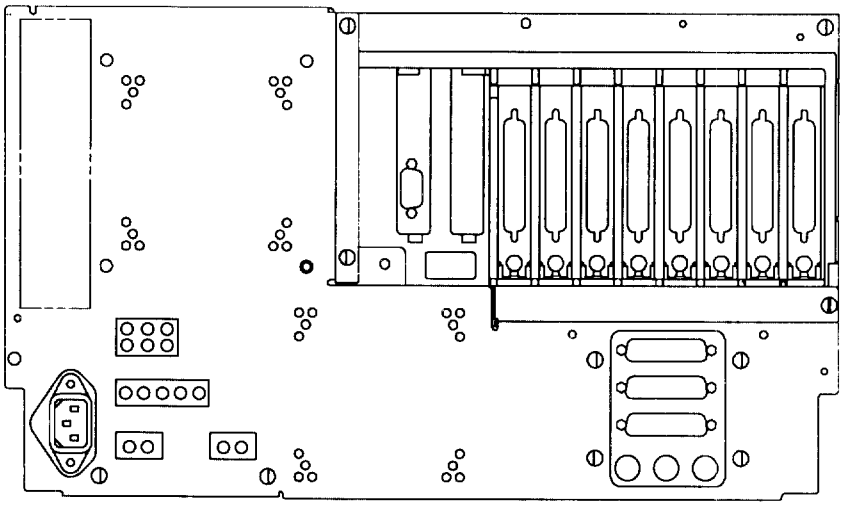
Reset Button Used to reset the system unit. The Reset button can only be used when the mode switch is in the Normal or Service position.

Remote Reset Port Located at rear of drawer, see page 1-2. Used to reset the system unit from an RS-232 port on another system unit. The remote reset port can only be used when the mode switch is in the Normal or Service position.

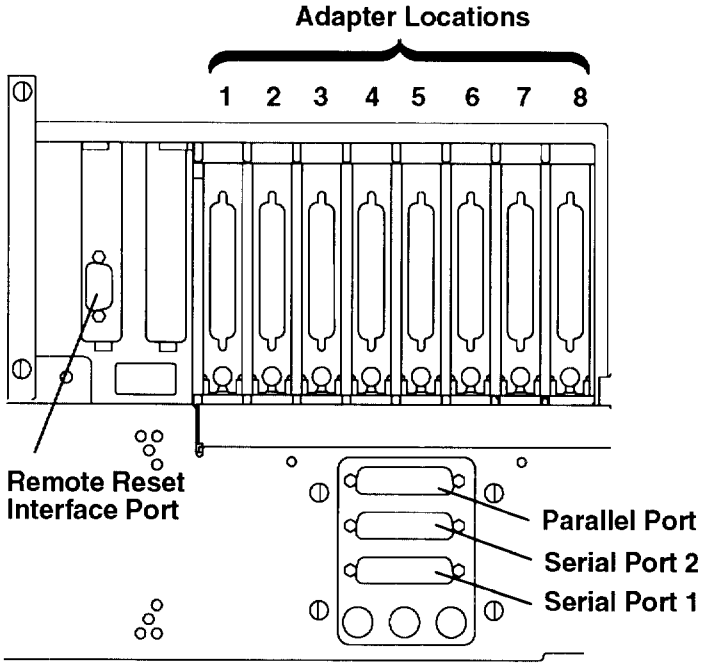
Mode Switch A switch with three positions labeled:

- Normal
- Secure
- Service

Rear View

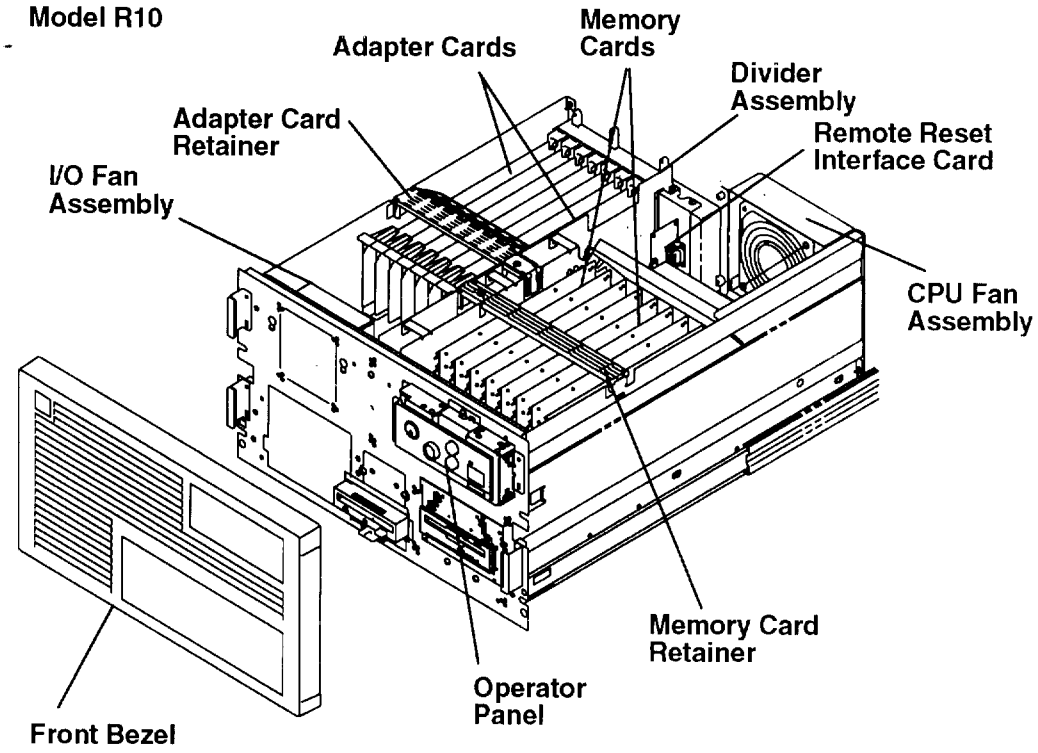


Cable Connections

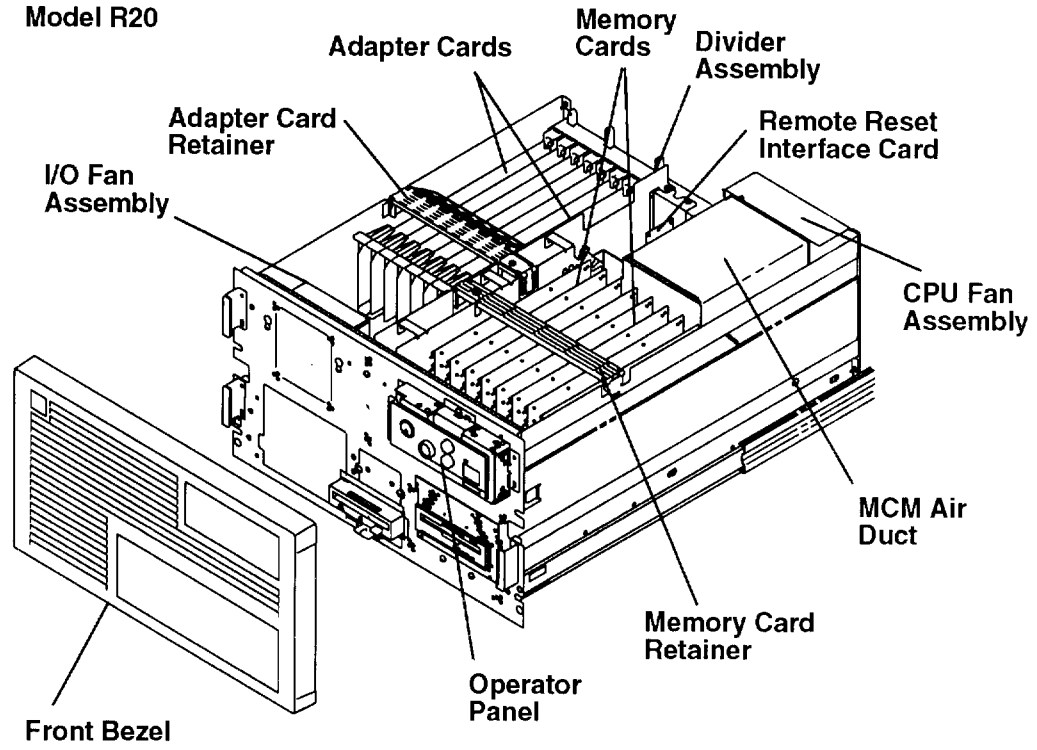


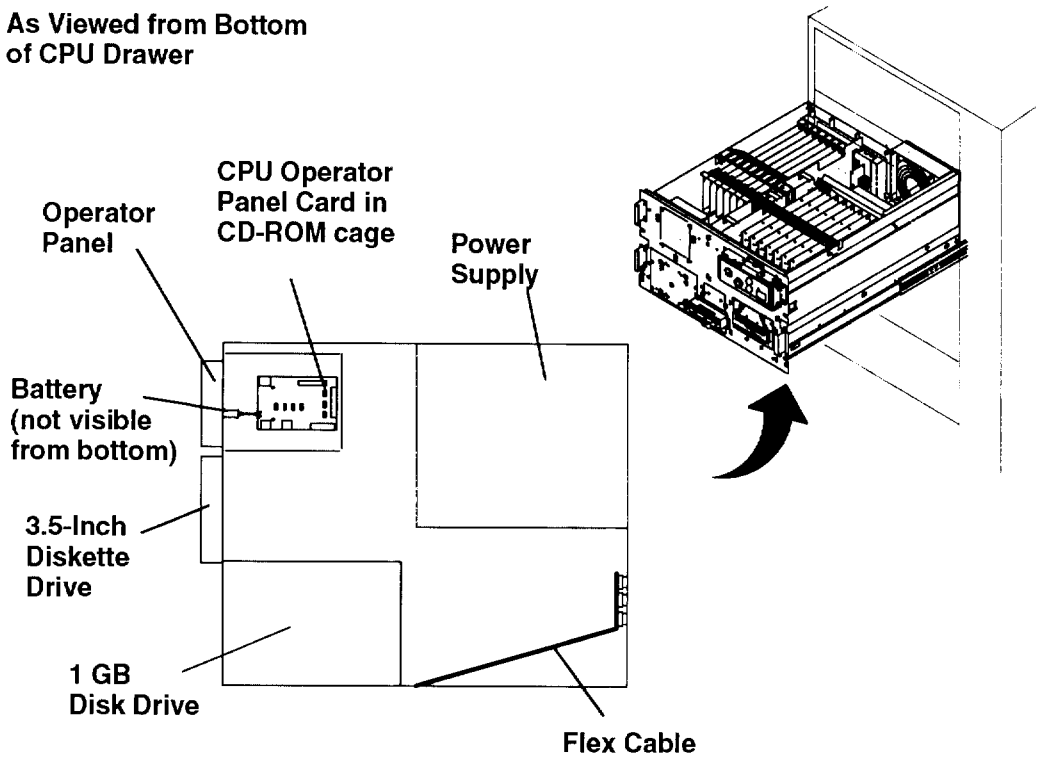
(Keyboard, Mouse and Tablet
are not supported functions)

System Unit Contents



Note: The power supply has electric power as long as the power supply cord is plugged into a working electrical outlet (even when the Off button has been pressed).

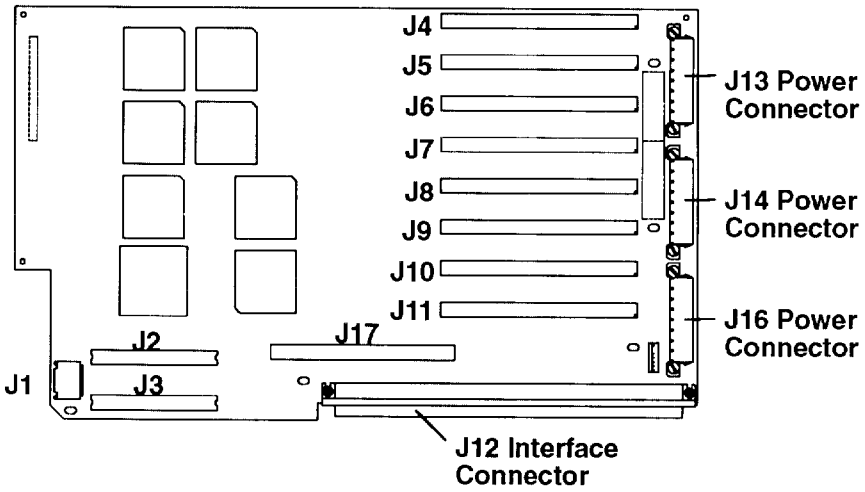



As Viewed from Bottom
of CPU Drawer
Operator
Panel
CPU Operator
Panel Card in
CD-ROM cage
Power
Supply
Battery
(not visible
from bottom)
3.5-Inch
Diskette
Drive
1 GB
Disk Drive
Flex Cable

