RS/6000 SP

Maintenance Information Volume 3, Locations and Service Procedures

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> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information under "Notices" on page xvii.

Second Edition (February 1999)

This is a major revision of GA22-7377-00.

This edition applies to Version 3 Release 1 of the IBM Parallel System Support Programs for AIX (PSSP) Licensed Program, program number 5765-D51, and to all subsequent releases and modifications until otherwise indicated in new editions.

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Safety Notices

RS/6000 SP: Maintenance Information Volume 1 contains a list of all safety notices pertaining to SP hardware maintenance from Volumes 1, 2, 3, and 4.

Translations of these notices are also provided in Volume 1.

Personal ESD Requirements

The processor uses FRUs that are known to be sensitive to electrostatic discharge (ESD). To prevent ESD damage to FRUs or to prevent system failures, observe the following procedures:

* Keep the FRU in its original static-dissipative shipping container until the FRU is ready to be installed in the system. Move the static-dissipative container near the location where the FRU is to be installed (within ESD wrist strap distance). If the FRU must be put down for any reason, first place it in its static-dissipative container or place it on the static-dissipative mat.

* Open only the covers that are necessary to complete the task. Any time a cover is open the service representative and all people in the area must be ESD-safe. If power is switched on, or if removing or exchanging any FRU, always use the ESD kit (part 93F2649).

  1. Put on the ESD wrist strap.
  2. Attach the ESD cord to the wrist strap.
  3. Attach the ESD mat to the wrist strap, if required.
  4. Attach the insulated clip to the ESD cord.
  5. Attach the insulated clip to the frame holes labeled **ESD**. If the frame holes are not available, use a grounding point on the frame.

Electronic Emissions Notices

Federal Communications Commission (FCC) Statement

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. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

European Union (EU) Statement

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

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

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

United Kingdom Telecommunications Safety Requirements

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunications systems in the United Kingdom.

Industry Canada Compliance Statement

This Class A digital apparatus meets the requirements of the Canadien Interference-Causing Equipment Regulations.

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

For Installations in Japan:

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

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者:

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時，可能會造成射頻干擾，在這種情況下，

使用者會被要求採取某些適當的對策。

The following is a summary of the EMI Taiwan statement above.

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

Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

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

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation

betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

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

<u>Hinweis</u>

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

About This Book

This book is to help you, as a customer engineer:

- Identify field replaceable unit (FRU) locations
- Perform diagnostic service procedures
- Perform removal and replacement procedures

This book is to be used with:

- *IBM RS/6000 SP: Maintenance Information Volume 1, Installation and Relocation* (GA22-7375), (referred to, throughout this publication, as *RS/6000 SP: Maintenance Information Volume 1*). Volume 1 contains information to help you Identify RS/6000 SP frame types and components, perform installation and relocation procedures, and maintenance agreements and qualifications.
- *IBM RS/6000 SP: Maintenance Information, Volume 2, Maintenance Analysis Procedures* (GA22-7376), (referred to, throughout this publication, as *RS/6000 SP: Maintenance Information, Volume 2*). Volume 2 contains information to help you isolate RS/6000 SP failures.
- *IBM RS/6000 SP: Maintenance Information, Volume 4, Parts Catalog* (GA22-7378), (referred to, throughout this publication, as *RS/6000 SP: Maintenance Information, Volume 4*). Volume 4 contains a list of RS/6000 SP parts and FRUs with corresponding figures that contain indexed descriptions and part numbers.

For a list of related books and information, see the bibliography in the back of *RS/6000 SP: Maintenance Information Volume 1*.

Who Should Use This Book

This book is intended for the product-trained Customer Engineer (CE). The procedures for RS/6000 SP and feature components described in this book represent a part of the overall support structure of the RS/6000 SP product. This book is intended to support the RS/6000 SP product and SP1/SP2 coexistence systems, in which SP2 code is utilized. The SP1 version of this book (*IBM 9076 Scalable POWERparallel Systems: Maintenance Information*, SY66-0299) should be used for ordering SP1 parts, or if SP1 code is utilized.

User's Responsibilities

Before calling the IBM customer engineer, the system administrator should use the problem determination section of the *IBM Parallel System Support Programs for AIX: Diagnosis Guide*, SC23-3866 for initial problem determination. If there is nothing wrong with the customer operating procedures, customer-supplied cables, or power source, the customer should call an IBM customer engineer.

Product Trained Customer Engineer

When performing RS/6000 SP maintenance, follow the "Maintenance Analysis Procedures" in *RS/6000 SP: Maintenance Information, Volume 2* (GA22-7376).

Beginning with the "Start" Map in *RS/6000 SP: Maintenance Information, Volume 2*, isolate the problem to one or more of these RS/6000 SP components:

- Supervisor Subsystem
- Processor Node
- Power Subsystem
- High Voltage Transformer (World Trade)
- Ethernet Local Area Networks (LANs)
- High-Performance Switch
- Micro Channel or PCI Adapter.

If you cannot determine the failure's cause, you should request the assistance of the RS/6000 SP Field Support Center.

Getting More Information

This book and other RS/6000 SP hardware and software documentation are available both online and in hardcopy from:

- The RS/6000 website at **http://www.rs6000.ibm.com**

- The Resource Center on the PSSP product media

- The Service Information Library (SIL)

- Hardcopy and CDROM versions orderable from IBM

- IBM internal use versions available on MKTTOOLS

For details, see the bibliography in *RS/6000 SP: Maintenance Information Volume 1*.

Summary of Changes

GA22-7377-00

This edition, along with GA22-7376-00 and GA22-7378-00, replaces GC23-3904-08 and makes it obsolete. Changes found in this edition include:

- Added SP-attached server (RS/6000 7017 Models S70 and S7A) information.

- Included 604/604e high node removal and replacement procedures and messages and codes from *7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide* that were not previously included in this manual.

- Included 332 MHz SMP node service procedures and messages and codes from *332 MHz SMP Thin and Wide Node Service Guide* that were not previously included in this manual. That guide is now obsolete.

- The Maintenance Information manuals, Volumes 1, 2, and 3, (GC23-3903 and GC23-3904) were reorganized into 4 volumes:

  - *IBM RS/6000 SP: Maintenance Information Volume 1, Installation and Relocation*, GA22-7375-00

  - *IBM RS/6000 SP: Maintenance Information, Volume 2, Maintenance Analysis Procedures*, GA22-7376-00

  - *IBM RS/6000 SP: Maintenance Information, Volume 3, Locations and Service Procedures*, GA22-7377-00

  - *IBM RS/6000 SP: Maintenance Information, Volume 4, Parts Catalog*, GA22-7378-00

GA22-7377-01

This edition replaces GA22-7377-00 and makes it obsolete. Changes found in this edition include:

- Added POWER3 SMP thin and wide node information.

Chapter 1. Locations

Naming Standard for RS/6000 SP Components

The purpose of this section is to define a naming standard for all components in the RS/6000 SP system. This standard provides a consistent, logical naming convention system necessary for documentation including details, assembly drawings, schematics, manufacturing documents, service documents, and customer publications.

Format Structure

The RS/6000 SP system is structured in a modular fashion with different levels of assembly which can be independently described. These levels are:

1. System level
2. Frame level
3. Major assembly level (e.g. processor node, high-performance switch).
4. Sub-Assembly level (e.g. cards, fan assembly).