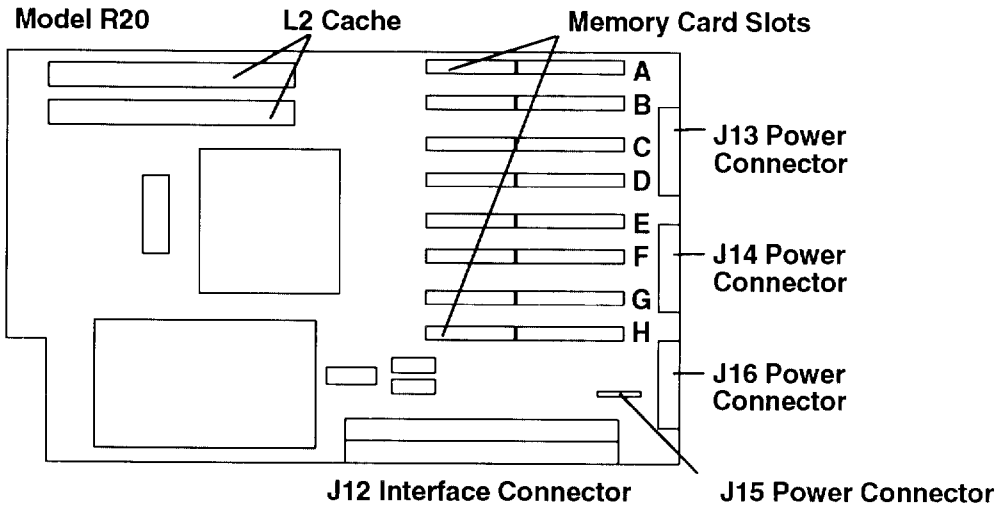
Connector Locations

CPU Planar Connectors

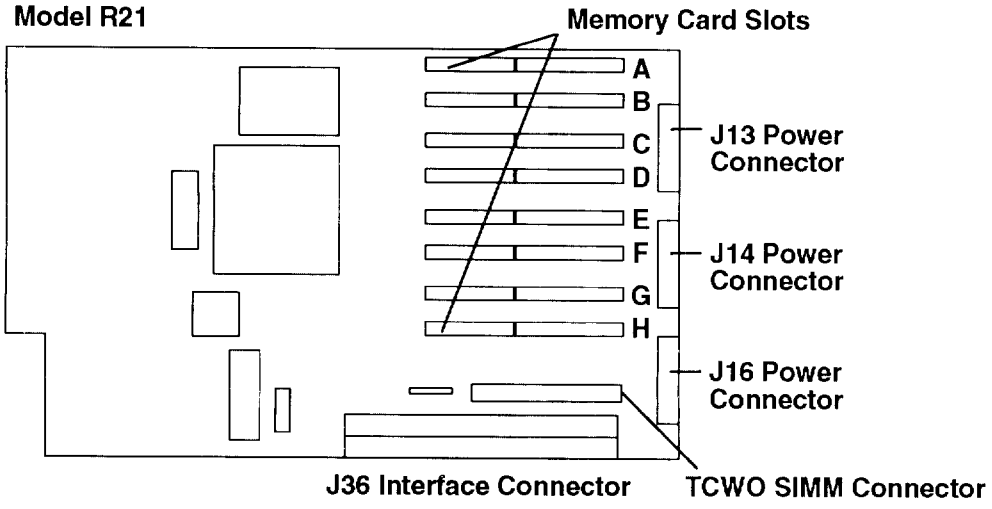
Model R10



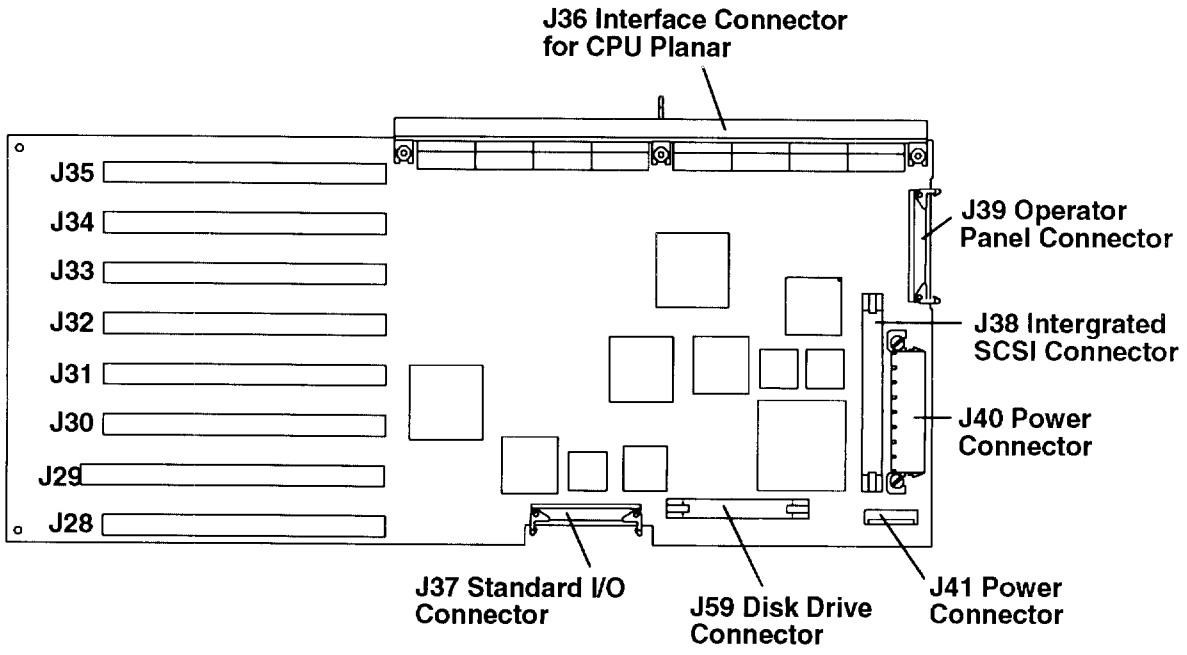
Model R20



Model R21

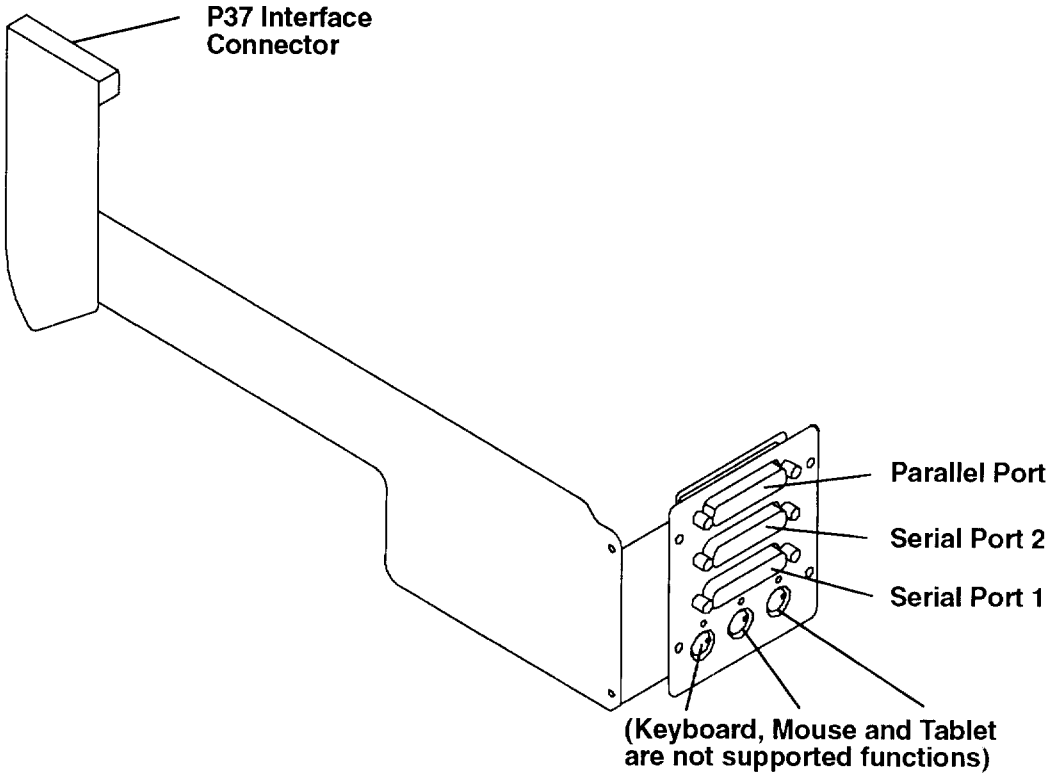


I/O Planar Connectors



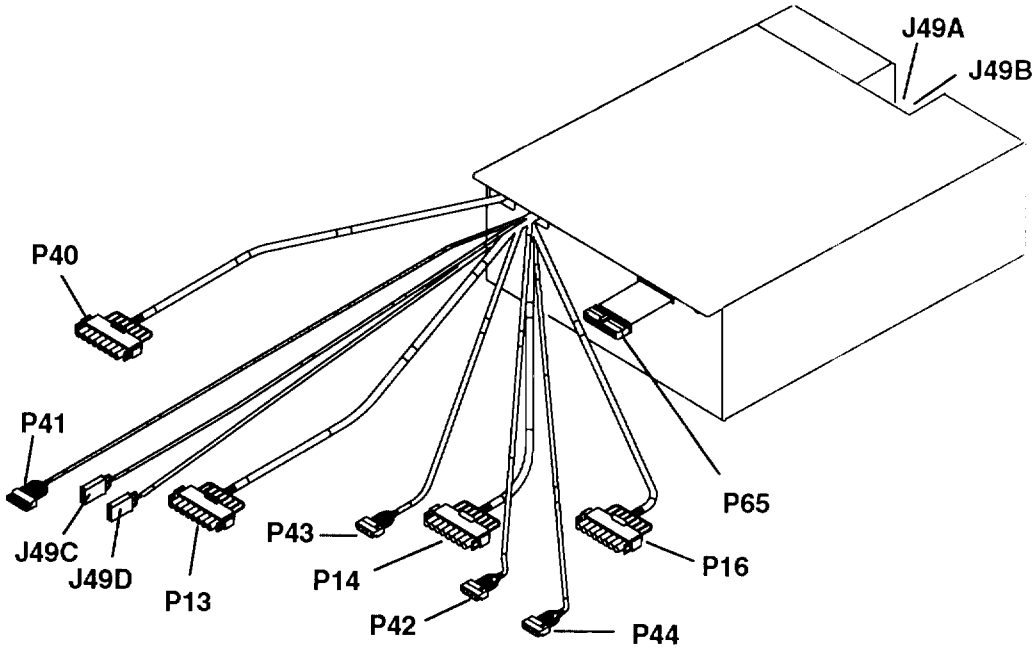
Standard I/O Flex Circuit

There are no fuses in the Standard I/O Flex circuit. The circuit contains automatic current limiting protection.



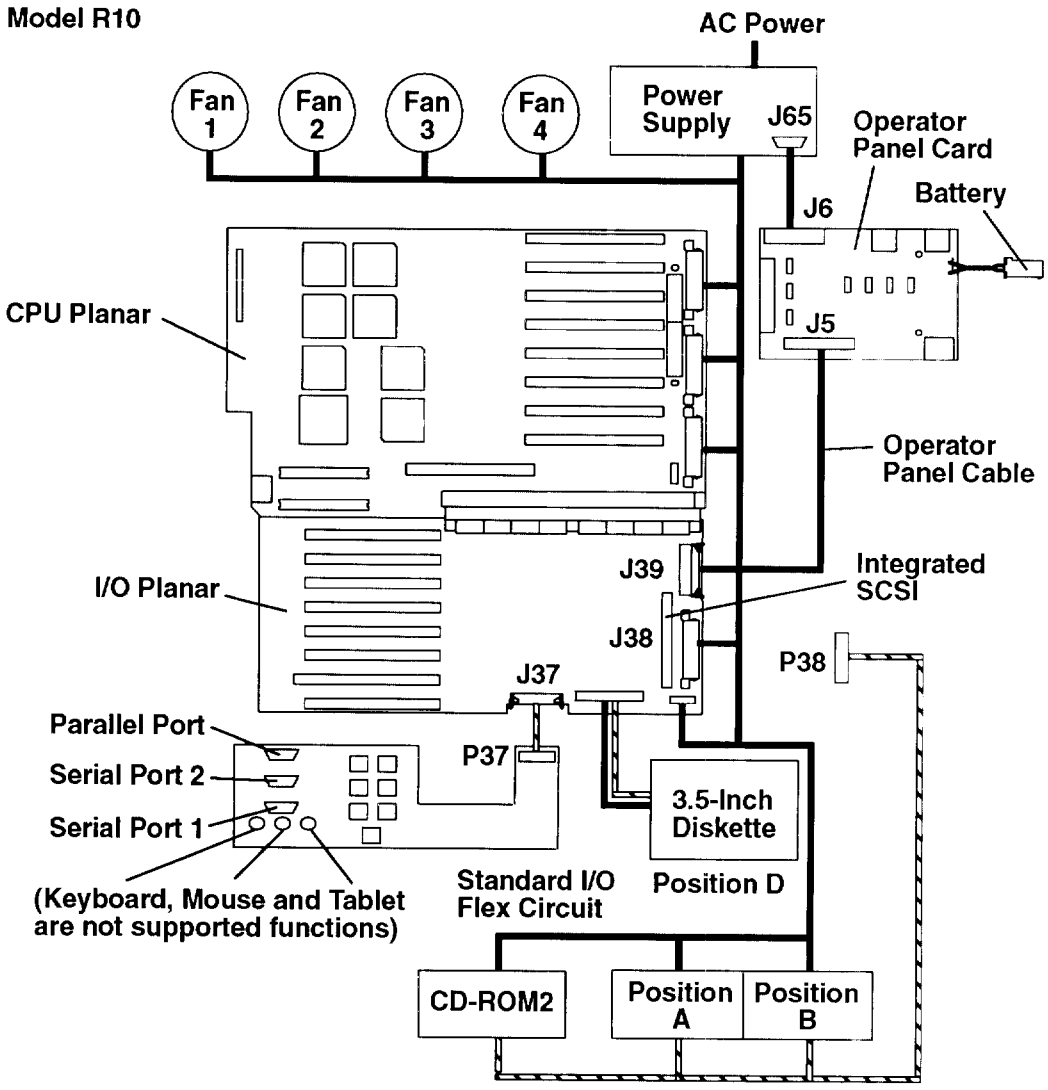
Power Supply Connectors

Note: The power supply has electric power any time the power supply cord is plugged into a working electrical outlet (even when the Power Off button has been pressed).



Connector	Function
P13	To CPU planar connector J13
P14	To CPU planar connector J14
P16	To CPU planar connector J16
P40	To I/O planar connector J40
P41	To I/O planar connector J41
P42	To fixed disk
P43	To 3.5-inch diskette drive
P44	To media device (optional)
J49A	To power supply fan
J49B	To CPU fan
J49C	To front fan (in disk drive carrier)
J49D	To I/O fan
P65	To operator panel card connector J6

Data and Power Flow



Note: See pages 1-5 and 1-5 for the layouts of the R20 and R21 CPU Planar. The data and power flow is identical for each model.

Specifications

The following section gives the specifications for the 7015 POWERserver, models R10, R20, and R21.

7015 Models R10, R20, and R21 Physical Specifications

Power

Power supply output	542 watts dc
Thermal output	Configuration dependent
Power source loading	0.7 kVA

Physical

Height	266.7 millimeters (10.5 inches)
Depth	610 millimeters (24 inches)
Width	445.5 millimeters (17.5 inches)
Approximate weight	30.28 kilograms (65 pounds) (Configuration dependent)
Operating environment	15.6 to 32.2° C (60 to 90° F)
Relative humidity	10 to 80%

Install the Rails and Mounting Hardware for the New CPU Drawer

Note: IBM racks have EIA numbers visible from the rear that go from 1 (at the bottom) to 32 (at the top). The lowest EIA number completely occupied by a drawer is said to be that drawer's EIA position. Therefore, the rack's rail surface that a drawer sets upon will be approximately inline with the lower edge of the EIA position for that drawer. A drawer's EIA number is also used in identifying cables attached to that drawer.

1. The new CPU drawer will occupy 6 EIA units. Install the new rails at the bottom of the lowest EIA number.
2. Install two (2) nut clips on the 1st hole below the upper guide pins of the rails, at the front of the rack.
3. Install two (2) more nut clips on the 7th hole above the upper guide pins of the rails, at the front of the rack.
4. At the rear of the rack, install two (2) nut clips on the left side of the rack (as you face it) at the 5th and 9th holes above the uppermost edge of the rail where it contacts the rack. These nut clips will be used to attach the drawer's cable management arm.

Install the CPU Drawer

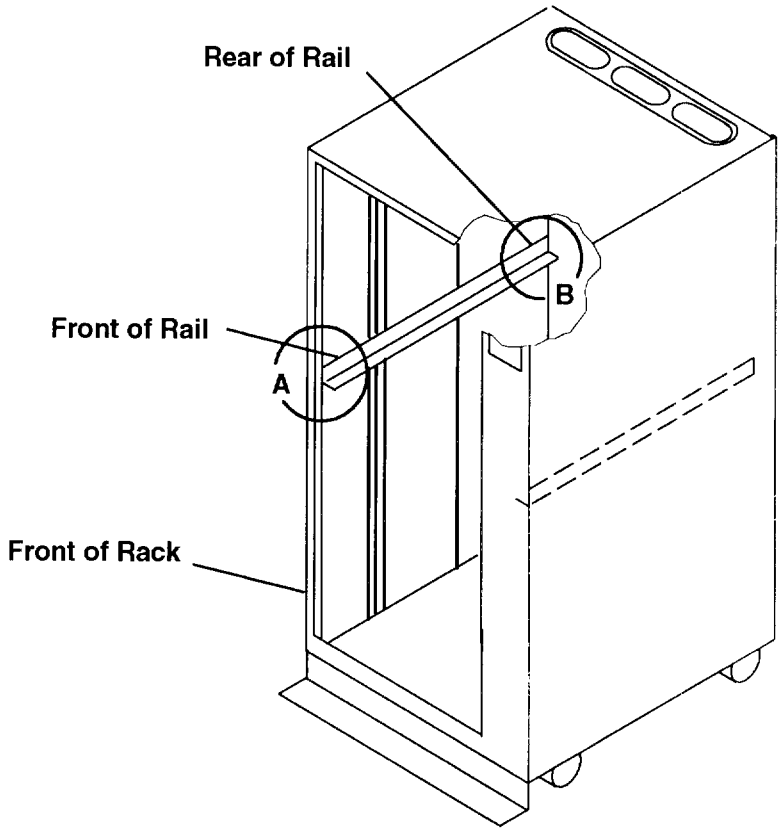
CAUTION:
The CPU drawer weighs 25 kg (55 lbs) with no devices installed. Do not try to lift it by yourself. Ask another service representative for assistance.

1. Slide the shipping box containing the CPU drawer in front of the rack.
2. Lift the CPU drawer onto the support rails, and slide it **slowly** into the rack until the front of the CPU drawer rests against the nut clips on the rack.

Warning: Do not lift the CPU drawer by its front bezel.

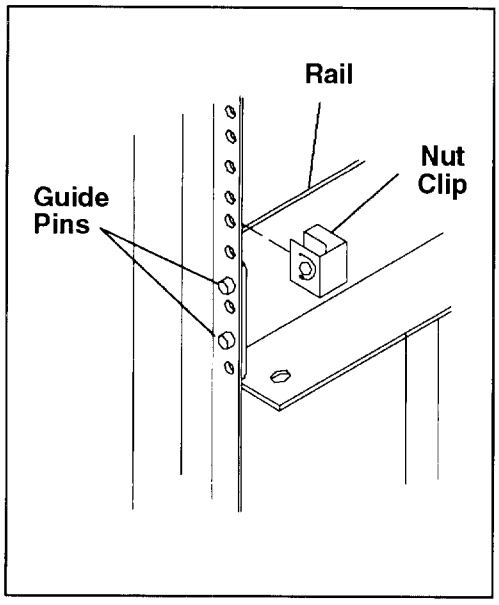
3. Attach the rear of the CPU drawer to the rack rails with the two (2) M4 screws provided with the CPU drawer. This will secure the drawer to the rack.
4. Remove the two (2) screws attaching the sliding portion of the CPU drawer to its stationary cover. This will allow you to slide the drawer into the service position.
5. Attach the cable management arm to the rack's rear at the two (2) nut clips you previously installed. Orient the cable management arm as shown on page 3-6.
6. Attach two screws to hold the cable management arm to the system unit.
7. Remove the front bezel of the CPU
8. Attach the CPU drawer to the nut clips in the front of the rack at the sides, using four (4) M5 x 14 hex head screws.

Typical Rail Installation

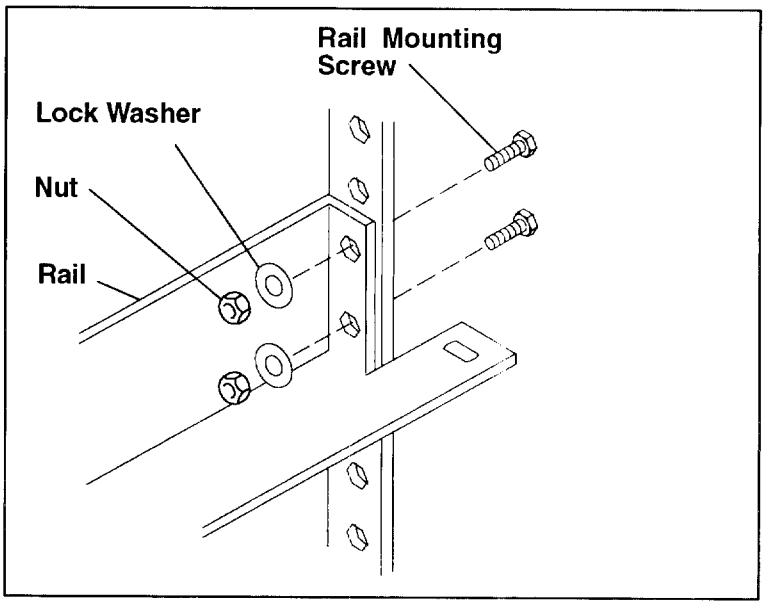


Mounting Hardware For CPU Drawer

Detail A – Front of Rail



Detail B – Rear of Rail



Service Inspection Guide

Perform a service inspection on the system in the following instances:

- 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 might affect the safe operation of the equipment.
- External devices that have their own power cable are attached.

If the inspection indicates an unacceptable safety condition, the condition must be corrected before the machine is serviced.

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

To ensure safe operating conditions, perform the following checks:

1. Check the covers both 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 fit securely in place.
3. To place the system in the service position, follow the procedure on page 3-6.
4. Check for alterations or attachments. If any exist, check for obvious safety hazards such as broken wires, sharp edges, or broken insulation.
5. Check the internal cables for damage.
6. Check for dirt, water, and any other contamination within the system unit.
7. Check the voltage label, at the rear of the system unit, to ensure that it matches the voltage at the outlet.
8. Check the external power cable for damage.
9. 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.
10. To place the system in the operating position, follow the procedure on page 3-7.
11. Check each external device that has its own power cable:
    a. For damage to the power cord.
    b. 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 plug and the metal frame of the device.

Chapter 2. Maintenance Analysis Procedures (MAPs)

MAP 1520: 7015 Models R10, R20, and R21 Power MAP

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 *POWERstation and POWERserver Common Diagnostics Information Manual.*

Purpose of This MAP

This MAP analyzes power problems in the system unit.

This procedure is used to locate power problems in the 7015, models R10, R20, and R21. If a problem is detected, this procedure helps you to isolate the problem to a failing field replaceable unit (FRU).

Observe the following safety notice during service procedures.

Note: For a translation of this notice, see *System Unit Safety Information.*

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products 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.

Step 1

Be sure that the power cable from the R00 rack to the CPU drawer has continuity and is plugged into both the CPU drawer and the R00 racks Power Distribution Unit (PDU)/Power Distribution Bus (PDB); be sure that the outlet for the R00 rack has been wired with the correct voltage.

Did you find a problem?

NO	Go to Step 2.
YES	Correct the problem; then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 2

(from Step 1)

1. Set the mode switch to the Service position.
2. Press the Power Off button.
3. Follow the procedure for placing the unit in the Service position on page 3-6.
4. Disconnect the power cable connectors from the fixed disks and CD-ROM drive.
5. Disconnect the power cable connector from the diskette drive if installed.
6. Disconnect the three power cable connectors, P13, P14, and P16 from the CPU planar.
7. Disconnect the two power cable connectors, P40 and P41, from the I/O planar.
8. Press the Power On button.

Did the fans come on and stay on?

NO Go to Step 3.

YES Go to Step 6.

Step 3

(from Step 2)

Did at least one fan start then stop?

NO Go to Step 4.

YES Go to Step 5.

Step 4

(from Step 3)

Disconnect the ribbon cable connector J6 from the operator panel card. Refer to page 3-25 for the operator panel card. This should start the power supply.

Is the power supply running the fans now?

YES Exchange the operator panel card, refer to page 3-25; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

NO Exchange the power supply, refer to page 3-20; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 5

(from Step 3)

This problem can be caused by a defective fan or power supply. The power supply does not stay on if it fails to sense the rotation of the cooling fans.