The format structure is used to individually identify any connection location at any level in the assembly. The main use of this format is to describe connector, cabling, and schematic locations shown in tables and diagrams throughout this manual.

Example of Format Structure: **Format:** `FRAME(WWW) – MAJOR ASSEMBLY(XXX) – SUBASSEMBLY(YY) – CONNECTOR NUMBER (ZZZZ)`

Frame (WWW)

- 1st character is the frame type:
  - E for RS/6000 SP frame
  - L for logical RS/6000 SP frame (used for models 30X and 40X)
  - S for multi-switch frame
  - C for control workstation
  - Z for another frame such as a server
- 2nd and 3rd characters are the frame number:
  - 00 for any/all frames (designates location inside any/all frames)
  - 01 - 99 for frames 1-99 (specific to that frame)

Notes:

1. E01 designates RS/6000 SP physical frame 1

2. L00 designates any/all RS/6000 SP logical frames

3. S00 designates any/all RS/6000 SP multi-switch frames

4. For locations inside a frame, the Frame (WWW) and/or Major Assembly (XXX) strings may be omitted, making the format YY-ZZZ

Major Assembly (XXX)

- 1st character is the major assembly type (all three characters if the assembly occurs only once in a frame):
  - N for processor node assembly
  - S for high-performance switch assembly
  - PDU for power distribution unit assembly
  - ADC for ac/dc Converter assembly
  - FRA for frame
- 2nd and 3rd characters are the major assembly number:
  - 00 for any/all major assemblies (designates location inside any/all major assemblies)
  - 01 - 99 for major assembly 1-99 (specific to that major assembly)

Sub-Assembly (YY):   1st and 2nd characters are the assembly designation inside the major assembly. (This string may be omitted in some cases.)

Refer to the lists of two-character designations associated with each major assembly throughout this chapter.

Example: SC denotes a switch card.

Connection Location (ZZZZ)

- 1st character is the connection type:
    - P for plug (cable side)
    - J for jack (card/component side)
    - G for chassis ground connection
- 2nd, 3rd, and 4th characters are number identifiers. Leading zeroes may be omitted.

    Example: P102 is plug 102

Examples for Using Complete Levels of Nomenclature: To describe the jack 23 on the switch assembly bulkhead in the second RS/6000 SP frame in a four-frame configuration, designate as:

E02-S01-BH-J23

To describe plug 1 on the power card of the any switch assembly of any RS/6000 SP frame in any size system configuration, designate as:

E00-S00-PC-P1 or just PC-P1

Location Diagrams of the RS/6000 SP Components

See Figure 1-1 on page 1-4, Figure 1-2 on page 1-5, and Figure 1-4 on page 1-7, in the pages that follow, for views of the RS/6000 SP frame locations. Refer to the diagrams included in this section for specific views and cabling of the main component sections in the RS/6000 SP frame.

Front and Rear Views of RS/6000 SP Frame

Figure 1-1 on page 1-4 shows a front view of the RS/6000 SP frame locations, including the high-performance switch feature. "Frame (FRA)" on page 1-8 describes the assembly designations for the RS/6000 SP frame.

Processor Node
LEDs and CB

Processor
Node 7
(Slot 7)

Processor
Node 8
(Slot 8)

Main Power
Switch with
LED

Switch Assembly
(Slot 17)

Left Skirt

Right Skirt

A   B   C

48 V Power
Modules

(Front Cover and Skirt, and Air Filter Removed)

Figure   1-1. Front View of Frame Locations

Notes:

1. Wide processor nodes take up an entire shelf position (two thin processor node slots). They are identified by the odd numbered position.

2. In a F/C 2030/1 frame, switch assemblies take up an entire shelf partition. (They are identified by the even-numbered position.)

3. Processor node slots are numbered only up to N08 in the 49-inch frame (versus N16), to reflect the expansion limitation.

4. On the multi-switch frame, HiPS assemblies S4, S8, S12, and S16 are for RPQs or special orders only.

5. The single-phase SEPBU power unit must have a power module in position "D" (right-most slot). For N+1 operation, a power module may be installed in position "C" (next to slot "D").

6. There are no skirts on the 49-inch frame.

Figure 1-2 shows a front view of the RS/6000 SP multi-switch frame.

SP Switch Frame Locations - Front View
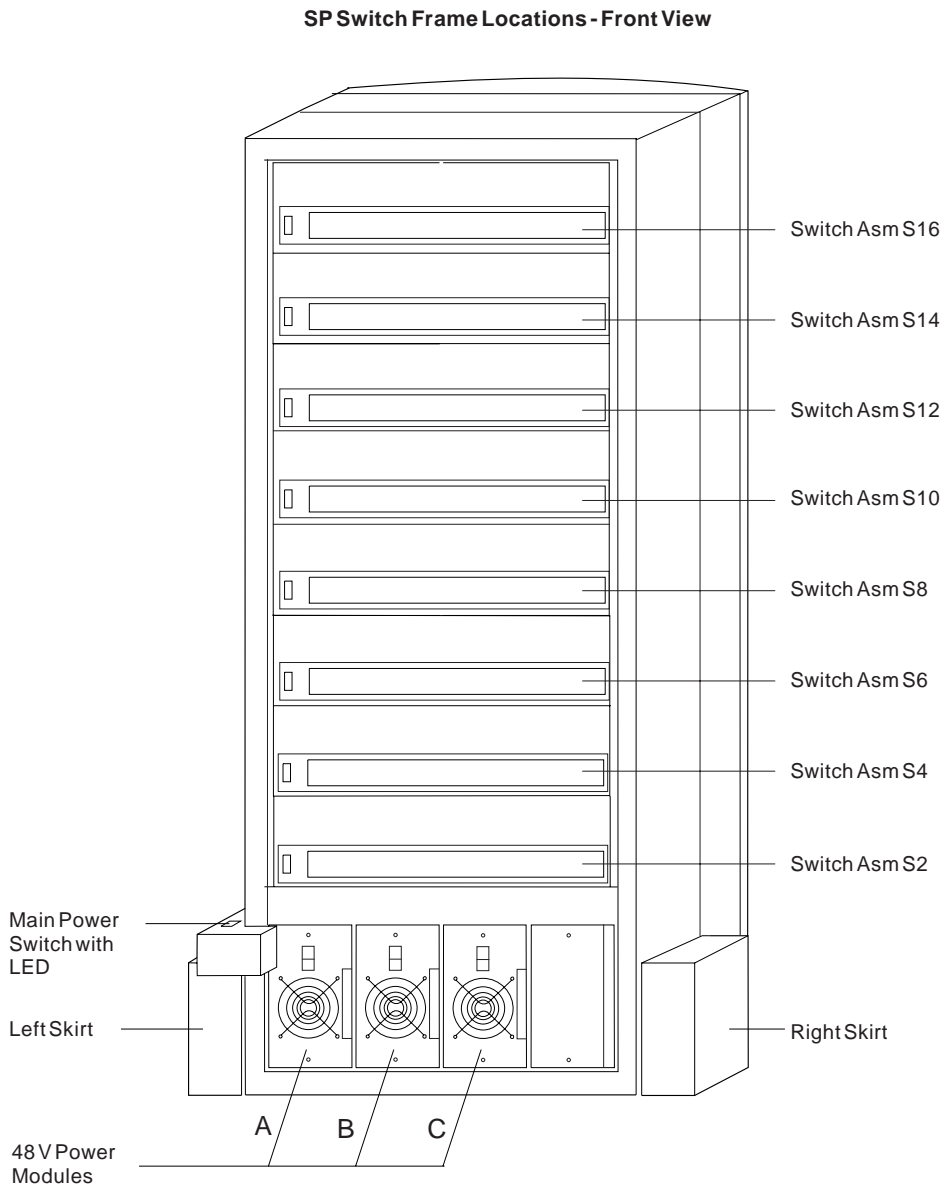
(Front Cover and Skirt, and Air Filter Removed)

Figure 1-2. Front View of Multi-Switch Frame Locations

Figure 1-3 on page 1-6 shows a front view of the Model 3AX (49-inch) frame.
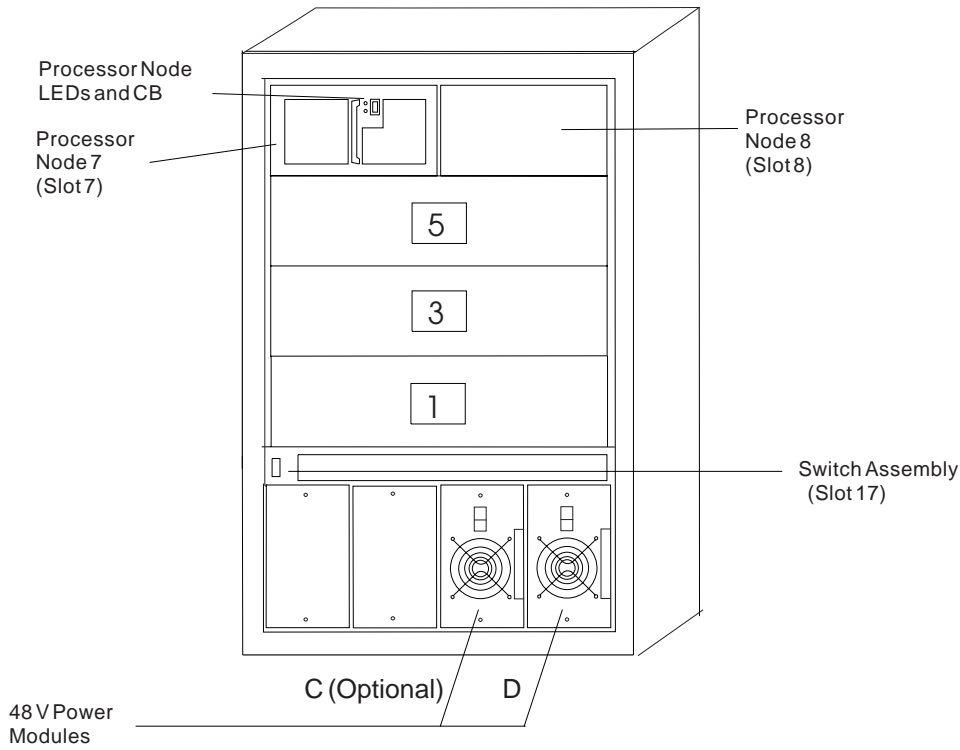
Figure 1-3. Front View of 49-Inch Frame Locations

Figure 1-4 on page 1-7 shows a rear view of the RS/6000 SP frame locations, including the high-performance switch feature.
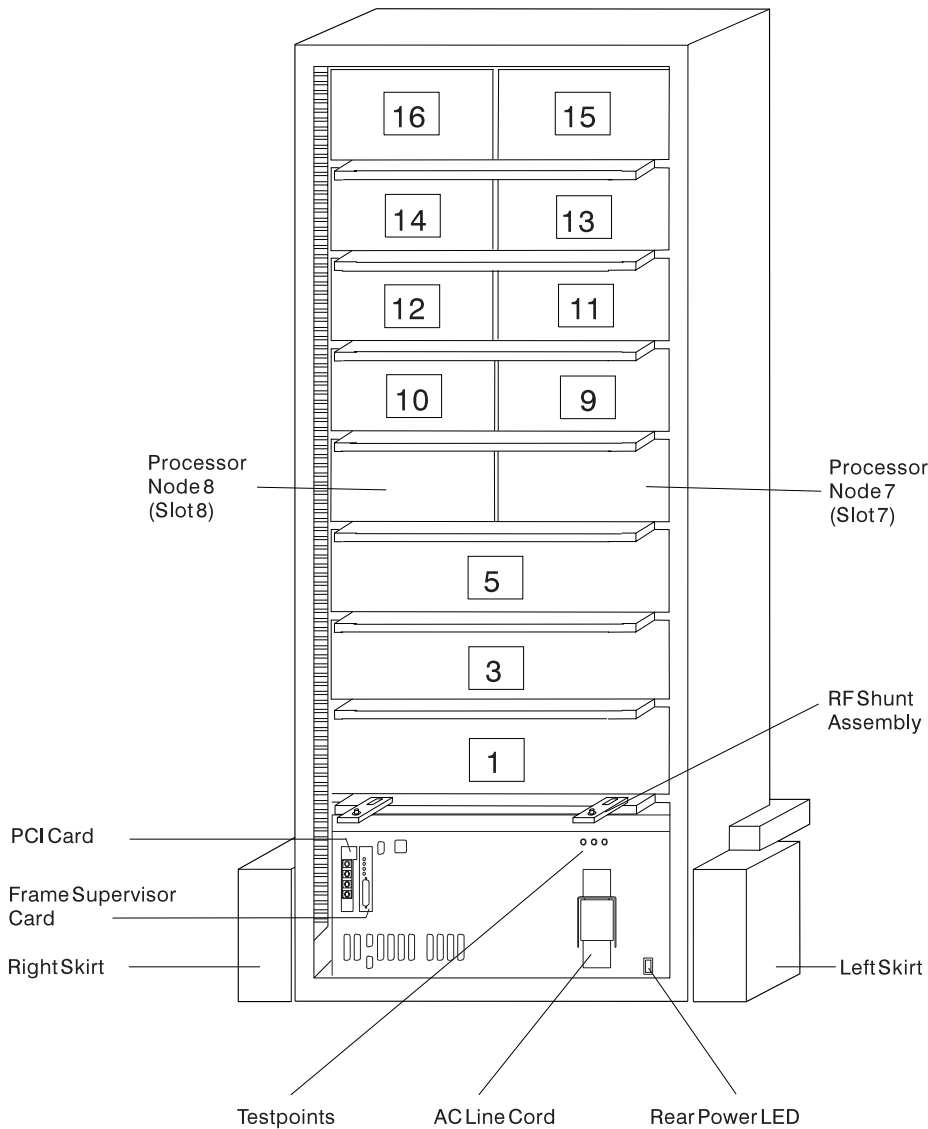
Figure   1-4. Rear View of Frame Locations

Note: See notes under Figure 1-1 on page 1-4 for processor node/switch assembly numbering.

Frame Locations

Figure 1-1 on page 1-4 shows a front view of the RS/6000 SP frame locations, including the high-performance switch feature, with numbered processor nodes, and the three phase SEPBU.

- • "Wide Processor Node (NXX)" on page 1-24 describes the assembly designations for the wide processor node
- • "Thin Processor Node (NXX)" on page 1-13 describes the assembly designations for the thin processor node
- • "Switch Assembly (SXX)" on page 1-47 describes the assembly designations for the high-performance switch assembly.