1. Press the Power Off button.
2. Exchange a fan, refer to pages 3-19, 3-18, 3-22 and 3-24.
3. Press the Power On button.

Did the power-on light come on and stay on?

NO If you have not tested all the fans, repeat this step; otherwise, exchange the power supply. Refer to the "Power Supply" procedure on page 3-20. Go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES Exchange the defective fan, refer to pages 3-19, 3-18, 3-22 and 3-24; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 6

(from Step 2)

1. Press the Power Off button.
2. Connect the three power cable connectors, P13, P14, and P16 to the CPU planar.
3. Press the Power On button.

Did the power-on light come on and stay on?

NO Go to Step 7.

YES Go to Step 8.

Step 7

(from Step 6)

1. Press the Power Off button.
2. Record the slot numbers of the memory cards on the CPU planar.
3. Remove one memory card at a time. Refer to the "Adapter or Memory Card" procedure on page 3-10.
4. Ensure that the power has been off for at least 15 seconds, then press the Power On button.

Did the power-on light come on and stay on?

NO Repeat this step until all the cards are removed, then exchange the CPU planar and go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES The last memory card or option that you removed is defective. Exchange it and go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 8

(from Step 6)

1. Press the Power Off button.
2. Connect the two power connectors, P40 and P41, to the I/O planar.
3. Press the Power On button.

Did the power-on light come on and stay on?

NO Go to Step 9.

YES Go to Step 19.

Step 9

(from Step 8)

1. Press the Power Off button.
2. Record the location of each adapter on the I/O planar.
3. Remove one of the adapters. Refer to the "Adapter or Memory Card" procedure on page 3-10.
4. Press the Power On button.

Did the power-on light come on and stay on?

NO Repeat this step until all the adapters are removed, then go to Step 10.

YES Go to Step 15.

Step 10

(from Step 9)

1. Press the Power Off button.
2. Disconnect the operator panel cable from connector J39 on the I/O planar.
3. Press the Power On button.

Is the power-on light on?

NO Go to Step 11.

YES Exchange the operator panel, refer to the "Operator Panel Removal" procedure on page 3-25; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 11

(from Step 10)

1. Press the Power Off button.
2. Record the location, then disconnect any external cables from the standard I/O flex circuit.
3. Press the Power On button.

Is the power-on light on?

NO Go to Step 12.

YES Go to Step 13.

Step 12

(from Step 11)

1. Follow the procedure for the standard I/O flex circuit removal on page 3-15. Do not separate the CPU planar from the I/O planar.
2. Reinstall the CPU planar, I/O planar, and bulkhead.
3. Reconnect the power connectors to the CPU planar.
4. Reconnect the power connectors to the I/O planar.
5. Press the Power On button.

Is the power-on light on?

NO Exchange the I/O planar, refer to page 3-16; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES Exchange the standard I/O flex circuit, refer to page 3-15; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 13

(from Step 11)

1. Press the Power Off button.
2. Connect one of the cables that was removed.
3. Be sure that the power was off at least 15 seconds, then press the Power On button.

Is the power-on light on?

NO Go to Step 14.

YES Repeat this step until you find the defective cable or device and exchange it. Go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 14

(from Step 13)

1. Press the Power Off button.
2. Disconnect the device from the cable.
3. Press the Power On button.

Is the power-on light on?

NO Exchange the cable, then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES Exchange or repair the device, then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 15

(from Step 9)

Look at the adapter you just removed.

Are, or were, there any cables attached to the adapter?

NO Exchange the adapter, refer to page 3-10; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES Go to Step 16.

Step 16

(from Step 15)

1. Press the Power Off button.
2. Reinstall the adapter without any cables connected to it.
3. Press the Power On button.

Is the power-on light on?

NO Exchange the adapter, refer to page 3-10; then, go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES Go to Step 17.

Step 17

(from Step 16)

1. Press the Power Off button.
2. Connect a cable to the adapter.
3. Press the Power On button, then wait 10 seconds.

Does the power-on light come on and stay on?

NO Go to Step 18.

YES Repeat this step until all cables are connected, then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 18

(from Step 17)

1. Press the Power Off button.
2. The cable or an attached device is defective. Disconnect a device.
3. Press the Power On button.

Is the power-on light on?

NO Repeat this step until all the devices and cables have been disconnected, then exchange the adapter. Go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

YES Exchange the device or cable, then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 19

(from Step 8)

1. Press the Power Off button.
2. Connect the power cable to any device.
3. Press the Power On button.

Is the power-on light on?

NO	Exchange the last device connected, then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*
YES	Repeat this step until all devices are turned on, then go to "MAP 410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

MAP 1540: 7015 Models R10, R20, and R21 CPU Drawer – Minimum Configuration

Note: This is not a start of call MAP. You should use this MAP only if you have been directed here from a MAP step in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

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 minimum-configured system. If a failure is detected on the minimum-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.

The MAP steps on the following pages instruct you to reduce the system to one or more of the following configurations:

- Models R10 and R21
  - CPU planar, I/O planar, buffer SIMM, two memory cards, and the three-digit display.

    If no failure is detected, `262` is displayed in the three-digit display. Any other response means one of the remaining FRUs is failing.
  - CPU planar, I/O planar, buffer SIMM, all memory cards, the three-digit display panel, Standard I/O flex circuit, a diskette drive or a CD-ROM drive and a terminal attached to a serial port.

    If no failure is detected, the Diagnostics Operating Instructions menu is displayed when the diagnostics are loaded, and the system console is selected. Any other response means one of the remaining FRUs is failing.
- Model R20
  - CPU planar, I/O planar, and the three-digit display.

    If no failure is detected, `213` is displayed in the three-digit display. Any other response means one of the remaining FRUs is failing.
  - CPU planar, I/O planar, L2 cache SIMMs (if used), all memory cards, and the three-digit display panel.

    If no failure is detected, `262` is displayed in the three-digit display. Any other response means one of the remaining FRUs is failing.
  - CPU planar, I/O planar, L2 cache SIMMs (if used), all memory cards, the three-digit display panel, Standard I/O flex circuit, a diskette drive or a CD-ROM drive and a terminal attached to a serial port.

    If no failure is detected, the Diagnostics Operating Instructions menu is displayed when the diagnostics are loaded, and the system console is selected. Any other response means one of the remaining FRUs is failing.

Step 1

1. Ensure that the diagnostics and the operating system are shut down.
2. Turn the key mode switch to the Service Position.
3. Press the Power Off button.
4. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM into the CD-ROM drive.
5. Press the Power On button.
6. Find the symptom in the following table that best matches the symptom on your system, and then perform the associated task.

Information in 3-digit display	Other conditions	Do this:
Nothing	Diagnostic Operating Screen is displayed.	Go to Step 16.
c07	The diskette drive "In-Use" light is on.	Insert the next diagnostic diskette. Wait for one of the other symptoms in this table to occur.
888 flashing		Go to Step 2.
Two or more numbers between 221 and 296 are displayed alternately.	First diagnostic diskette is loaded.	Go to Step 7.
	Diagnostic CD-ROM is loaded.	Go to Step 9.
c31	Instructions to select the system console are displayed on the screen.	Follow the instructions on the screen. Wait for one of the other symptoms in this table to occur.
c05	The diskette drive "In-Use" light is on.	The diagnostic diskette is probably bad. Insert the same diskette from a duplicate diagnostic set. If the duplicate diskette causes the same symptom, Go to Step 7.
299 or less	Digits are on solid for more than 3 minutes and the Power light is on.	Go to Step 2.
300 or greater	Digits are on solid for more than 3 minutes, the Power light is on, and the first diagnostic diskette is loaded.	Go to Step 7.
	Digits are on solid for more than 3 minutes, the Power light is on, and the diagnostic CD-ROM is loaded.	Go to Step 9.
Any symptom not listed above.		Go to Step 2.

Step 2

(from Step 1 and 18)

1. Press the Power Off button.
2. Record the slot numbers of the adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters from the I/O planar or system planar.
3. Disconnect the SCSI cable (P38), the 3.5 inch diskette drive data-signal cable (P59), and the SIO data-signal cable (P37) from the I/O planar.
4. Disconnect any cables that are plugged into connectors S1, S2, P, K, T, and M on the rear of the system unit.
5. Record the slot numbers of the memory cards, and then remove all the memory cards from the CPU planar, except for:

   Models R10 and R21 Leave two memory cards in the system.
6. If L2 cache SIMMSs are installed on the CPU planar, record the locations and then remove them.
7. Press the Power On button.
8. Wait for one of the following conditions to occur:
   - The system stops for at least three minutes, a constant number, character, or symbol is displayed in the three-digit display, and the Power light is on.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is `213` or `262` displayed in the three-digit display?

NO Go to Step 3.

YES Go to Step 4.

Step 3

(from Step 2)

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

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

1. Operator panel.
2. I/O planar
3. Memory cards (Models R10 and R21)
4. Buffer SIMM in connector TCW (Models R10 and R21)
5. CPU Planar
6. Power supply

The system is working correctly if it stops and the number `213 or 262` is displayed in the three-digit display. If this occurs, the last FRU you exchanged is defective.

1. Press the Power Off button.
2. Exchange one of the FRUs in the list.
3. Press the Power On button.

Is `213` or `262` displayed in the three-digit display?

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 1 in this MAP and follow the instructions for the new symptom.

YES Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 4

(from Step 2)

No failure was detected with this configuration. If you removed L2 cache SIMMs from the system reinstall them one at a time after the last pair of memory cards is installed.

1. Press the Power Off button.
2. Install a pair of memory cards.
3. Press the Power On button.
4. Wait for one of the following conditions to occur:
   - The system stops for at least three minutes, a constant number, character, or symbol is displayed in the three-digit display, and the Power light is on.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is `213` or `262` displayed in the three-digit display?

NO Go to Step 5.

YES Repeat this step until all memory cards and L2 cache SIMMs (if removed) are installed and tested.

After all memory cards and L2 cache SIMMs are installed and tested, Press the Power Off button. Do one of the following actions.

To run diagnostics from diskette:

- connect the signal cable for the 3.5-inch diskette drive (P59) to the I/O planar.

  Go to Step 7, substep 5.

To run diagnostics from CD-ROM:

- connect the SCSI cable (P38) to the I/O planar.

  Go to Step 9, substep 5.

Step 5

(from Step 4)

The failure may be caused by a defective SIMM on either of the last two memory cards installed. To isolate the failing SIMM in a pair of SIMMs, do the following:

1. Press the Power Off button. Using a pair of operational SIMMs for the type of memory card used, install the pair of SIMMs in locations 1 and 2 on one of the suspected memory cards.
2. Press the Power On button. The system is working correctly if it stops and the number `213` or `262` is displayed in the three-digit display.
3. If the system still fails, continue testing the SIMMs in pairs (locations 3 and 4, 5 and 6, 7 and 8) until the system does not fail, or all the SIMMs on the suspected memory cards have been tested.

Were you able to isolate the failed pair of SIMMs?

NO Exchange the memory cards. If this does not correct the problem, go to Step 6.

YES Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual*.

Step 6

(from Step 5)

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

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

- Buffer SIMM in connector TCW (Models R10 and R21)
- CPU planar
- First L2 cache SIMM (Model R20, if installed)
- Second L2 cache SIMM (Model R20, if installed)
- Power supply

The system is working correctly if it stops and the number 213 or 262 is displayed in the three-digit display. If this occurs, the last FRU you exchanged is defective.

1. Press the Power Off button.
2. Exchange one of the FRUs in the list.
3. Press the Power On button.

Did the system stop and is the number 213 or 262 displayed in the three-digit display?

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 1 in this MAP, and follow the instructions for the new symptom

YES Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 7

(from Steps 1 and 4)

1. Press the Power Off button.
2. Record the slot numbers of the adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters from the I/O planar.
3. Disconnect the SCSI cable (P38) and the SIO data-signal cable (P37) from the I/O planar.
4. Disconnect any cables that are plugged into connectors S1, S2, P, K, T, and M on the rear of the system unit.
5. Insert the first diagnostic diskette into the diskette drive.
6. Press the Power On button.
7. Wait for one of the following conditions to occur:
   - The 3.5-inch diskette drive in-use light is on, and `c05` or `c07` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol is displayed in the three-digit display and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is the 3.5-inch diskette drive in-use light on and `c07` displayed in the three-digit display?

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

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

1. Diskette drive
2. Diskette drive signal cable
3. I/O planar
4. Buffer SIMM in connector TCW (Models R10 and R21)
5. CPU planar
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 1 in this MAP, and follow the instructions for the new symptom.

YES Go to Step 8.

Step 8

(from Step 7)

1. Press the Power Off button.
2. Connect the SCSI cable (P38) to the I/O planar.
3. Disconnect the signal and power connectors from all the SCSI devices.
4. Insert the first diagnostic diskette into the diskette drive.
5. Press the Power On button.
6. Wait for one of the following conditions to occur:
   - The 3.5-inch diskette drive in-use light is on, and `c05` or `c07` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is the 3.5-inch diskette drive in-use light on and `c07` displayed in the three-digit display?

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. I/O planar
2. SCSI cable
3. CPU planar
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 1 in this MAP, and follow the instructions for the new symptom.

YES Go to Step 11.

Step 9

(from Steps 1 and 4)

1. Press the Power Off button.
2. Record the slot numbers of the adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters from the I/O planar.
3. Disconnect the 3.5-inch diskette drive data-signal cable (P59) and the SIO data-signal cable (P37) from the I/O planar.
4. Disconnect any cables that are plugged into connectors S1, S2, P, K, T, and M on the rear of the system unit.
5. Disconnect the signal and power connectors from all the SCSI devices except the CD-ROM drive.
6. Insert the diagnostic CD-ROM into the CD-ROM drive.
7. Press the Power On button.
8. Wait for one of the following conditions to occur:
   - The system stops, and `c31` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Did the system stop and is `c31` displayed in the three-digit display?

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. I/O planar
2. CD-ROM drive
3. SCSI cable
4. Buffer SIMM in connector TCW (Models R10 and R21)
5. CPU planar
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 1 in this MAP and follow the instructions for the new symptom

YES Go to Step 10.

Step 10

(from Step 9)

1. Press the Power Off button.
2. Connect the signal cable for the 3.5-inch diskette drive (P59) to the I/O planar.
3. Insert the diagnostic CD-ROM into the CD-ROM drive.
4. Press the Power On button.
5. Wait for one of the following conditions to occur:
   - The system stops, and `c31` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Did the system stop and is `c31` displayed in the three-digit display?

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

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

1. Diskette drive
2. Diskette drive signal cable
3. I/O planar
4. CPU planar
5. Power Supply

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

If the symptom did not change and all the FRUs have been exchanged, call 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 1 in this MAP, and follow the instructions for the new symptom

YES Go to Step 11.

Step 11

(from Steps 8 and 10)

1. Press the Power Off button.
2. Connect the signal and power connectors to one of the SCSI devices that was attached to the integrated SCSI controller.
3. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM into the CD-ROM drive.
4. Press the Power On button.
5. Wait for one of the following conditions to occur:
   - The 3.5-inch diskette drive in-use light is on, and `c05` or `c07` is displayed in the three-digit display.
   - The system stops, and `c31` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is `c07` or `c31` displayed in the three-digit display?

NO

The last SCSI device that you connected is defective.

Exchange the defective device.

Repeat this step until the signal and power connectors for all the SCSI devices attached to the integrated SCSI controller or SCSI adapter have been connected.

If all the SCSI devices have been connected, in the following order exchange the FRUs that have not been exchanged:

1. SCSI cable
2. I/O planar
3. CPU planar
4. 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 1 in this MAP, and follow the instructions for the new symptom.

YES

Repeat this step until the signal and power connectors for all the SCSI devices attached to the integrated SCSI controller or SCSI adapter have been connected.

Go to Step 12.

Step 12

(from Step 11)

1. Press the Power Off button.
2. Connect the SIO data-signal cable (P37) to the I/O planar.
3. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM into the CD-ROM drive.
4. Press the Power On button.
5. Wait for one of the following conditions to occur:
   - The 3.5-inch diskette drive in-use light is on, and `c05` or `c07` is displayed in the three-digit display.
   - The system stops, and `c31` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is `c07` or `c31` displayed in the three-digit display?

NO Exchange the SIO data-signal cable or serial port extender cable.

Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual*.

YES Go to Step 13.

Step 13

(from Steps 11 and 12)

1. Press the Power Off button.
2. Connect the cables that were plugged into connectors S1, S2, P, K, T, and M on the rear of the system unit.
3. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM into the CD-ROM drive.
4. Press the Power On button.
5. Wait for one of the following conditions to occur:
   - The DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed.
   - The system stops, and `c31` is displayed in the three-digit display.
   - The 3.5-inch diskette drive in-use light is on, and `c07` is displayed in the three-digit display. Insert the next diagnostic diskette. Continue this substep until all diskettes are loaded, `c31` is displayed in the three-digit display or the DIAGNOSTICS OPERATING INSTRUCTIONS screen is displayed.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is the DIAGNOSTIC OPERATING INSTRUCTIONS screen displayed or is `c31` displayed in the three-digit display?

NO Go to the Problem Determination procedures (test procedures) for the devices attached to the SIO ports, and test those devices. If a problem is found, follow the procedures for correcting the problem on that device.

YES Go to Step 14.

Step 14

(from Step 13)

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

1. Press the Power Off button.
2. Install a FRU (adapter), and connect any cables and devices that were attached to it.
3. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM disc into the CD-ROM drive.
4. Press the Power On button.
5. Wait for one of the following conditions to occur:
   - The DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed.
   - The system stops, and `c31` is displayed in the three-digit display.
   - The 3.5-inch diskette drive in-use light is on, and `c07` is displayed in the three-digit display. Insert the next diagnostic diskette. Continue this substep until all diskettes are loaded, or `c31` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is the DIAGNOSTIC OPERATING INSTRUCTIONS screen displayed or is `c31` displayed in the three-digit display?

NO Go to Step 15.

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

Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual*.

Step 15

(from Step 14)

1. Press the Power Off button.
2. Starting with the devices, disconnect a device or cable connector from the last adapter installed.
3. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM disc into the CD-ROM drive.
4. Press the Power On button.
5. Wait for one of the following conditions to occur:
   - The DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed.
   - The system stops, and `c31` is displayed in the three-digit display.
   - The 3.5-inch diskette drive in-use light is on, and `c07` is displayed in the three-digit display. Insert the next diagnostic diskette. Continue this substep until all diskettes are loaded or `c31` is displayed in the three-digit display.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is the DIAGNOSTIC OPERATING INSTRUCTIONS screen displayed or is `c31` displayed in the three-digit display?

NO

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

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

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

1. Adapter (last one installed)
2. I/O planar
3. CPU planar
4. 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 1 in this MAP, and follow the instructions for the new symptom

YES The last device or cable you disconnected is defective.

Exchange the defective device or cable.

Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Step 16

(from Step 1)

1. Press the Power Off button.
2. Record the slot numbers of the adapters. Label and record the location of any cables attached to the adapters. Remove all the adapters from the I/O planar.
3. Disconnect any cables that are plugged into connectors S1, S2, P, K, T, and M on the rear of the system unit.