Frame (FRA): This list shows the designations specifically for the RS/6000 SP frame:

G1:   Right-hand rear ground

G2:   Left-hand rear ground

G3:   PDU ac ground

G4:   PDU dc ground

G5:   Input cable ground

G6:   Front door ground

G7:   Rear door ground

G8:   Ground

SW: Power-on switch

LD: LED card

FC: Front cover

RC: Rear cover

Example: E01-FRA-G1

Power Distribution Unit (PDU) Locations

Figure 1-5 shows a rear view of the RS/6000 SP power distribution unit with the access covers removed. "Power Distribution Unit (PDU)" on page 1-9 shows the power distribution unit assembly designations.
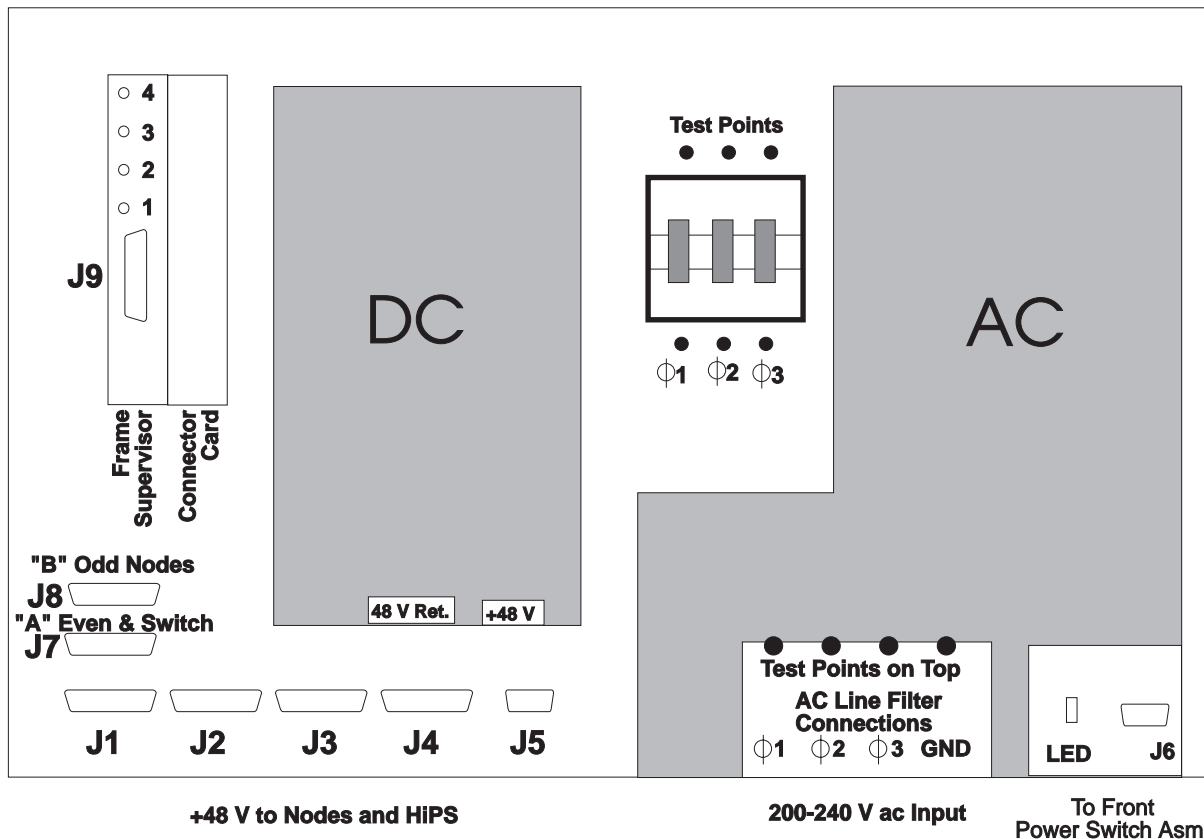
Figure 1-5. Rear View of Power Distribution Unit

Figure 1-6 on page 1-9 shows a top view of the RS/6000 SP power distribution unit:
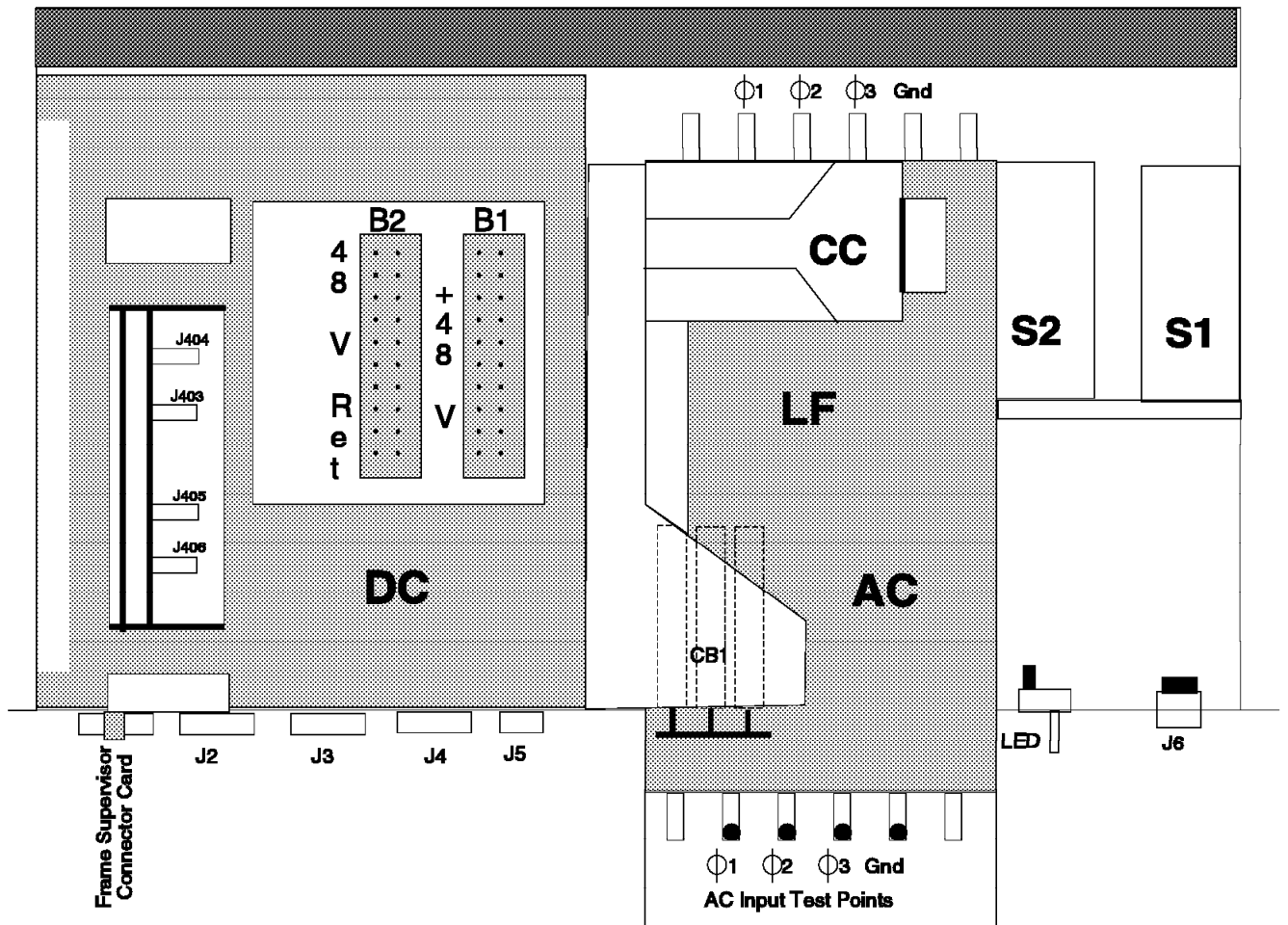
Figure 1-6. Top View of RS/6000 SP Primary Power Compartment

Power Distribution Unit (PDU): This list shows the designations for the power distribution unit:

B1-B2: Busbar 1-2

FC: Frame connector card

FS: Frame supervisor card

BP: Frame supervisor backplane

BH: Bulkhead

LF: Line Filter

CC: Contactor

S1: 12 V Lambda

S2: 24 V Lambda

LD: LED card

CB: Circuit breaker

CH: Chassis (for chassis ground)

ac/dc Converter (ADC): This term describes the designation for the ac/dc convertor:

TB: TB1, terminal block

S1 - S4:   Power supply modules (numbered from left to right, when facing)

V1:   dc output

BH: Bulkhead

Scalable Electrical Power Base Unit (SEPBU) Locations

Figure 1-5 on page 1-8 shows a rear view of the RS/6000 SP power distribution unit with the access covers removed. Figure 1-7 shows the scalable electrical power base unit assembly designations.
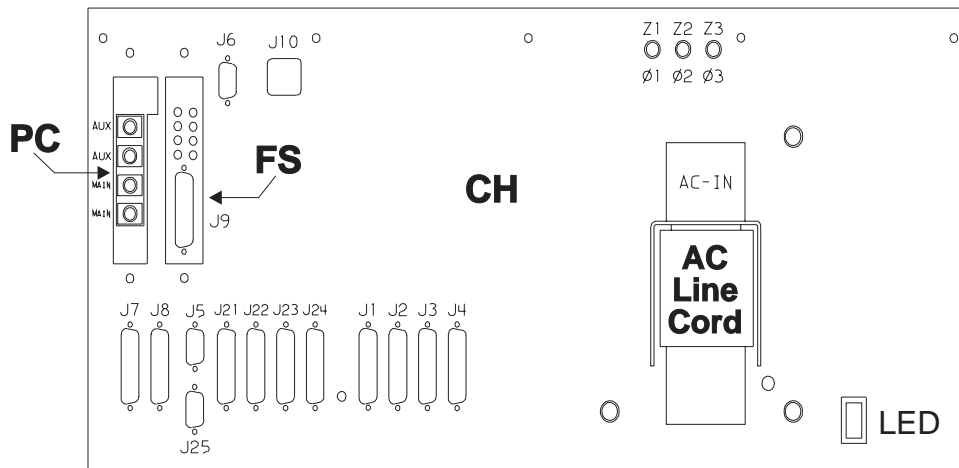
Figure   1-7. Rear View of Scalable Electrical Power Base Unit

Scalable Electrical Power Base Unit (PDU Nomenclature): This list shows the designations for the Scalable Electrical Power Base Unit:

FS: Frame supervisor card

PC: PCI (power control interface) card

BH: Bulkhead

CH: Chassis

S1-S4:   Power supply modules (numbered from left to right, when facing)