   Note: If a terminal attached to S1 or S2 will be the system console, do not disconnect it.
4. Insert the first diagnostic diskette into the diskette drive or the diagnostic CD-ROM into the CD-ROM drive.
5. Press the Power On button.
6. Wait for one of the following conditions to occur:
   - The DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed.
   - The system stops, and `c31` is displayed in the three-digit display. Follow the instructions on the display to select your console display.
   - The 3.5-inch diskette drive in-use light is on, and `c07` is displayed in the three-digit display. Insert the next diagnostic diskette. Continue this substep until all diskettes are loaded, `c31` is displayed in the three-digit display, or the DIAGNOSTICS OPERATING INSTRUCTIONS screen is displayed.
   - The system stops for at least three minutes, a constant number, character, or symbol other than `c31` is displayed in the three-digit display, and the Power light is on.
   - The system stops, and two or more numbers with values between `221` and `296` are displayed alternately in the three-digit display.
   - The system stops, and a flashing `888` is displayed in the three-digit display.
   - The Power light does not come on, or the Power light comes on but does not stay on.

Is the DIAGNOSTIC OPERATING INSTRUCTIONS screen displayed?

NO The symptom has changed. Check for loose cards, cables, and obvious problems. If you do not find a problem, return to Step 1 in this MAP, and follow the instructions for the new symptom

YES Go to Step 17.

Step 17

(from Step 16)

1. Press the Enter key.
2. If the terminal type has not been defined, you must use the Initialize Terminal option on the FUNCTION SELECTION menu to initialize the AIX operating system environment before you can continue with the diagnostics. This is a separate and different operation than selecting the console display.
3. Select Advanced Diagnostics Routines.
4. When the DIAGNOSTIC MODE SELECTION menu displays, select System Verification.
5. Select System Checkout.

Did you get an SRN?

NO One of the adapters or devices you removed is causing the problem. Install the adapters and devices one at a time to determine the failing adapter or device. Test the system after each adapter or device is installed.

YES Go to Step 18.

Step 18

(from Step 17)

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 replaced or System Checkout runs with no trouble found. Run System Checkout after each FRU is exchanged.

Go to "Map 0410: Repair Checkout" in the *POWERstation and POWERserver Common Diagnostics Information Manual*

YES Go to Step 2.

Chapter 3. Removal and Replacement Procedures

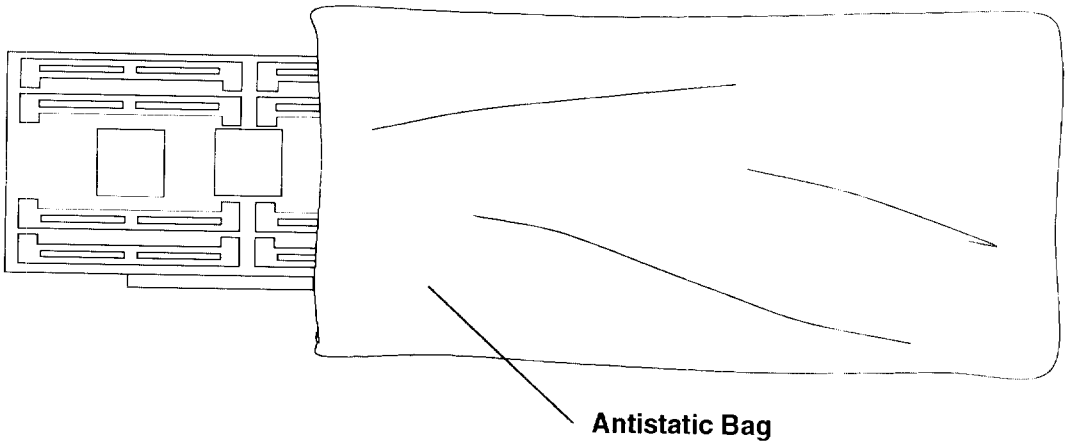
This chapter contains information about powering the system on and off, and removing and replacing the field replaceable units for Models R10 and R20.

Handling Static-Sensitive Devices

Warning: Adapters and planars 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:

- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- If you have an antistatic wrist strap available, use it while handling the device.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- Grasp cards and boards by the edges. 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 you pick it up again, touch the antistatic bag and the metal frame of the system at the same time.
- Handle the devices carefully to prevent permanent damage.



Acclimation

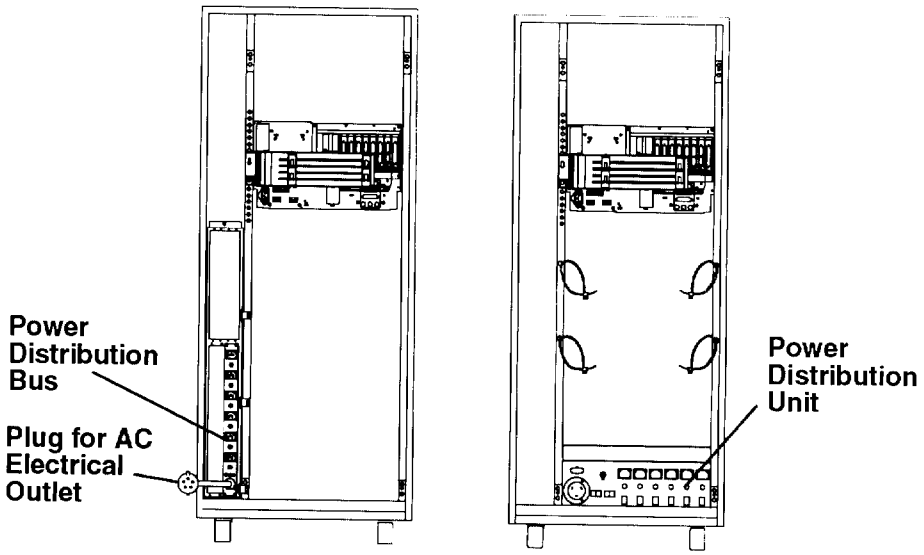
Before using a drive or cartridge, always let these items adjust (acclimate) to the operating environment by placing the drive or cartridge in the operating environment for as long as it was away from this environment, or for 24 hours.

Acclimation is necessary for any drive or cartridge that is exposed to a different environment or temperature change of 11°C (20°F).

Power-On Procedure

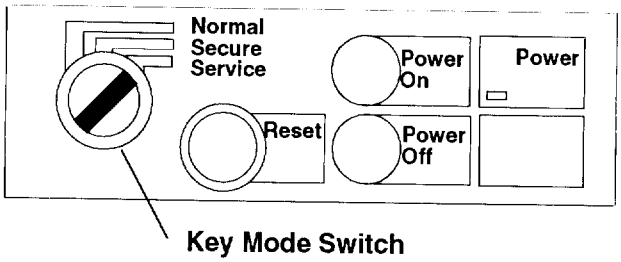
Your rack may have either a power distribution bus (PDB) or a power distribution unit (PDU). The power on procedure for either is very similar to the other.

Rear View of Rack



1. Set the key mode switch to the Service position.

CPU Drawer Operator Panel



Note: For a translation of this notice, see the *System Unit Safety Information* manual.

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 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.

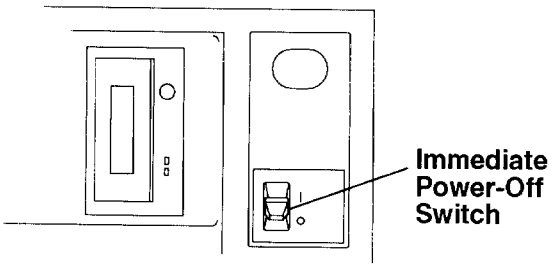
Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

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

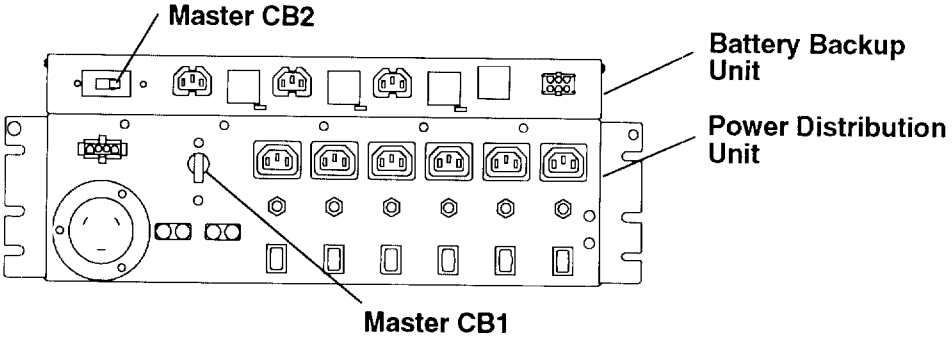
CAUTION:
This product is equipped with a 3-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.

2. Plug the system-unit power cord into the electrical outlet at the rear of the system unit.
3. Plug all external device power cords into the electrical outlets and switch on power to all external devices attached to the system unit.
4. If your rack has a PDU, it may be equipped with an immediate power-off (IPO) switch. Ensure that the IPO is set to the I (On) position.

Front of 7015 Rack



5. If your rack has a PDU, set the Master CB2 circuit breaker to On.



6. If your rack has a PDU, set the Master CB1 circuit breaker to On.
7. Close the back door of the rack.
8. The system unit will come on and cycle through to the diagnostics display screen. Follow the instructions for the diagnostics.

Operating with Multiple Attached Systems

When you are operating a system that is attached to one or more other systems, consider how actions you take with your system can affect the attached systems, and how other systems can affect yours. Consult with the operator of an attached system whenever you think your operations might affect the other system.

The following actions can affect or be affected by the operation of an attached system:

- Starting and stopping communication with the other system
- Running diagnostics on the system
- Using wrap plugs with diagnostic programs
- Analyzing error log information

Isolate a system unit from any attached systems before stopping the operating system or running diagnostic programs. Some system cabling changes (such as installing wrap plugs or removing a device from the configuration) may require action by the operator of the attached system before you make the cabling changes on your system.

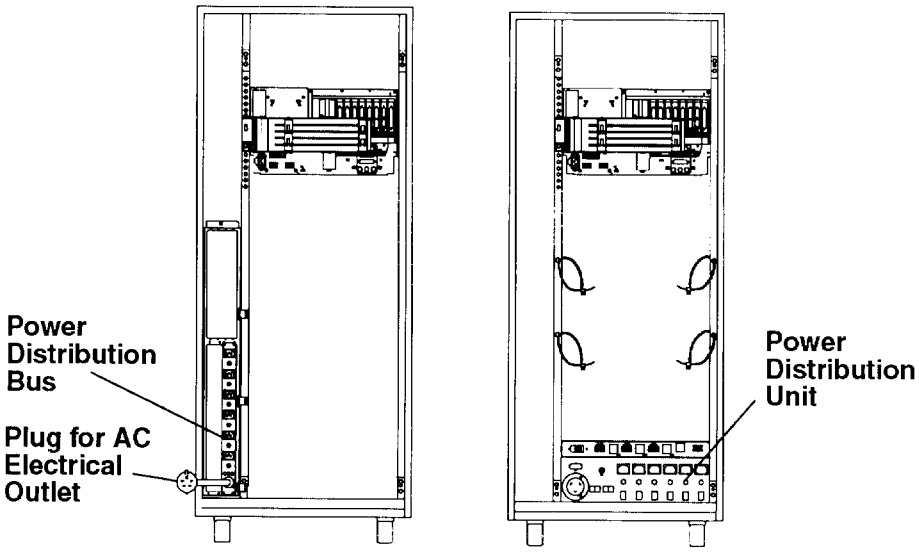
Power-Off Procedure

Note: Before stopping the system unit, you must first shut down the operating system to prevent losing data.

Warning: Use the appropriate **shutdown** command before you stop the system unit; failure to do so may result in the loss of data. See your operating system documentation for information about the **shutdown** command.

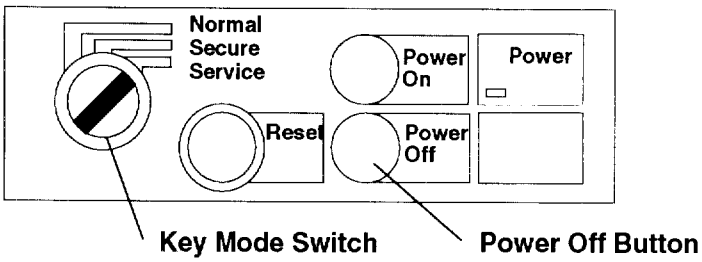
Your rack may have either a power distribution bus (PDB) or a power distribution unit (PDU). The power-off procedure for either is very similar to the other.

Rear View of Rack



1. Set the key mode switch to the Service position.
2. Press the Power Off button.

CPU Drawer Operator Panel



Note: For a translation of this notice, see the *System Unit Safety Information* manual.

DANGER

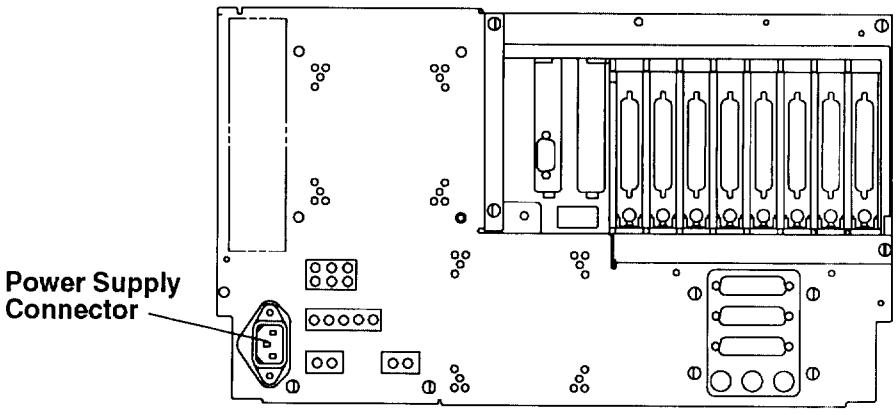
An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing 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 stations protectors, for communications lines.

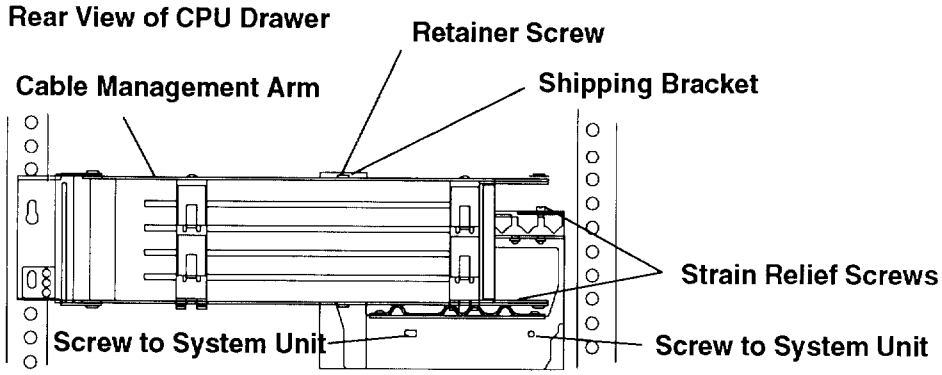
3. If practical, switch off power to all external devices attached to the system unit, and then unplug the device power cords from the electrical outlets.
4. Open the back door of the system unit.
5. Disconnect the power cord to the CPU drawer being worked on at the power supply connector of the CPU drawer.

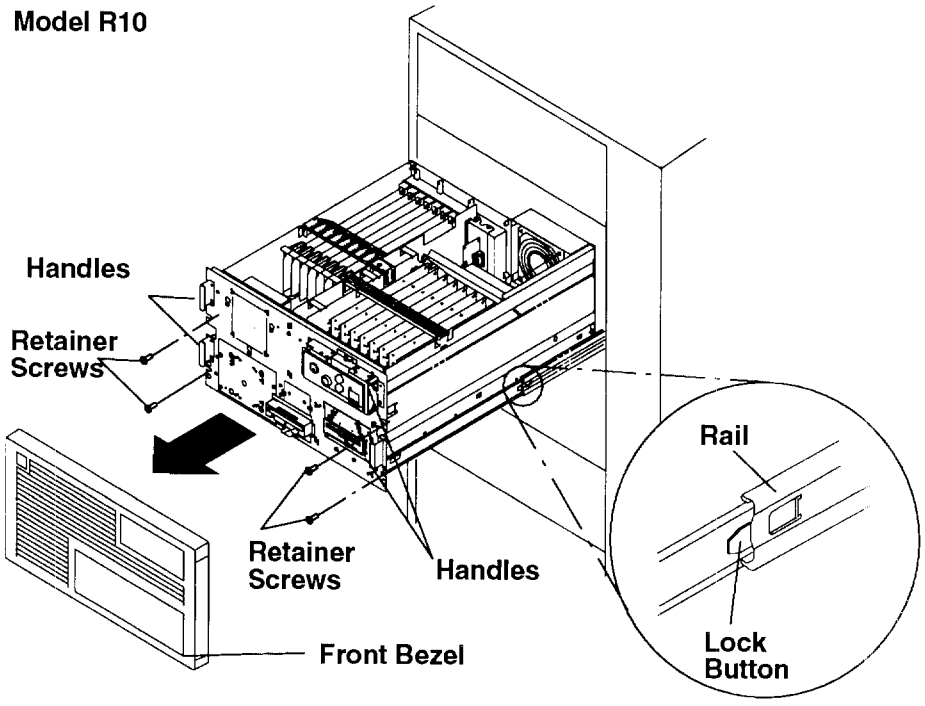


Service Position

To gain access to the system unit, follow these steps:

1. Do the steps in the "Power-Off Procedure" on page 3-4.
2. If the shipping bracket is attached to the rear of the rack, loosen the retainer screw and swing the bracket away so that the cable management arm is free to move when the drawer is extended.
3. If you need to service any adapter cards, loosen the screw on the strain relief, and then disconnect any external cables from the adapter cards.
4. Remove the power cord from the rear of the CPU drawer.
5. Ensure that any loose cables will not bind when the drawer is pulled out.
6. If the machine has a front bezel installed, remove it by pulling it toward you.
7. Remove the four retainer screws from the front of the drawer.
8. Pull the drawer out until the lock buttons on the rails lock.