Thin Processor Node Locations

Figure 1-8 on page 1-11 shows a top view of a RS/6000 SP thin processor node, Figure 1-9 on page 1-12 shows a top view of a RS/6000 SP thin processor node 2, and Figure 1-10 on page 1-13 shows a top view of a RS/6000 SP 120 or 160 MHz thin processor node. "Thin Processor Node (NXX)" on page 1-13 describes the thin processor node component designations.
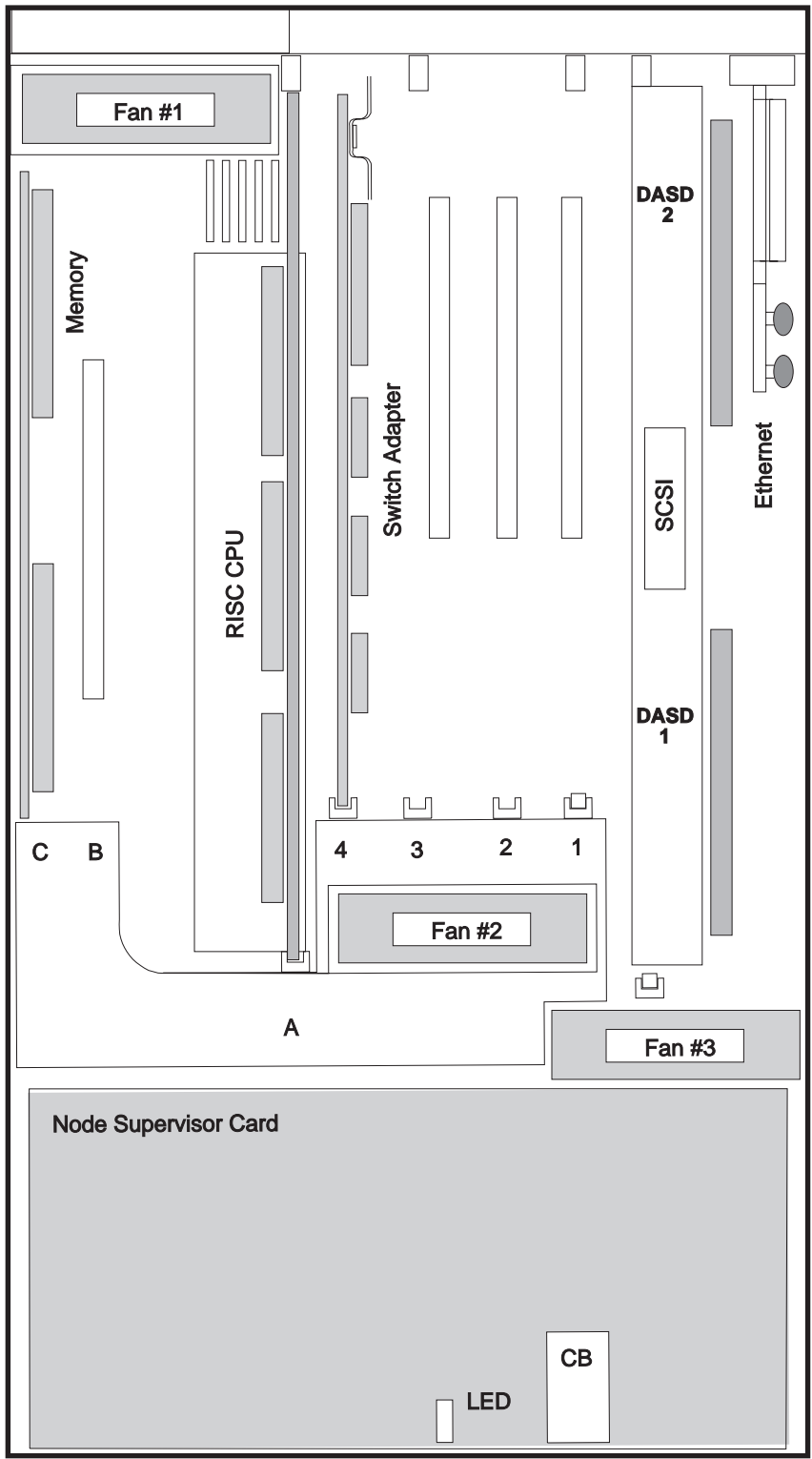
Figure   1-8. Top View of a RS/6000 SP Thin Processor Node
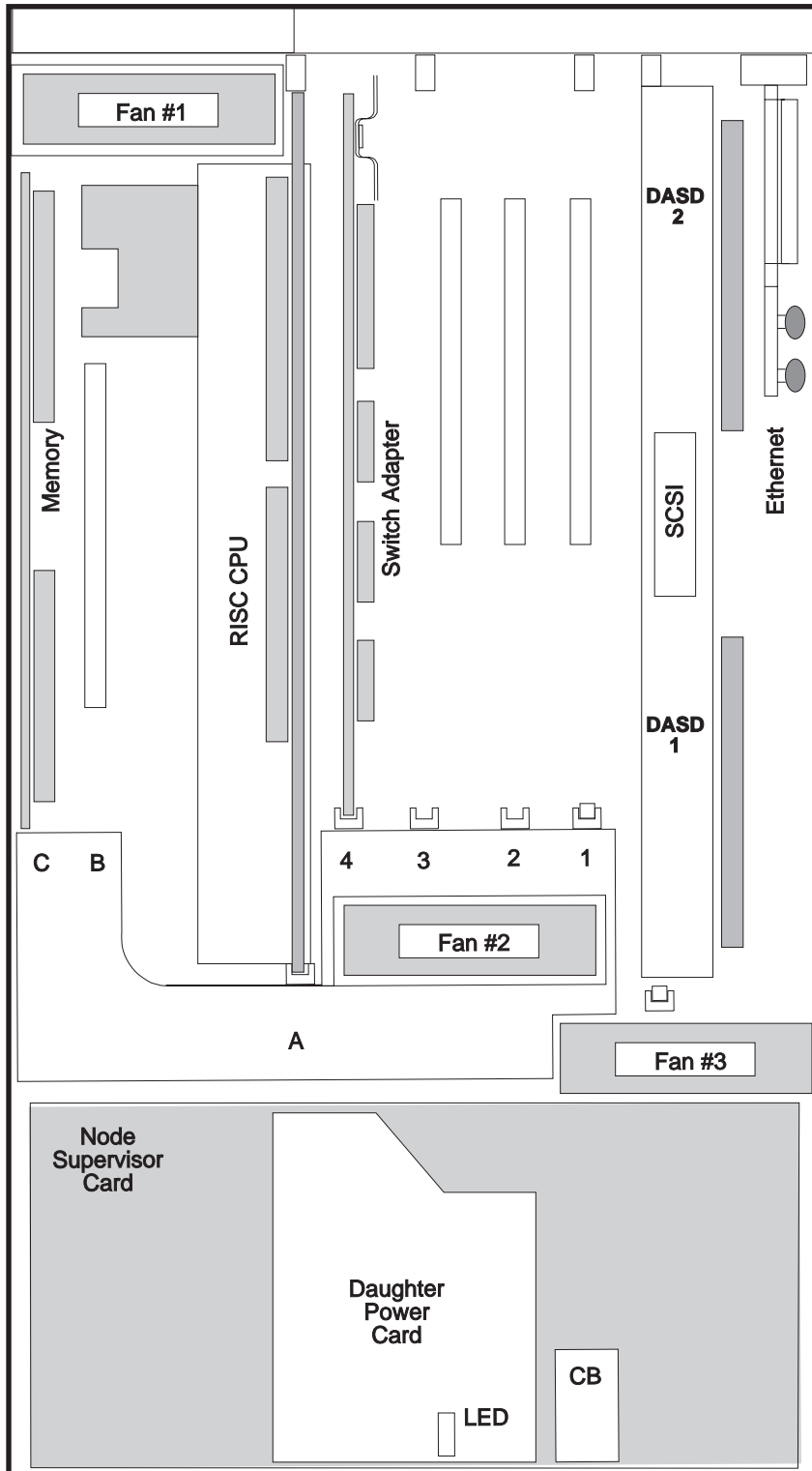
Figure 1-9. Top View of a RS/6000 SP Thin Processor Node 2
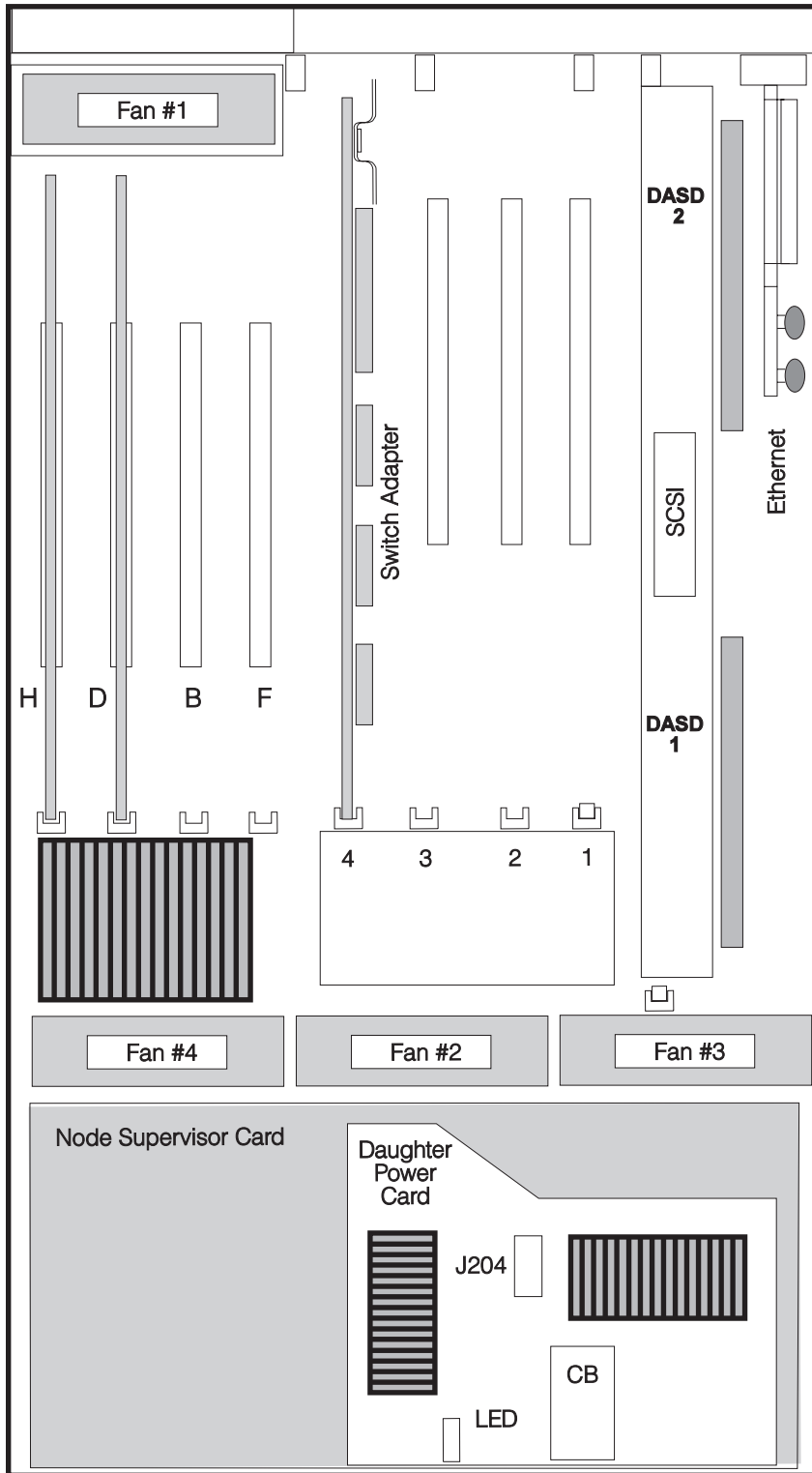
Figure 1-10. Top View of a RS/6000 SP 120 or 160 MHz Thin Processor Node