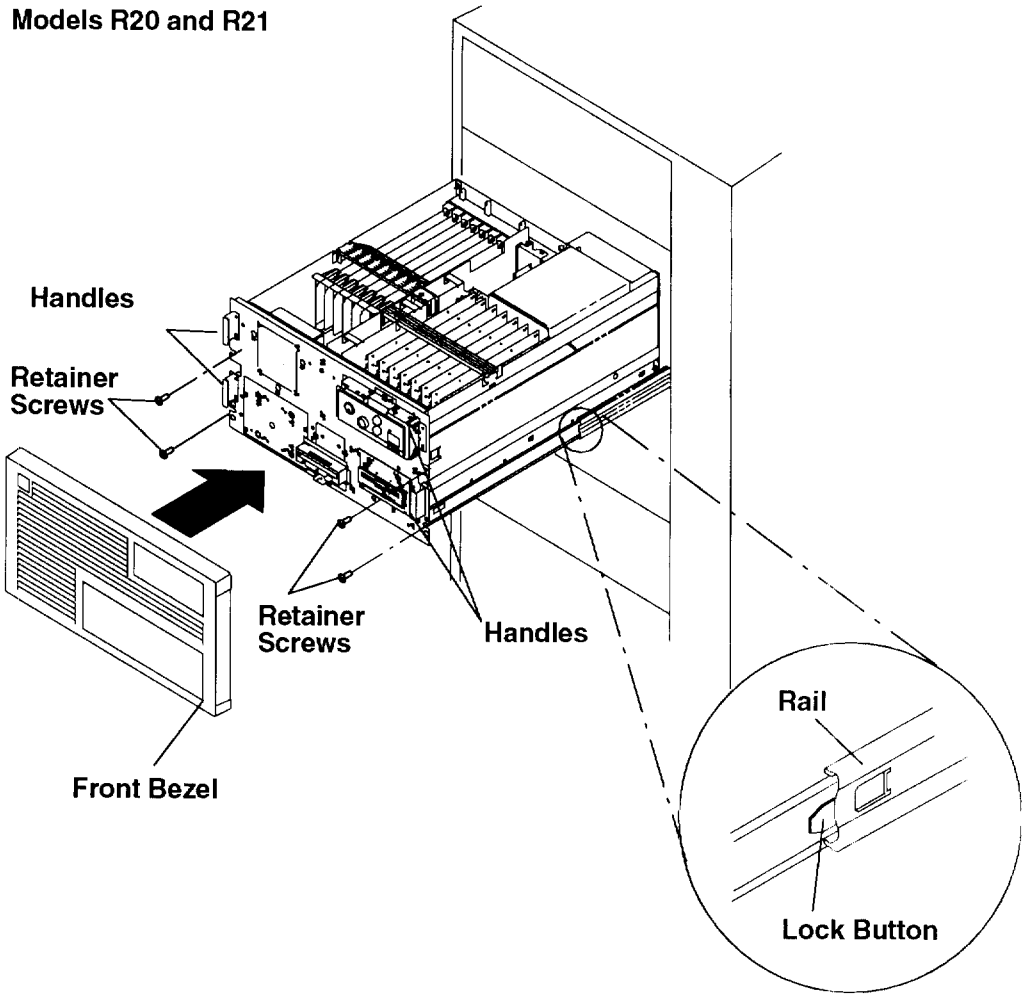


Operating Position

To place the system unit into the operating position, follow these steps:

1. Press the lock buttons on the rails and slide the drawer into the system unit.
2. Install the four retainer screws on the front of the drawer.
3. Replace the front bezel by pushing it toward the machine.
4. Plug the power cord into the CPU drawer.
5. Re-connect any external cables to the rear of the I/O planar if you removed them earlier, and then tighten the screws on the strain relief.
6. Do the steps in the "Power-On Procedure" on page 3-2.

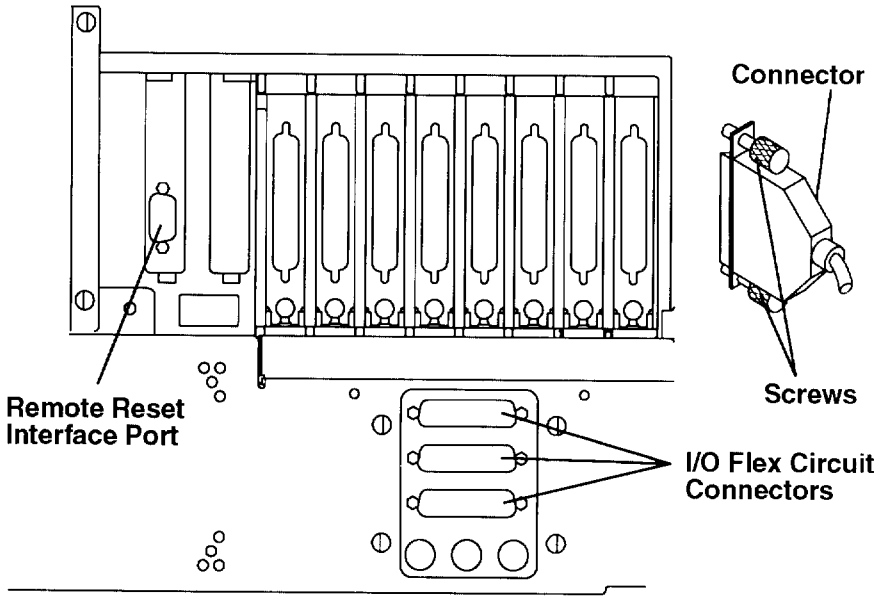
Models R20 and R21



Adapter Cable

Removal

1. Do the "Power-Off Procedure" on page 3-4.
2. Record the locations of the adapter cables.
3. If needed, loosen the strain relief screws on the cable management arm, see page 3-6.
4. Loosen the screws on the cable connector at the rear of the system unit.
5. Disconnect the adapter cable from the adapter.



Replacement

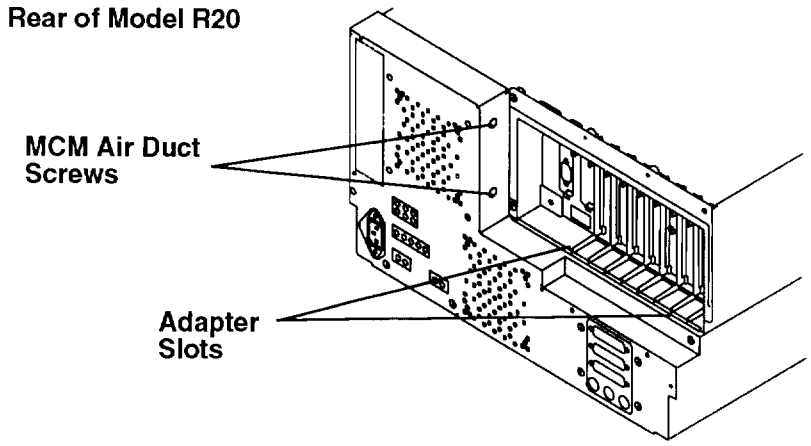
Replace in reverse order. Then, do the "Power-On Procedure" on page 3-2.

L2 Cache SIMM

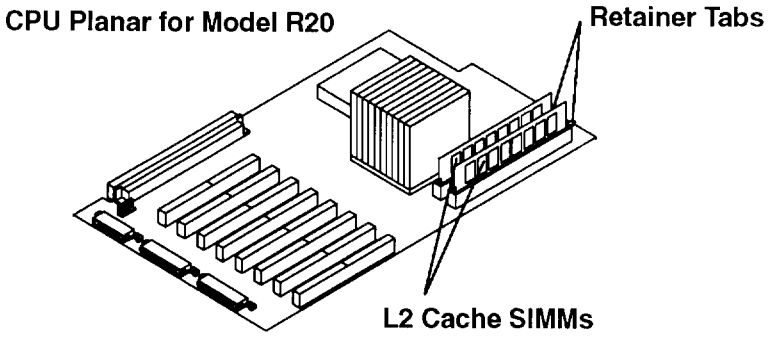
The L2 Cache SIMMs are located only on the model R20 CPU planar.

Removal

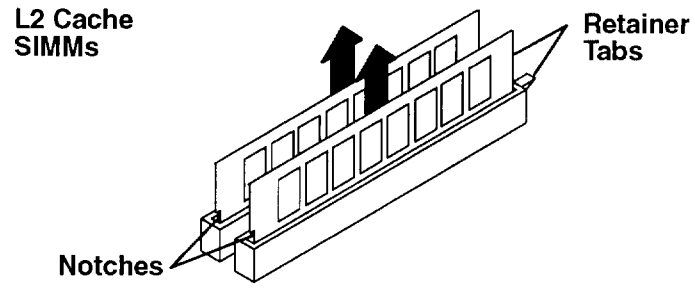
1. Do steps 1 and 2 in "Service Position" on page 3-6.
2. Remove the two screws that attach the MCM air duct to the fan housing.



3. Complete the remaining steps of "Service Position" on page 3-6.
4. Lift the air baffle up and away from the L2 cache area.



5. Lift the retainer tabs and pull the L2 Cache SIMMs straight out.



Replacement

Place the notched end into the connector first and then press the other end in until it clicks. Replace in the reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Adapter or Memory Card

Note: Refer to "Handling Static-Sensitive Devices" on page 3-1 before removing or installing adapters.

The memory cards are pressed into their slots on the CPU planar. The memory card components face down.

Most memory cards are configured in pairs. Both of the paired cards must have the same amount of memory (MB), and be the same type (Sx). The paired memory cards are configured as follows:

Model R21 uses type S5.0 or higher memory, which can be installed as either 1 pair (slots D and H only), 1 quad (slots D, H, B, and F only), or 2 quads (all eight slots).

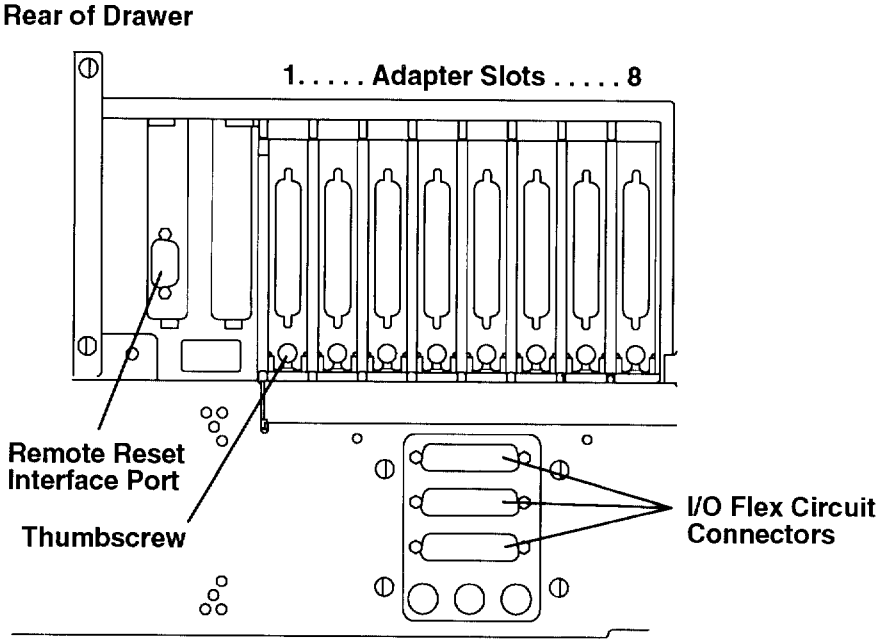
Model R20 uses type S4.6 or higher memory, which can be installed as either 1 pair (slots D and H only), 2 pair (slots D, H, B, and F only), 3 pair (slots D, H, B, F, C, and G only), or 4 pair (all eight slots).

Model R10 does not require that the memory cards be installed in pairs.

For information about the speed of the CPU planar and the type designation, see the *POWERstation and POWERserver Common Diagnostics Information Manual.*

Removal

1. Do the "Power-Off Procedure" on page 3-4.
2. If a cable is attached to the adapter you are removing, follow the procedure for adapter cable removal page 3-8.
3. Loosen the thumbscrew that holds the adapter in place at the rear of the system unit.



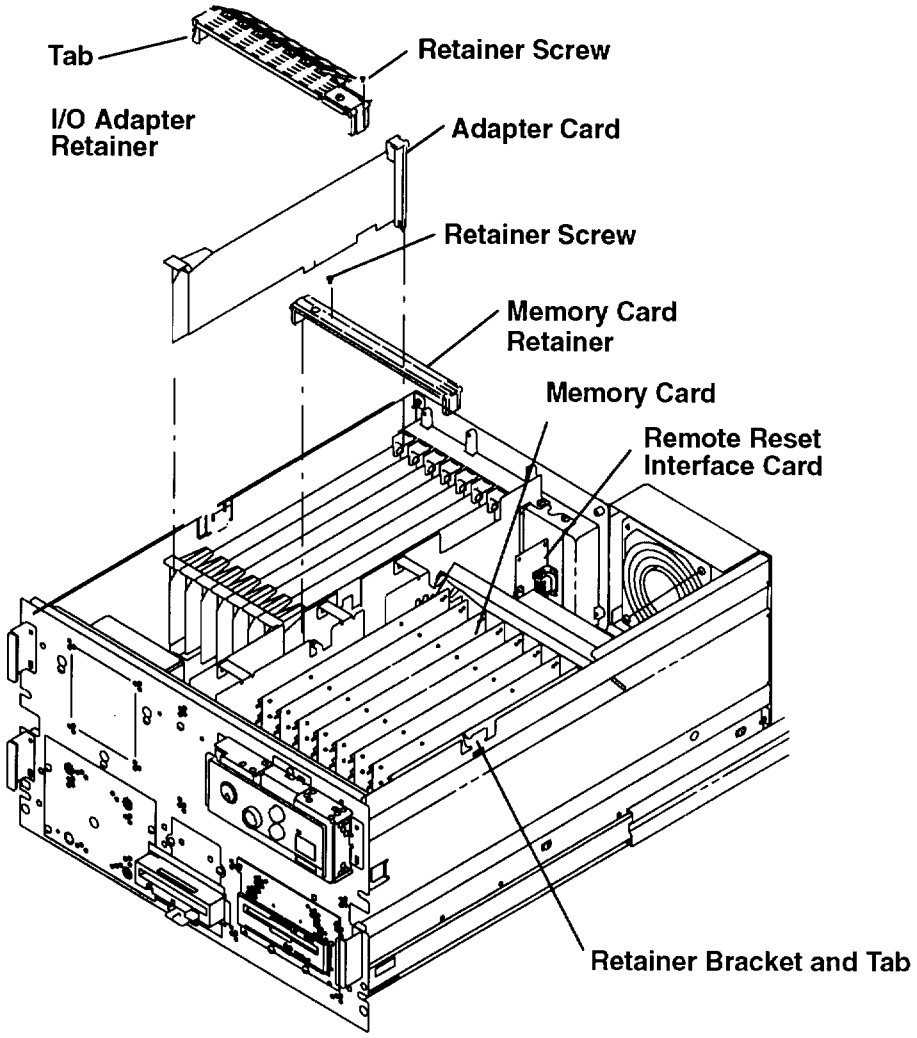
Note: If you are performing this procedure as part of the I/O and CPU planar assembly removal procedure, loosen all the thumbscrews.

4. Place the system unit in the service position. refer to page 3-6.
5. Remove the retainer screw from the adapter or memory card retainer.

6. Press the tabs on the retainer with a flat-blade screwdriver, then lift the retainer out of the retainer brackets.
7. Disconnect any internal cables attached to the adapter.
8. Record the position of the adapter or memory card before removing it from the drawer.

Warning: The latches on the SIMM connectors break easily. Handle them carefully.

9. Without touching the memory modules, carefully pull the card straight up and out
10. If you are removing a single inline memory module (SIMM) from the memory card, refer to the procedure for memory SIMM removal and replacement on page 3-12.



Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Memory SIMM

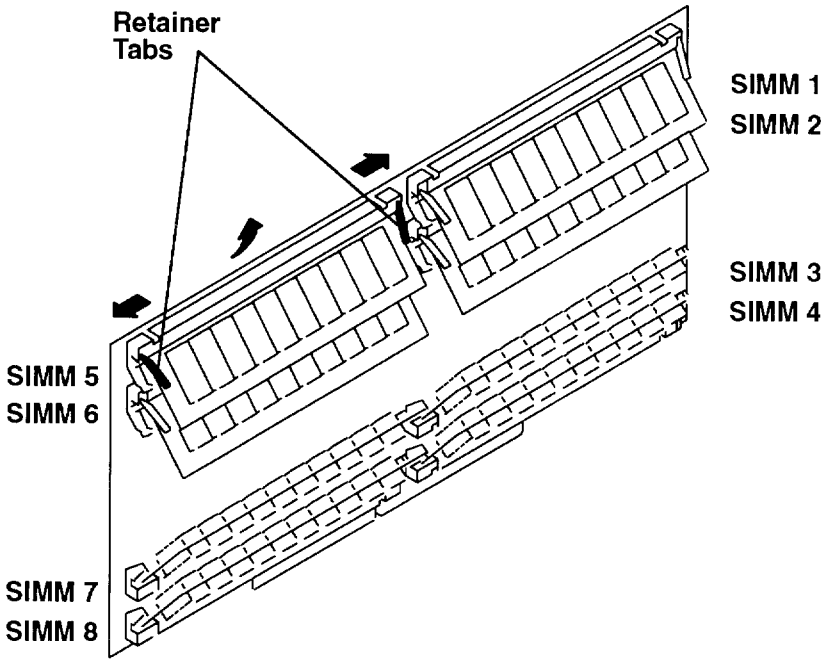
Removal

1. Do the memory card removal procedure on page 3-10.
2. Release the retainer tabs by pulling them away from the ends of the SIMM.
3. Rotate the SIMM away from the center of the card and pull it away from the socket.

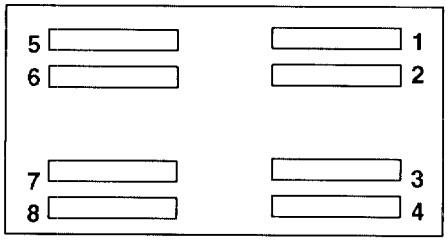
Replacement

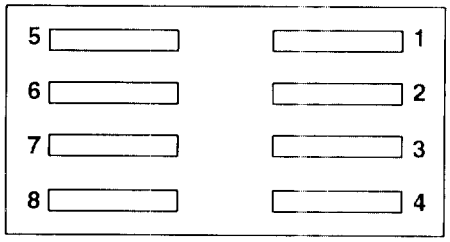
1. Place the SIMM in the keyed socket on the memory card; press the SIMM into the socket and then toward the center of the memory card until the retainer tabs latch.
2. Do the memory card replacement procedure on page 3-11.

Note: SIMM locations are shown as follows.



Memory board SIMM positions vary and are numbered as follows:



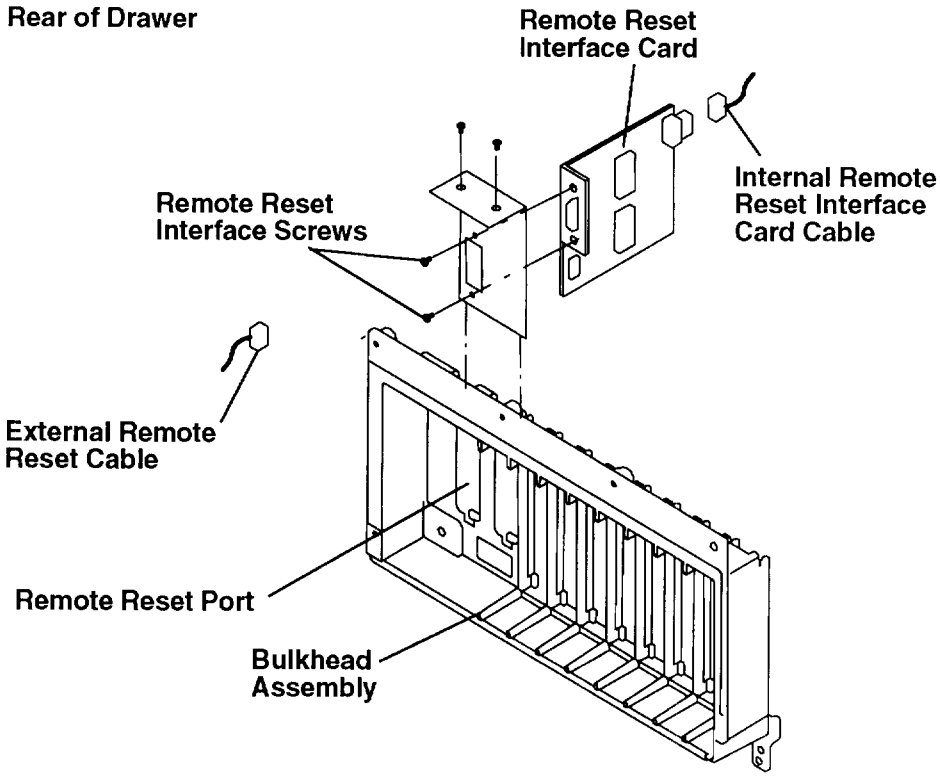


Remote Reset Interface Card

Note: Refer to "Handling Static-Sensitive Devices" on page 3-1 before removing or installing the remote reset interface card.

Removal

1. Do the "Power-Off Procedure" on page 3-4.
2. Disconnect the external cable attached to the remote reset port.
3. Place the system unit in the service position, refer to page 3-6.
4. Remove the two screws that hold the card bracket in place at the rear of the system unit.
5. Remove the remote reset interface card and bracket from the system unit.
6. Disconnect the internal cable attached to the remote reset interface port.
7. Remove the two screws that join the card to the bracket.



Replacement

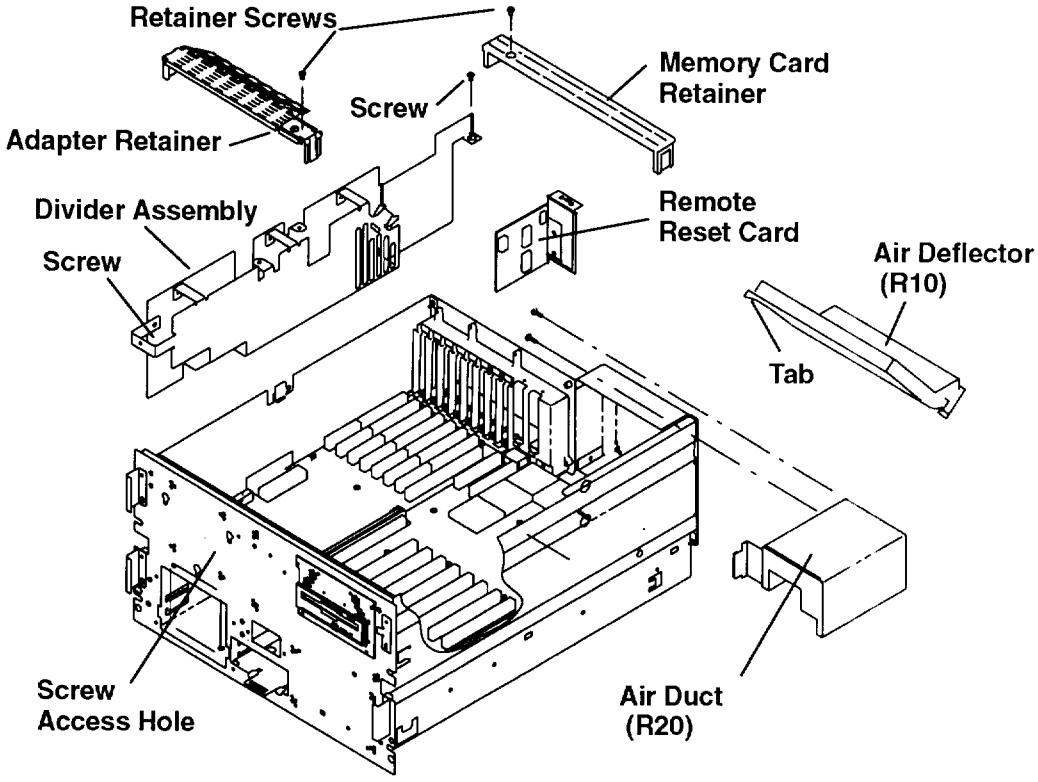
Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Note: Ensure that the bracket for the remote reset interface card is mounted under the tab for the divider.

Divider Assembly

Removal

1. Place the system unit in the service position. refer to page 3-6.
2. Remove all the retainer screws.
3. Remove the retainers, one at a time, by pressing one of the retainer tabs with a flat-blade screwdriver and lifting the retainer out of the retainer brackets.
4. For model R10, press the tab on the air deflector with a flat-blade screwdriver, then remove the air deflector. For model R20, detach the air duct from the divider.
5. Remove the two screws from the divider assembly. One is located at the front and the other is on the top rear of the assembly.
6. Carefully remove all cables that are routed through the divider.
7. Remove the divider assembly.



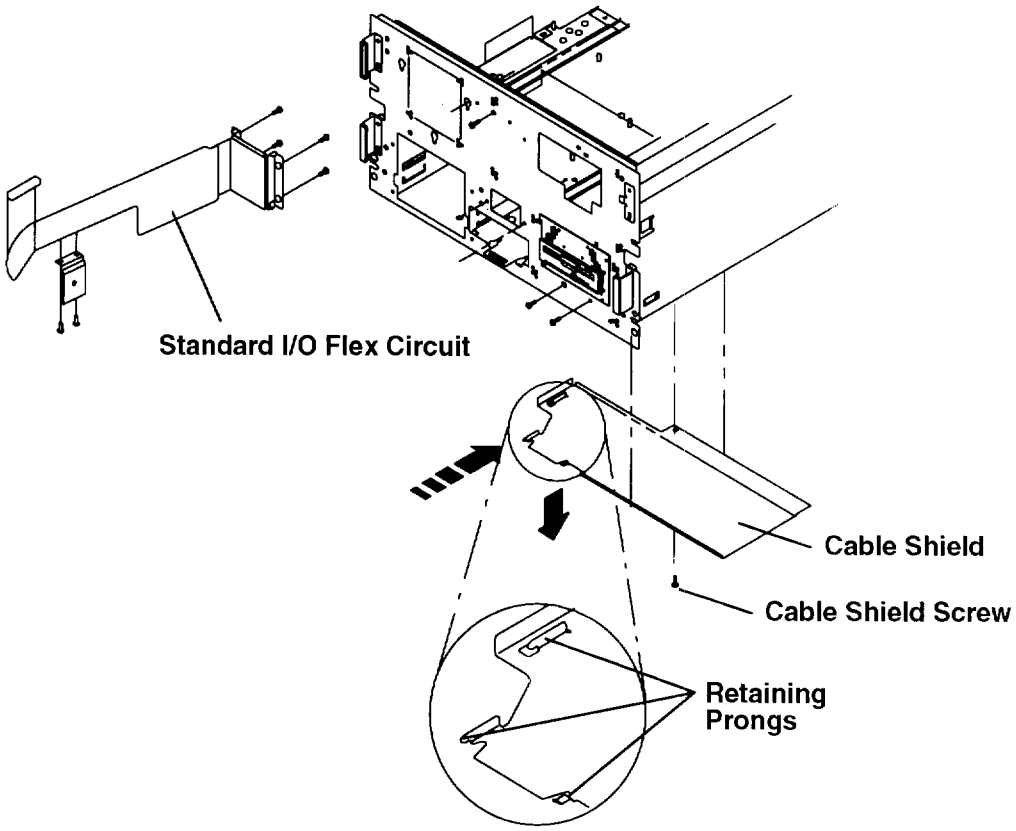
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Standard I/O Flex Circuit

Removal

1. Do the "Power-Off Procedure" on page 3-4.
2. Disconnect any external cables from the rear of the standard I/O flex circuit and adapter cards 7 and 8, see page 3-10.
3. Remove the mounting screws from the standard I/O flex circuit.
4. Place the system unit in the service position, refer to page 3-6.
5. Remove the screw that holds the cable shield to the system unit and slide the cable shield gently toward the back of the system unit, until it comes out.



6. Carefully disconnect the standard I/O flex circuit from the I/O planar, and remove it from the system unit.

Note: Remove adapter cards 7 and 8 if necessary to remove the connecter.

Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

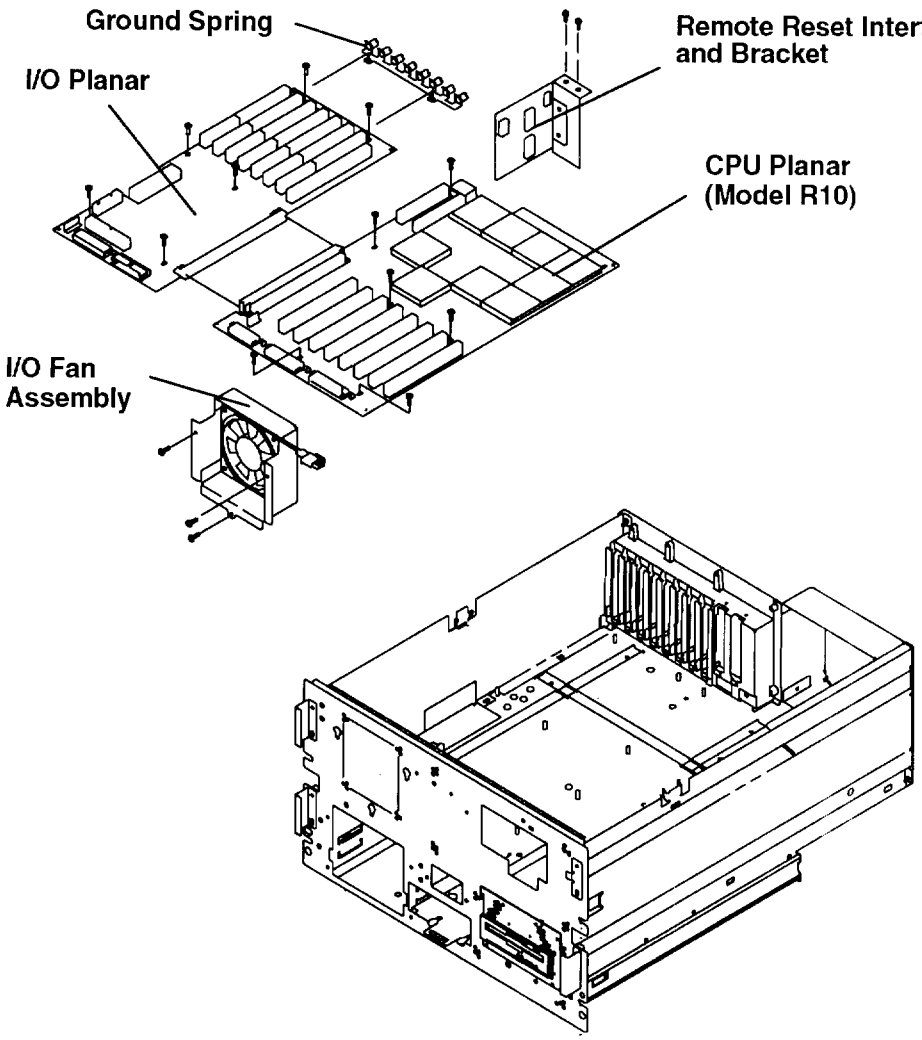
I/O and CPU Planar Assembly

Removal

1. Do the steps 1, 2, and 3 of the removal procedure for "Adapter or Memory Card" on page 3-10.
2. For model R20, remove the two screws holding the air duct to the CPU fan assembly. see page 3-13.
3. Disconnect the external cable attached to the remote reset interface port, see page 3-13.
4. Complete the removal procedure for "Adapter or Memory Card" on page 3-10 to remove all the adapters and cards.
5. Disconnect the standard I/O flex circuit from the I/O planar.
6. Follow the procedure for the removal of the divider assembly, refer to page 3-14.
7. Remove the remote reset interface card, see page 3-13.
8. Do steps 2 and 3 of the I/O fan assembly, refer to page 3-18.
9. Record the connector locations, and then disconnect the cables from the I/O and CPU planars.
10. Remove all mounting screws from the I/O planar and the CPU planar.
11. Remove the ground spring.
12. Remove the I/O and CPU planars as a unit, then carefully separate the planars.

Notes:

1. If you exchange the CPU planar, notify the customer that the unique identification number of the system unit has changed. The customer must update the authorization for programs using the identification number.
2. If L2 cache is present, be sure to transfer it to the new CPU planar, see page 3-9.



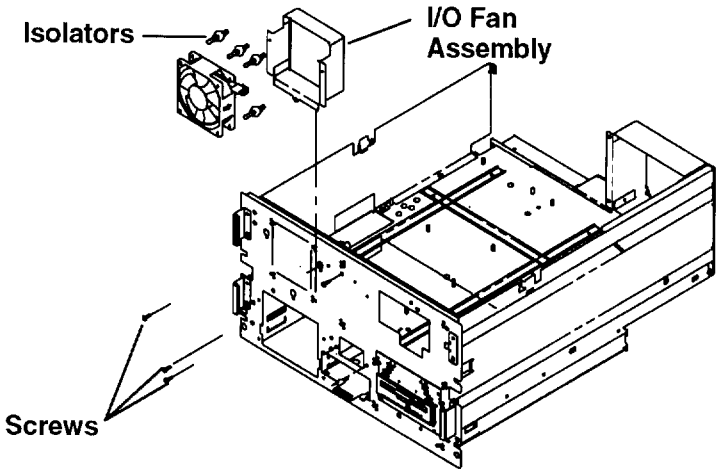
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

I/O Fan Assembly

Removal

1. Place the system unit in the service position, refer to page 3-6.
2. Loosen the three screws on the outside of the chassis that attach the fan assembly to the system unit.
3. Pull the fan assembly out of the system unit until you have access to the power connector. Press the locking tab on the connector, then disconnect the inline power connector from the power supply cable.
4. Push the isolators through the sheet metal housing by pressing on them with a flat blade screwdriver.
5. Carefully remove the four rubber isolators from the fan and set them aside for when you replace the fan.



Replacement

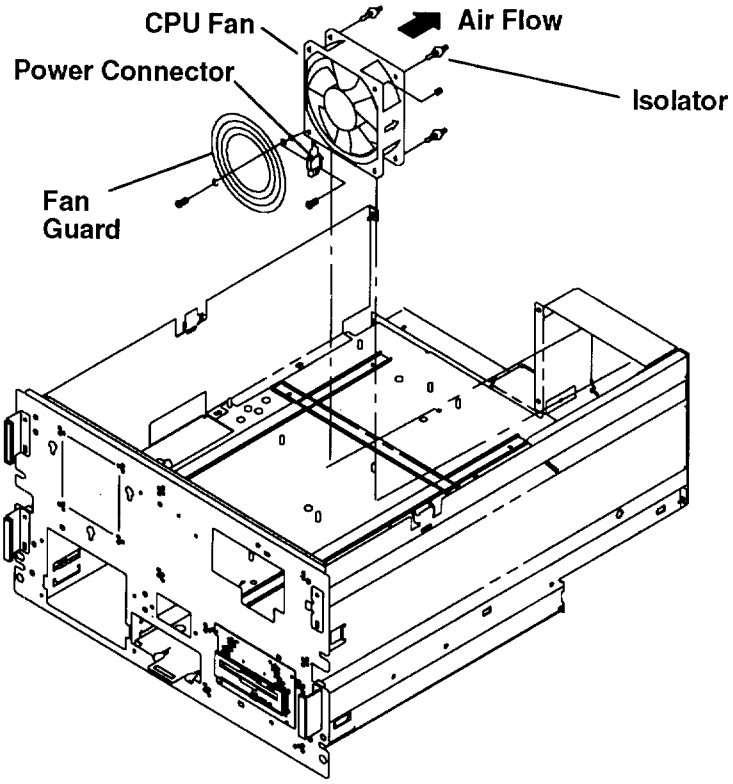
Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Note: Carefully pull the fan isolators through the sheet metal until they are correctly positioned.

CPU Fan Assembly

Removal

1. Do the "Power-Off Procedure" on page 3-4.
2. Carefully push the isolators through the sheet metal by pressing on them with a flat screwdriver.
3. If this is a model R20, remove the screws for the air duct, see page 3-9.
4. Place the system unit in the service position, refer to page 3-6.
5. For model R10, press the tab on the air deflector with a flat-blade screwdriver, then remove the air deflector. For model R20, remove the air duct, see page 3-9.
6. Pull the fan assembly out of the system unit until you have access to the power connector. Press the locking tab on the connector, then disconnect the power connector from the power supply.
7. Carefully remove the four rubber isolators from the fan and set them aside for when you replace the fan.
8. Remove the screws that attach the guard to the fan.



Replacement

Replace in reverse order.

Note: Carefully pull the fan isolators through the sheet metal until they are correctly positioned.