Thin Processor Node (NXX): This list shows the designations for the thin processor node:

PR: Processor card

PL: System I/O planar

NS: Node supervisor

F1-F3:   Fans 1 - 3

LD: LED card

CB: Circuit breaker

ME: Memory card

MC: Micro Channel card

EN: Ethernet Riser card

SB: Supervisor bus card

D1:   Direct access storage device in location 1

D2:   Direct access storage device in location 2

BH: I/O bulkhead

DP: Daughter power card (+4 V dc)—thin node 2 only

JC: Jumper card—thin node 2 only

Figure 1-11 on page 1-15 shows the locations of connectors for a RS/6000 SP thin processor node:

48V Input Supervisor Bus

GND

J7

J16

System
I/O Planar
(PL)

J27

J24   J25

J2

J20

J22

J21

J23

J101   J104

J107   J103   J110

Node Supervisor
(NS)

EPROM

J102

J106

J111   J601

LED   CB
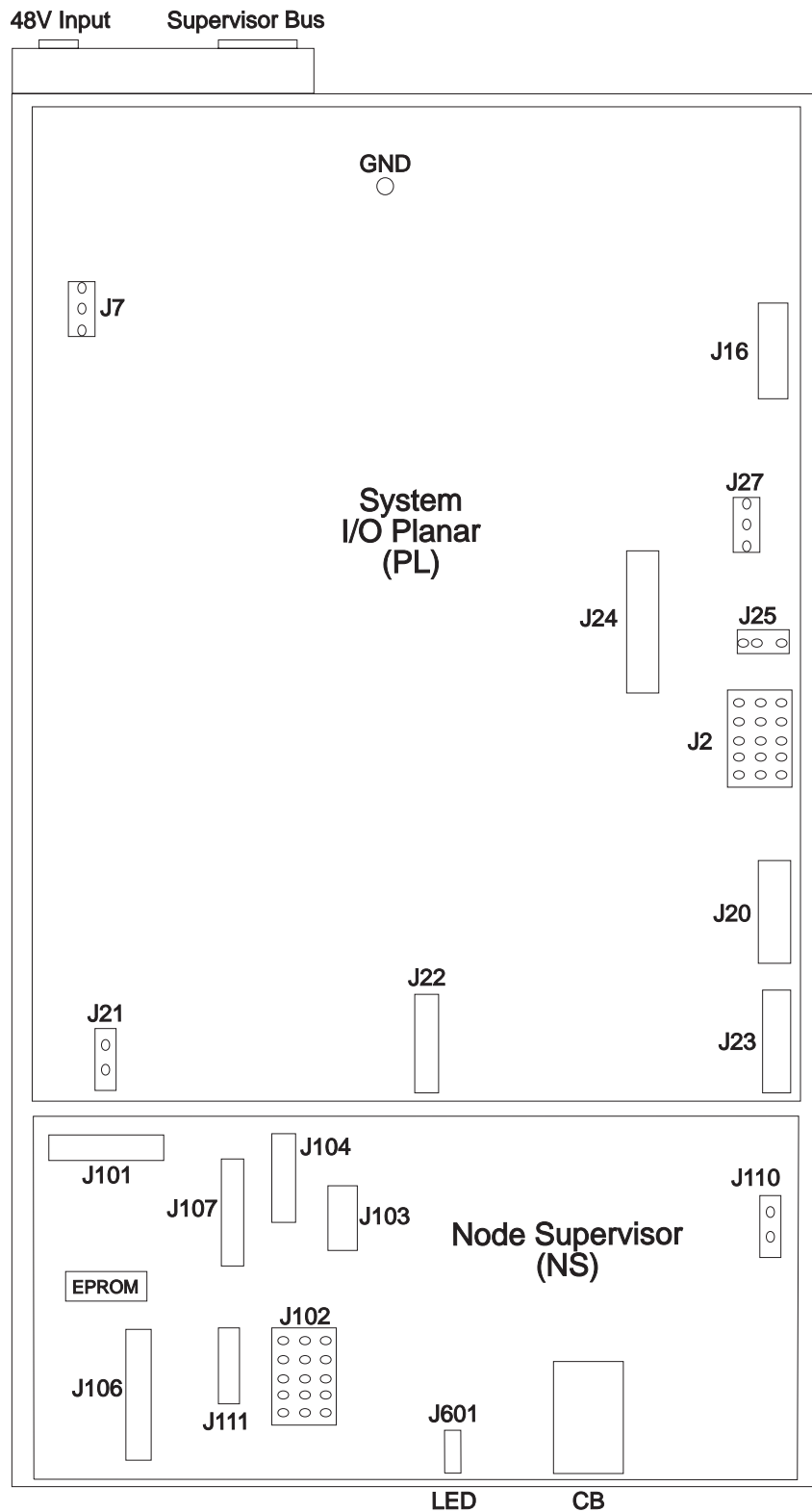
Figure   1-11. Connector Locations in RS/6000 SP Thin Processor Node