To place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

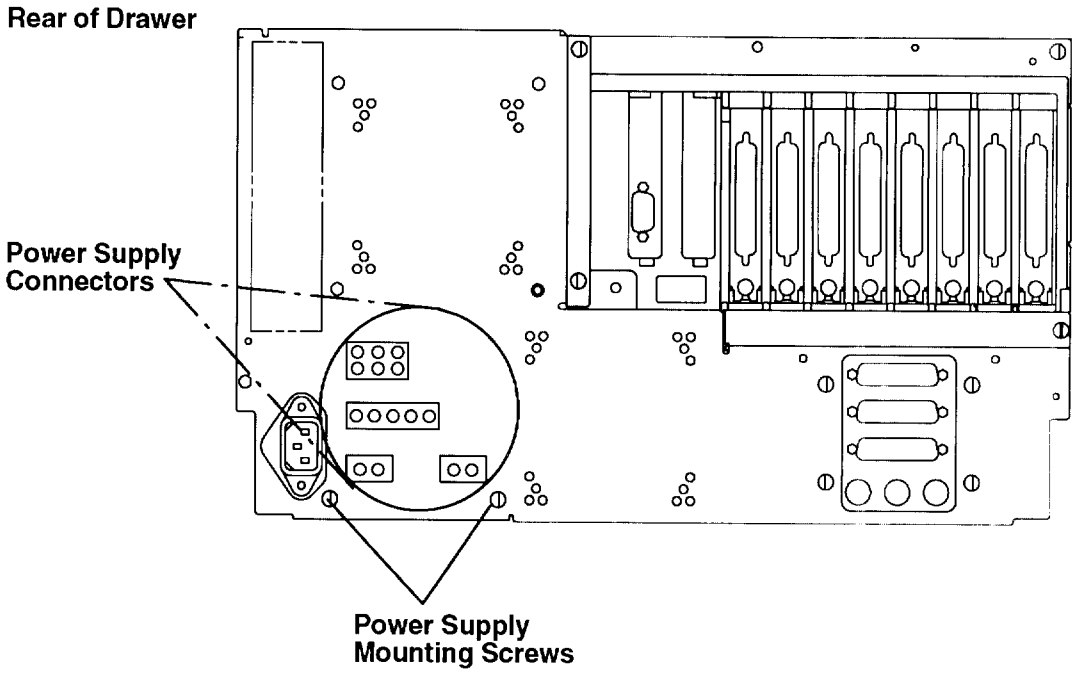
Power Supply

Removal

DANGER

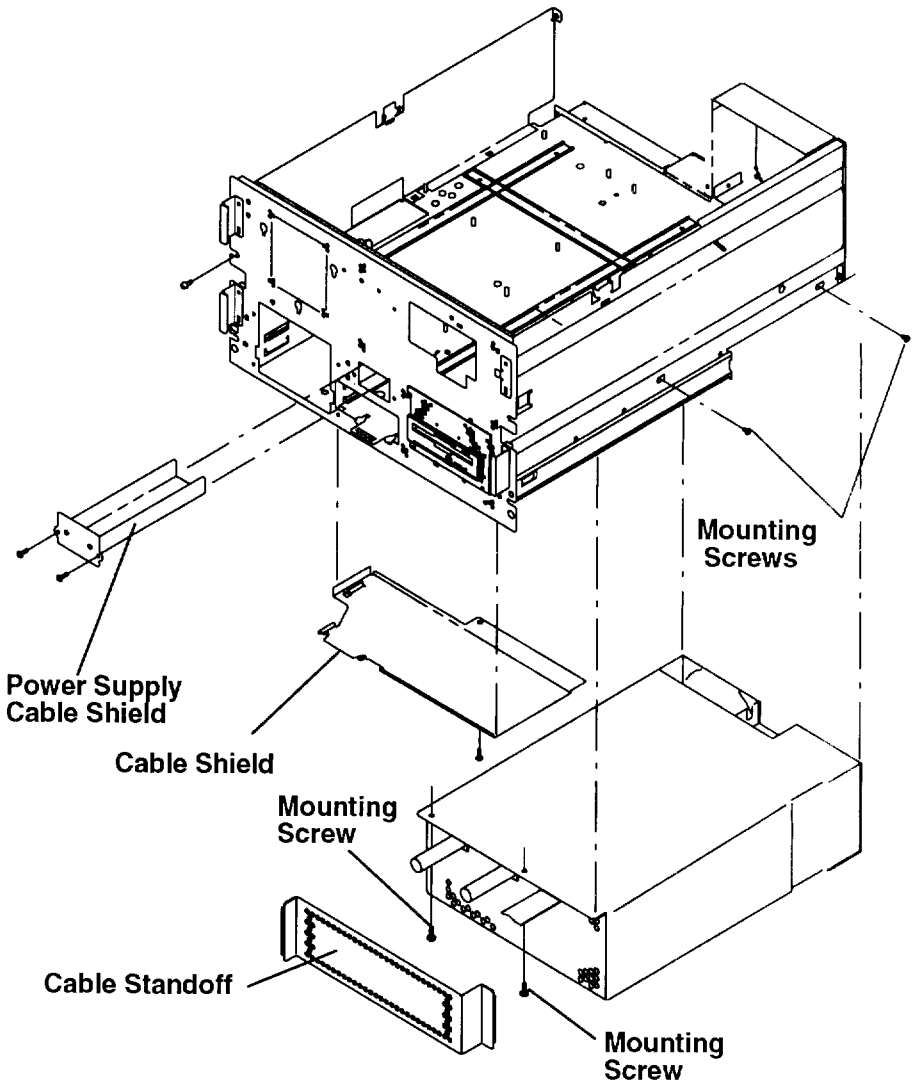
Do not attempt to open the covers of the power supply. Power supplies are not serviceable and are to be replaced as a unit.

1. Do the "Power-Off Procedure" on page 3-4.
2. Label and then unplug all cables attached to the power supply connectors.
3. Remove the two power-supply mounting screws.



4. Follow the removal procedure for the CPU fan on page 3-19.
5. Remove the two screws from the right side of the power-supply.
6. Remove the screws that retain the power supply cable shield to the front of the system unit, and then remove the power supply cable shield. See the figure on page 3-21.
7. Follow the procedure to remove the divider assembly on page 3-14.
8. Disconnect the power connectors from the I/O and CPU planars. Refer to the illustration on page 1-8 for information about disconnecting the power cables. Carefully guide the connecters through the hole in the floor of the system unit one at a time.
9. Label and remove memory cards as necessary, see page 3-10.
10. Remove the I/O fan assembly for access, see page 3-18.
11. Remove the screw that holds the cable shield to the system unit, and slide the cable shield gently toward the back of the system unit, until it comes out.
12. Disconnect the power connectors from the media drives.
13. Disconnect the power connector from J6 on the operator panel card, see page 3-25.

14. Pull the cable standoff from the chassis.
15. While supporting the power supply, remove the two remaining mounting screws from the front of the power supply.
16. Carefully guide the power-supply cables free of the frame, and then remove the power supply.



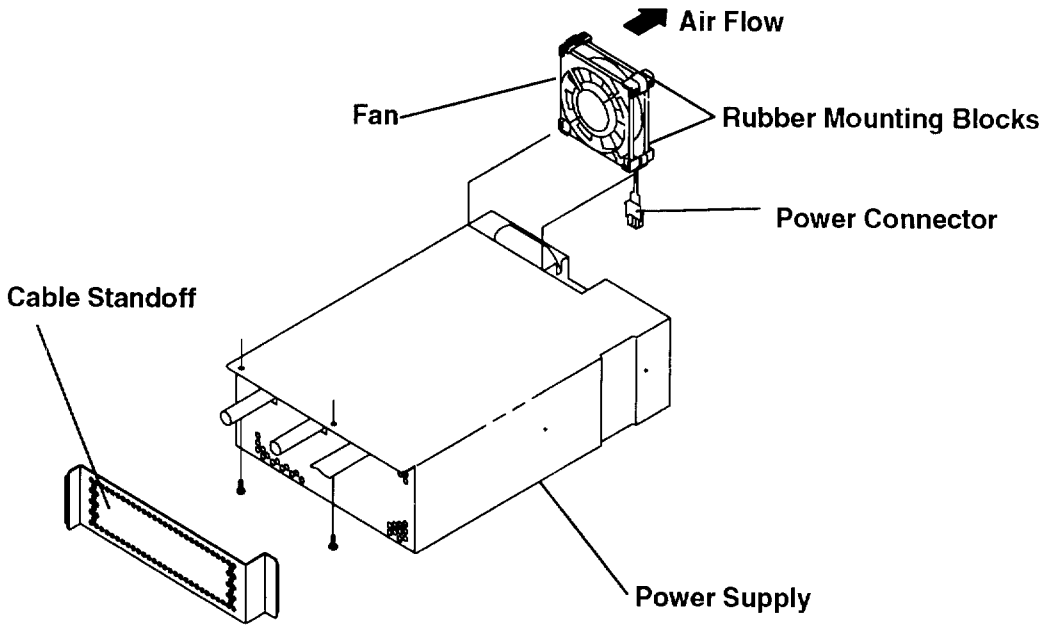
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Power Supply Fan

Removal

1. Follow the procedures for power supply removal on page 3-20.
2. Disconnect the fan power connector from the power supply.
3. Remove the fan and four rubber mounting blocks.
4. Carefully remove and set aside the four rubber mounting blocks for when you reassemble the fan.



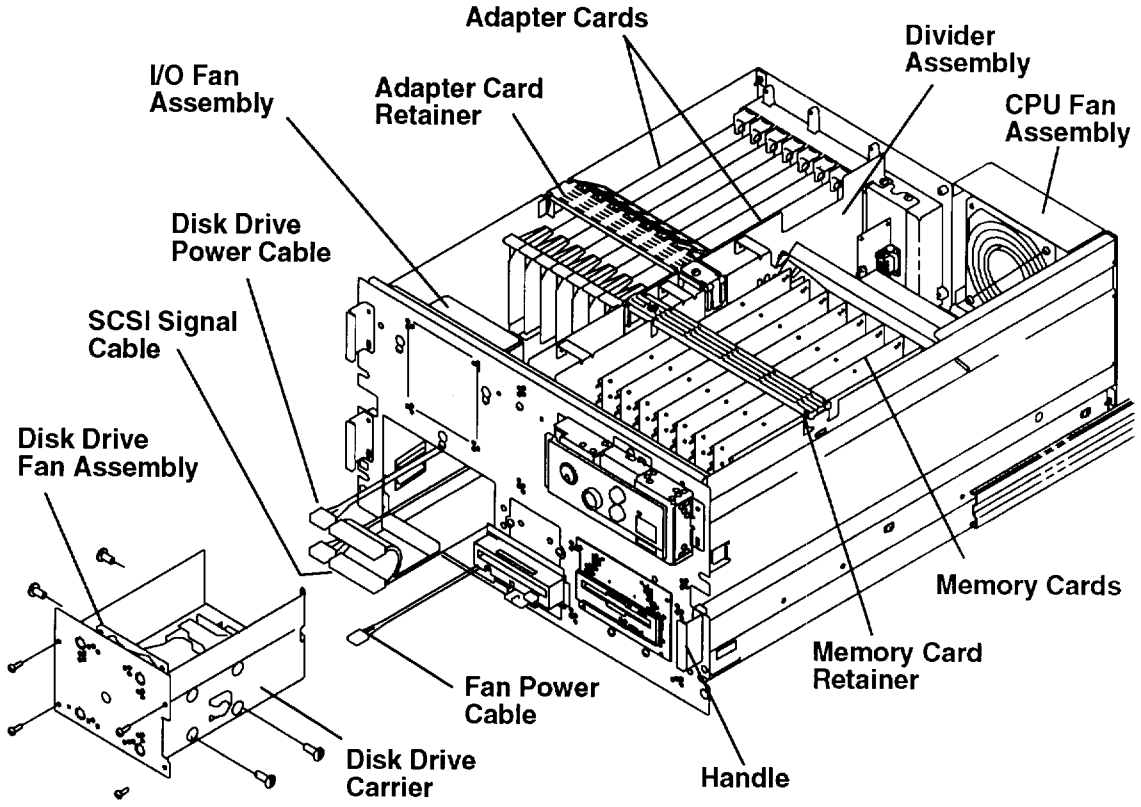
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Disk Drives

Removal

1. Place the system unit in the service position, refer to page 3-6.
2. Remove the four screws that secure the disk drive carrier and fan assembly in the system unit.
3. Pull the disk drive carrier and fan assembly out.
4. Disconnect the signal and power cables from the disk drive, and the power connector from the disk drive fan.
5. Remove the four screws and isolators that secure the disk drive to the sides of the carrier.



Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Warning: Do not overtighten the screws that hold the isolators to the sides of the carrier because this could cause the isolators to collapse.

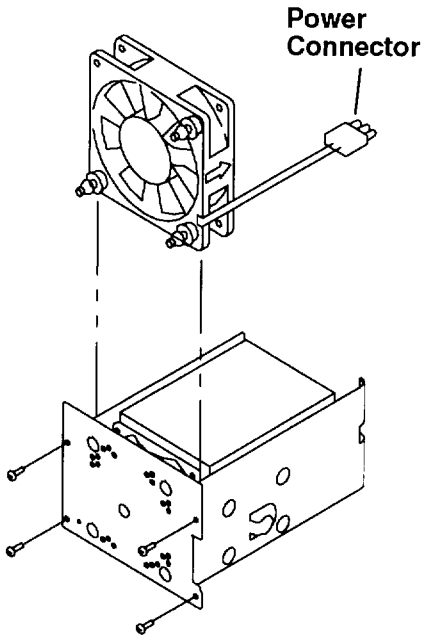
Disk Drive Fan

Removal

1. Follow the procedures for the removal of the disk drive on page 3-23.
2. Note the routing of the power connector cable for the fan.

Note: The tenon of the isolator extending through the sheet metal of the carrier is trimmed flush to the carrier face and will be difficult to reinsert into the carrier. For this reason, the isolator should remain in the carrier. The tenon should be pressed through the flange of the fan assembly only.

3. Pull the fan assembly out of the disk drive bracket by pressing the isolators through the flange of the fan assembly.



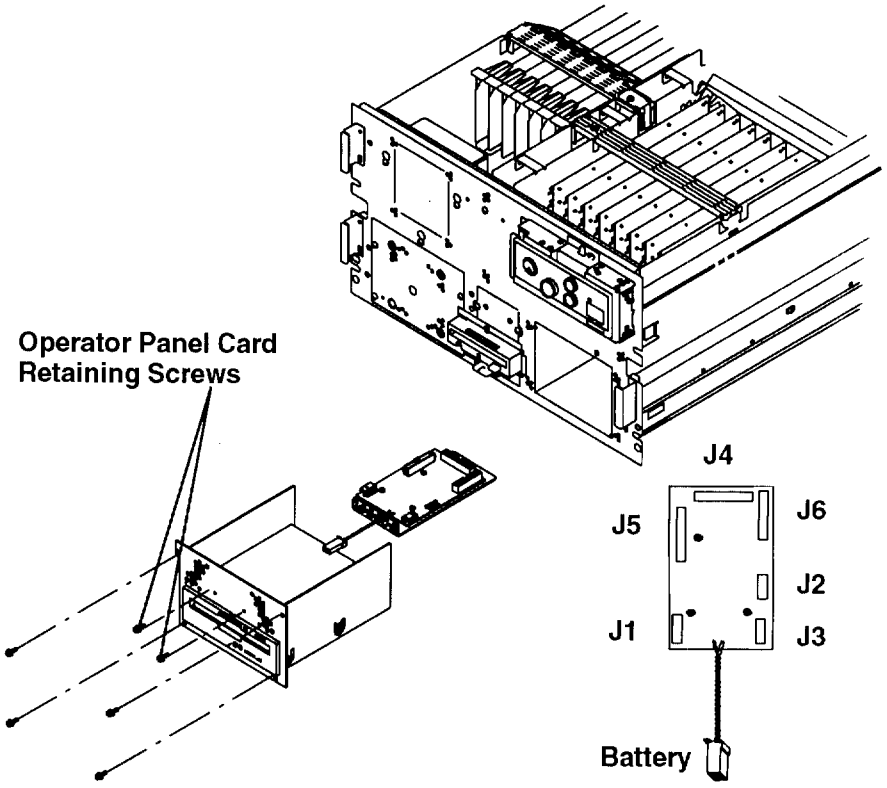
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Operator Panel Card

Removal

1. Place the system unit in the service position, refer to page 3-6.
2. Remove the four screws holding the CD-ROM carrier in place.
3. Pull the CD-ROM carrier out.
4. Label and disconnect all cables from the operator panel card.
5. Remove the two operator card retaining screws from the chassis of the unit.



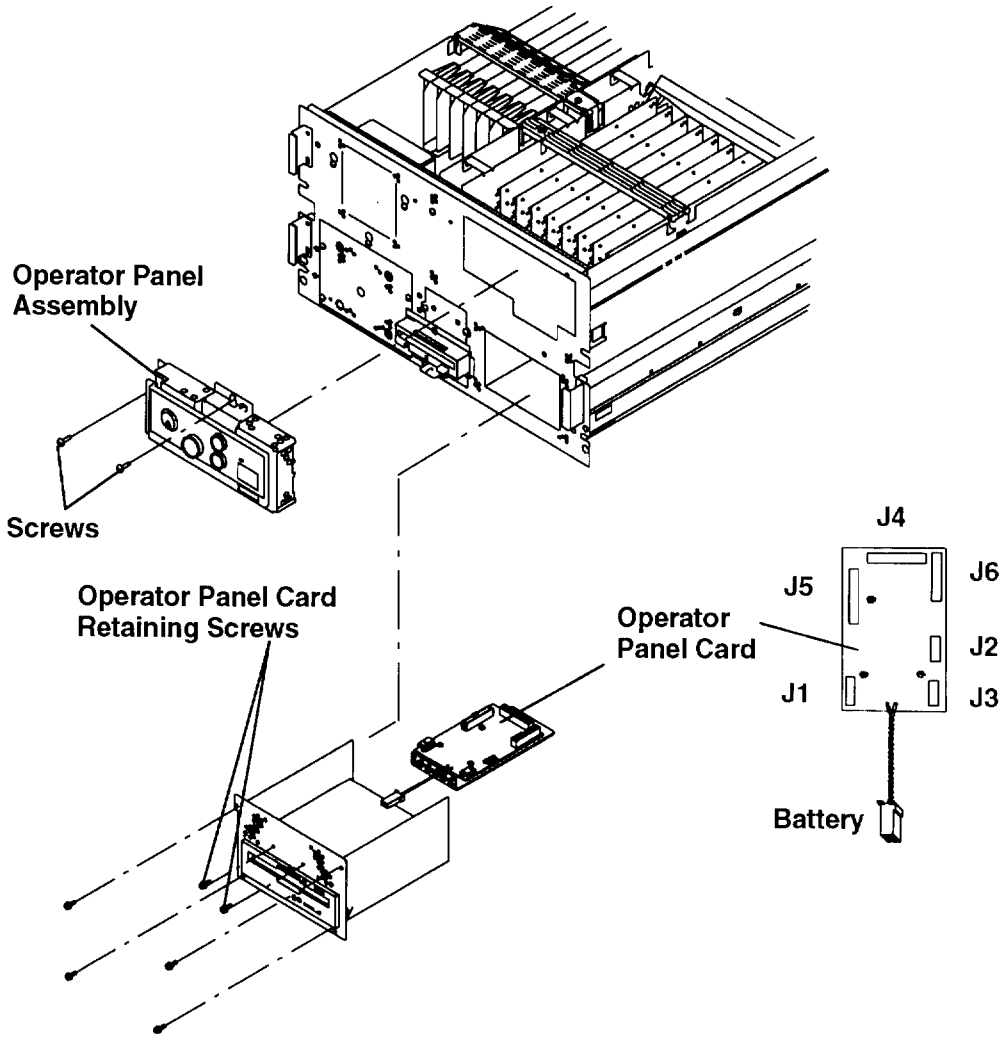
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Operator Panel Assembly

Removal

1. Place the system unit in the service position, refer to page 3-6.
2. Remove the four screws holding the CD-ROM carrier in place.
3. Pull the CD-ROM carrier out.
4. Disconnect J2, and J3 from the operator panel card.
5. Remove the left screw and loosen the top screw that secure the operator panel assembly.
6. Disconnect the flat cable from J6.



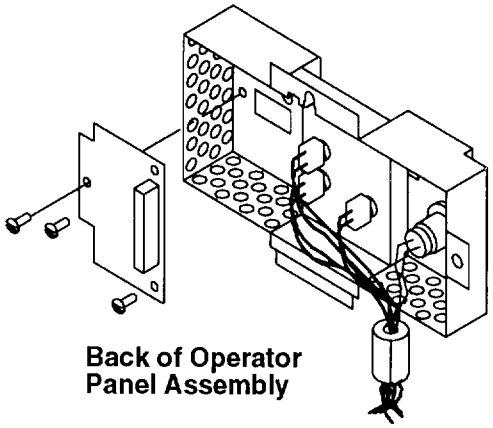
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Three-Digit Display Card

Removal

1. Follow the removal procedure for the operator panel assembly, refer to page 3-25.
2. Remove the three screws that hold the three-digit display card in position.
3. Remove the three-digit display card from the assembly.



Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

Battery

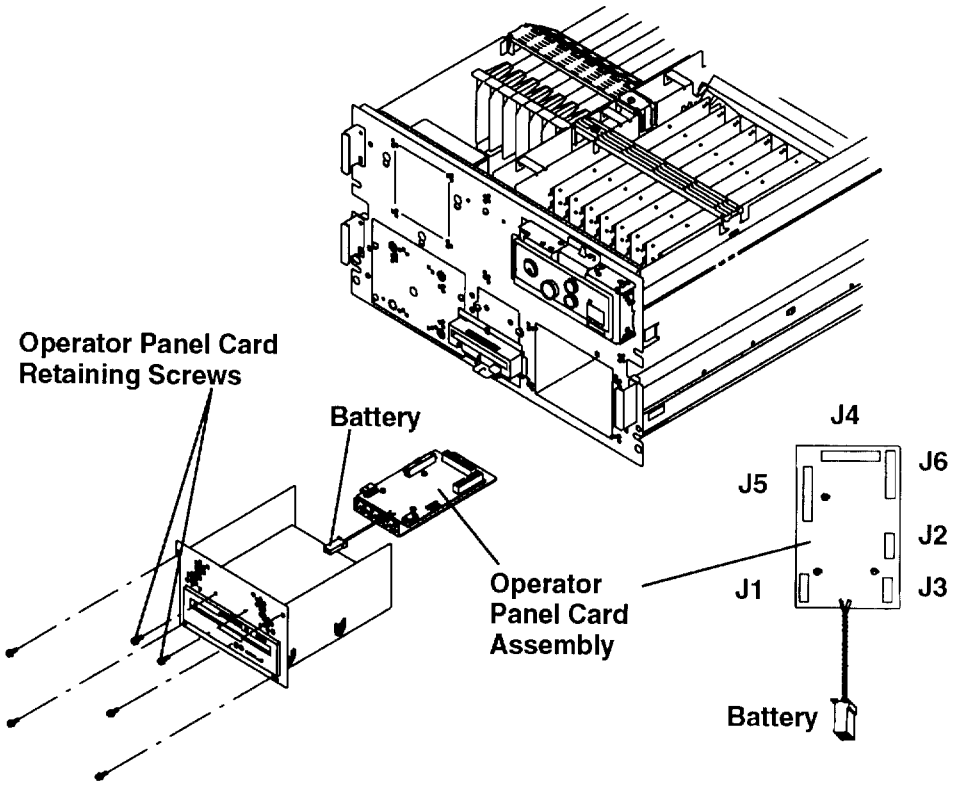
CAUTION:
A lithium battery can cause fire, explosion, or a severe burn. Do not recharge, disassemble, heat above 100°C (212°F), solder directly to the cell, incinerate, or expose cell contents to water. Keep away from children. Replace only with the part number specified for your system. Use of another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

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

Dispose of the battery according to local regulations.

Removal

1. Follow the procedure for the operator panel card removal on page 3-25.
2. Disconnect the in-line power connector from the battery, and then remove the battery from the CPU operator panel card.



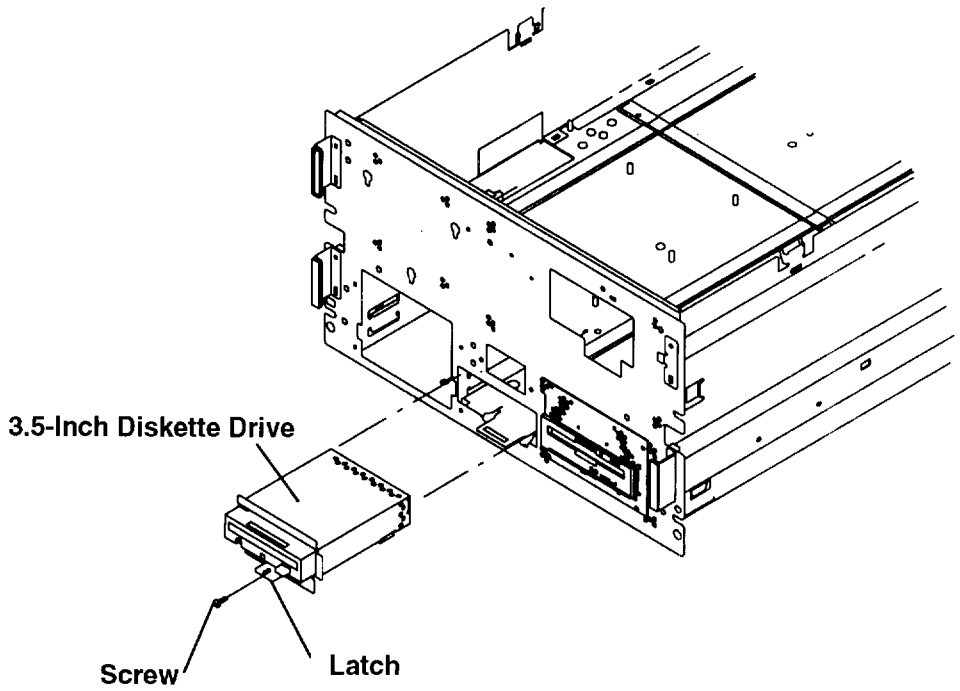
Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

3.5-Inch Diskette Drive

Removal

1. Place the system unit in the service position, refer to page 3-6.
2. Remove the screw that holds the drive to the chassis.
3. Press the latch and slide the drive assembly out until you have access to the connector, then disconnect the cable from the drive.
4. Invert the assembly. Remove the four screws holding the diskette drive to the tray.
5. Remove the drive from the tray.



Replacement

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.

CD-ROM Drive or Media Device

Note: For a translation of this notice, see *System Unit Safety Information.*

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

Removal

1. Place the system in the service position, refer to page 3-6
2. Remove the screw that holds the cable shield to the system unit and slide the cable shield gently toward the back of the system unit, until it comes out, see page 3-15.
3. Record the connector numbers, and then disconnect from the device the power connector, signal connector, and ground wire, if present.
4. Remove the four screws holding the device carrier in place.
5. Pull the device carrier out to gain access to the four screws holding the drive to the carrier.
6. Remove the two screws holding the device in the carrier.
7. Slide the device out toward the front.

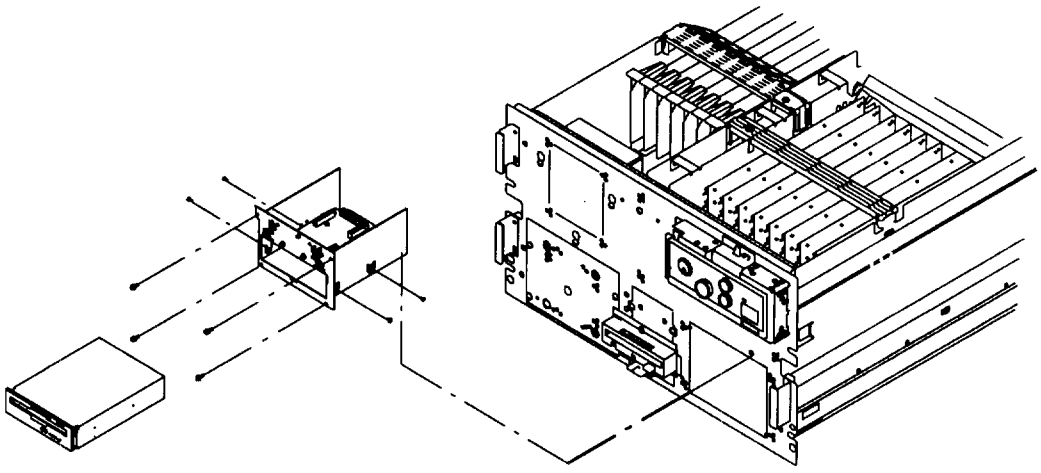
Replacement

Set the address and jumpers to be like those of the device you removed. Be sure the new drive is acclimated. Refer to "Acclimation" on page 3-1.

As needed, install new isolators if the removed drive had some installed.

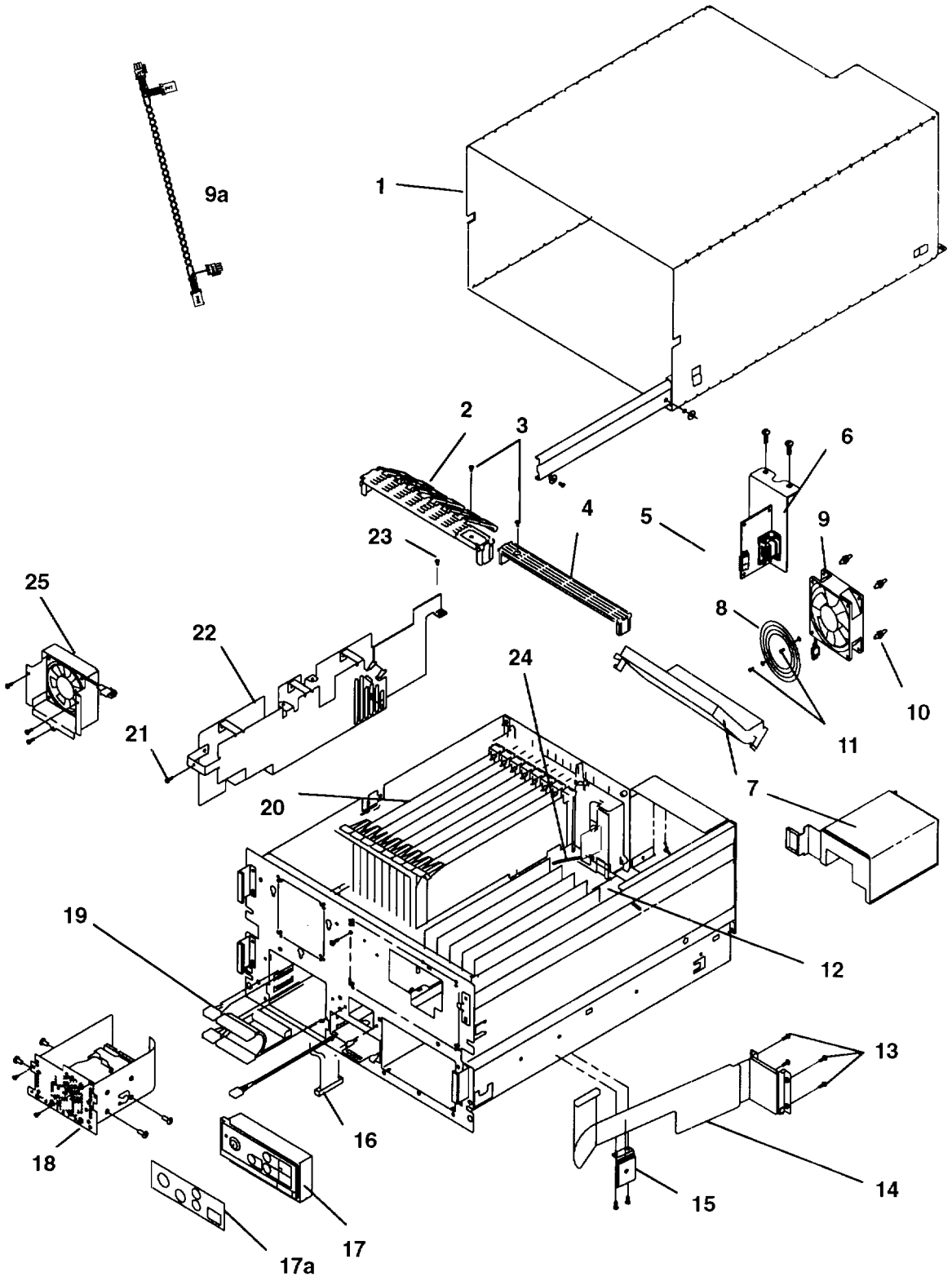
Note: Refer to the *POWERstation and POWERserver Common Diagnostics Information Manual* for address, jumper, and cartridge removal information.

Replace in reverse order. Then, to place the system unit in the operating position, refer to page 3-7. Then, do the "Power-On Procedure" on page 3-2.



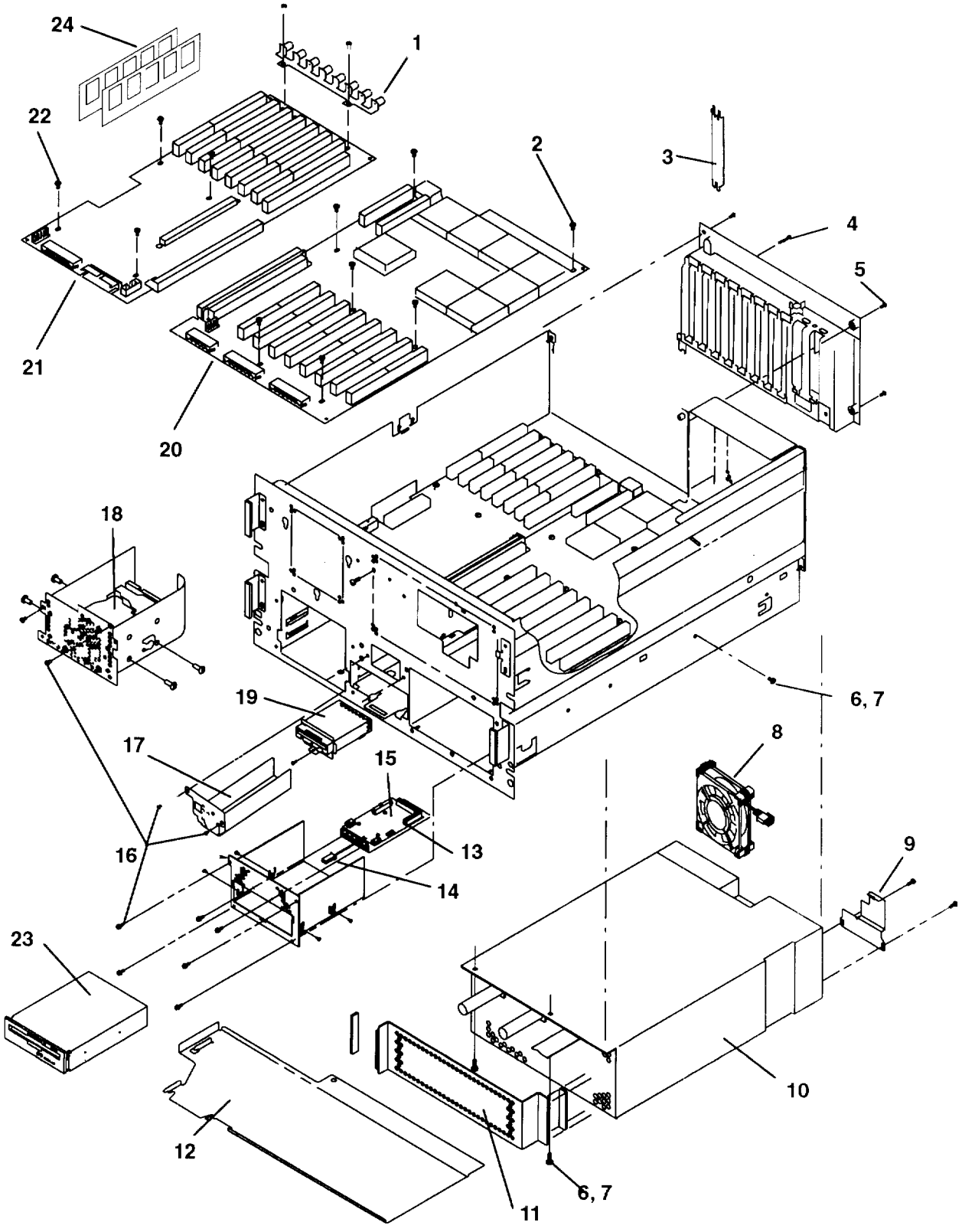
Chapter 4. Parts Information

Detail 1. Covers and Related Parts



Index Number	Part Number	Units Per Asm	Description
1	40H0480	1	Common assembly
2	41F0663	1	I/O adapter retainer
3	00G1270	2	Screw, M4 x 17 hex slot
4	40F9881	1	Memory card retainer
5	65G6875	1	Remote reset interface card
6	88G0247	1	Remote reset interface card assembly
7	11F8844	1	Air deflector (Model R10)
7	88G4717	1	Air duct (Model R20)
7	11H8295	1	Air duct (Model R21)
8	2546641	1	Fan guard
9	42F9872	1	Memory fan assembly
9a	39H8835	1	Fan speed control cable (Model R21 only)
10	81F7977	4	Isolator, fan
11	1621206	2	Fan guard screws, M4 x 14 pan
12	See note	1	Memory cards
13	00G1268	6	Screw, M4 x 7 hex slot
14	52G1483	1	Standard I/O flex cable
15	52G1458	1	Bracket
16	52G1466	1	Diskette cable
17	52G1485	1	Operator panel assembly
17a	40F9859	1	Operator panel assembly overlay
18	52G1505	1	Disk drive assembly
19	88G3325	1	SCSI cable, internal
20	See note	1	I/O adapters
21	00G1268	1	Screw, M4 x 7 hex slot
22	52G1492	1	Divider assembly
22	11H8293	1	Divider assembly (Model R21)
23	00G1269	1	Screw, M4 x 10 hex slot
24	52G1464	1	Remote reset cable
25	88G0255	1	I/O fan assembly
25	40F9871	1	I/O fan
Note:	For information about memory cards and SIMMs, see "Appendix C. System Memory Reference" in *POWERstation and POWERserver Common Diagnostics Information Manual.*		

Detail 2. Planars and Related Parts



Index Number	Part Number	Units Per Asm	Description
1	22F9503	1	Ground spring
2	6258899	10	Screw, M3 x 3 hex slot
3	6279235	AR 1-8	I/O slot brackets
4	1621204	1	Screw, M4 x 40 pan
5	00G1269	3	Screw, M4 x 10 hex slot
6	00G1268	5	Screw, M4 x 7 hex slot
7	1622304	2	Washer, power supply
8	59F4460	1	Power supply fan assembly
9	52G1449	1	Power supply cable shield
10	88G0131	1	Power supply (Model R10)
10	88G0134	1	Power supply (Model R20)
10	11H8271	1	Power supply (Model R21)
11	88G4723	1	Power supply cable standoff
12	52G1451	1	Cable shield
13	11H3253	1	Operator panel card
14	23F0168	1	Battery
15	11H3254	1	Remote reset cable (Not shown)
15	52G1465	1	Operator panel cable (Not shown)
15	52G1466	1	Diskette drive cable (Not shown)
15	52G1483	1	Cable assembly (Not shown)
15	65G2854	1	LED cable (Not shown)
16	00G1268	10	Screw, M4 x 7 hex slot
17	52G1450	1	Power supply cable shield
18	See Note 1	1	Disk drive
19	See Note 1	1	3.5-inch diskette drive
20	See Note 2	1	CPU planar
21	See Note 2	1	I/O planar
22	6258899	6	Screw, M3 x 3 hex slot
23	See Note 1	1	CD-ROM
24	See note 1	2	L2 cache, .5MB SIMM (must be installed in pairs)

Notes:

1. For information about adapters, see *Adapters, Devices, and Cable Information.*

2. For information about L2 cache, planars and cards, see codes Dxx, 210, 215, and 221 in "Failing Function Codes" in *POWERstation and POWERserver Common Diagnostics Information Manual.*

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