Figure 1-12 on page 1-16 shows the locations of connectors for a RS/6000 SP 120 or 160 MHz thin
processor node:
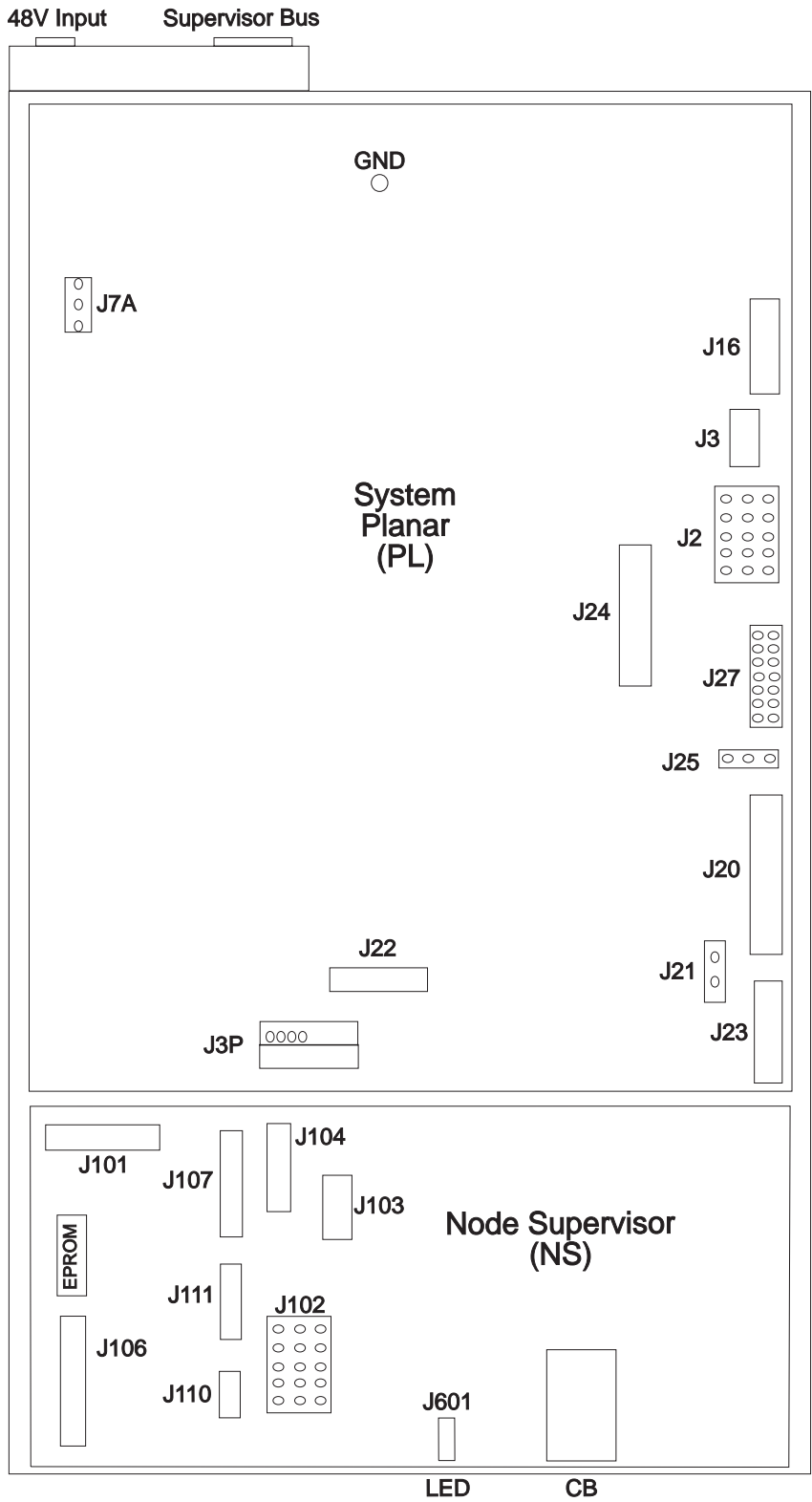
Figure 1-12. Connector Locations in RS/6000 SP 120 and 160 MHz Thin Processor Node

Table 1-1 on page 1-17 describes the locations of the processor node cabling for the connectors shown in Figure 1-11 on page 1-15:

Table	1-1. Thin Node Connector Descriptions
Jack	**Description**
J101	Supervisor bus providing communication to frame supervisor bus
J102	J2 - I/O planar power
J103	Expansion
J104	J16 - Serial port (RS-232) from I/O planar
J106	J23 - 3-digit LED from I/O planar board
J107	Node Control Harness for communication to: • J21 - "Virtual battery" • J22 - I/O planar mode switch/reset • J25 - I/O planar EPOW • J601 - LED card • F1-F3 - Fans 1-3
J110	48-volt input to dc converters
J111	DASD power to DASDs 1 and 2

Figure 1-13 shows memory SIMM, cache-memory SIMM, and jack locations on the thin processor node 2 CPU card. Figure 1-14 shows memory SIMM locations on the 120/160 MHz thin processor node memory card. Figure 1-15 on page 1-18 shows memory SIMM locations on the 66 MHz thin processor node CPU card.

J1-J8 Memory SIMMs
L1-L2 Cache Memory SIMMs
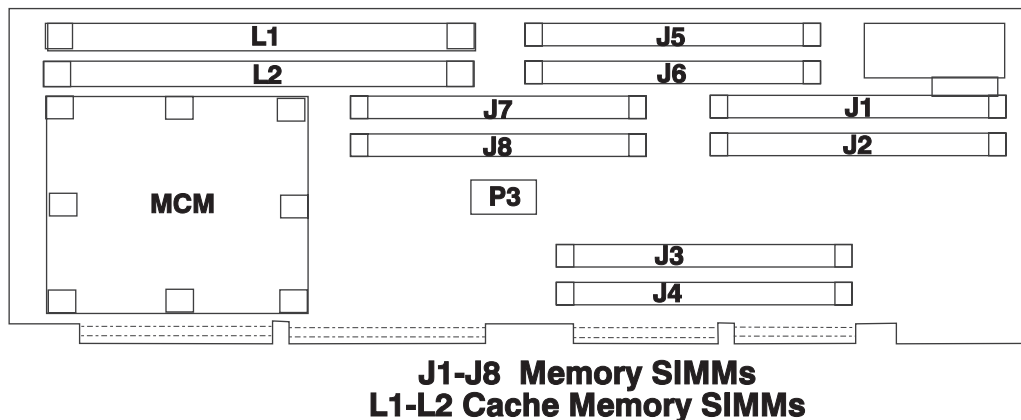
Figure 1-13. Thin Processor Node 2 CPU Card Locations
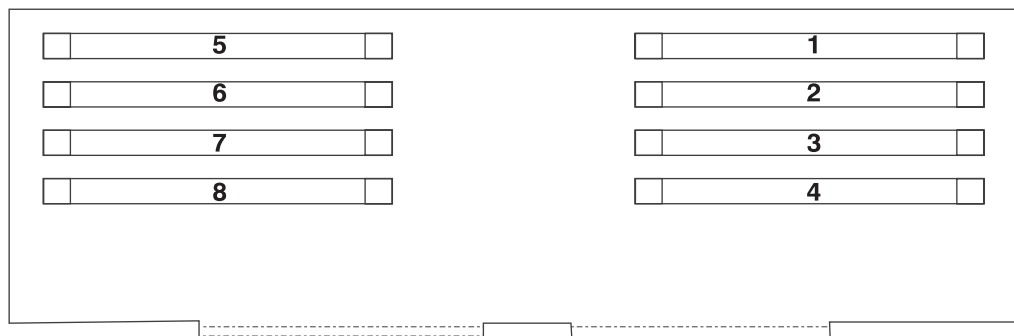
Figure 1-14. 120/160 MHz Thin Processor Node Memory Card SIMM Card Locations

L2 Cache Memory SIMM
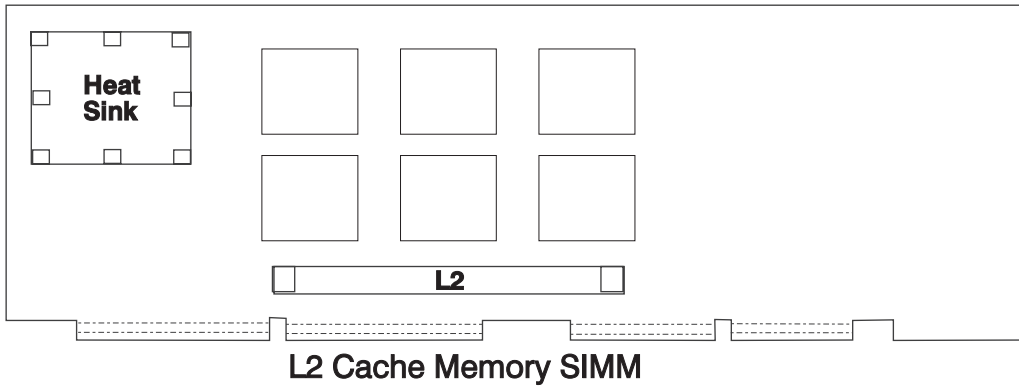
Figure 1-15. 66 MHz Thin Processor Node (With L2 Cache) CPU Card Locations

Wide Processor Node Locations

Figure 1-16 on page 1-19 shows a top view of a RS/6000 SP wide processor node:
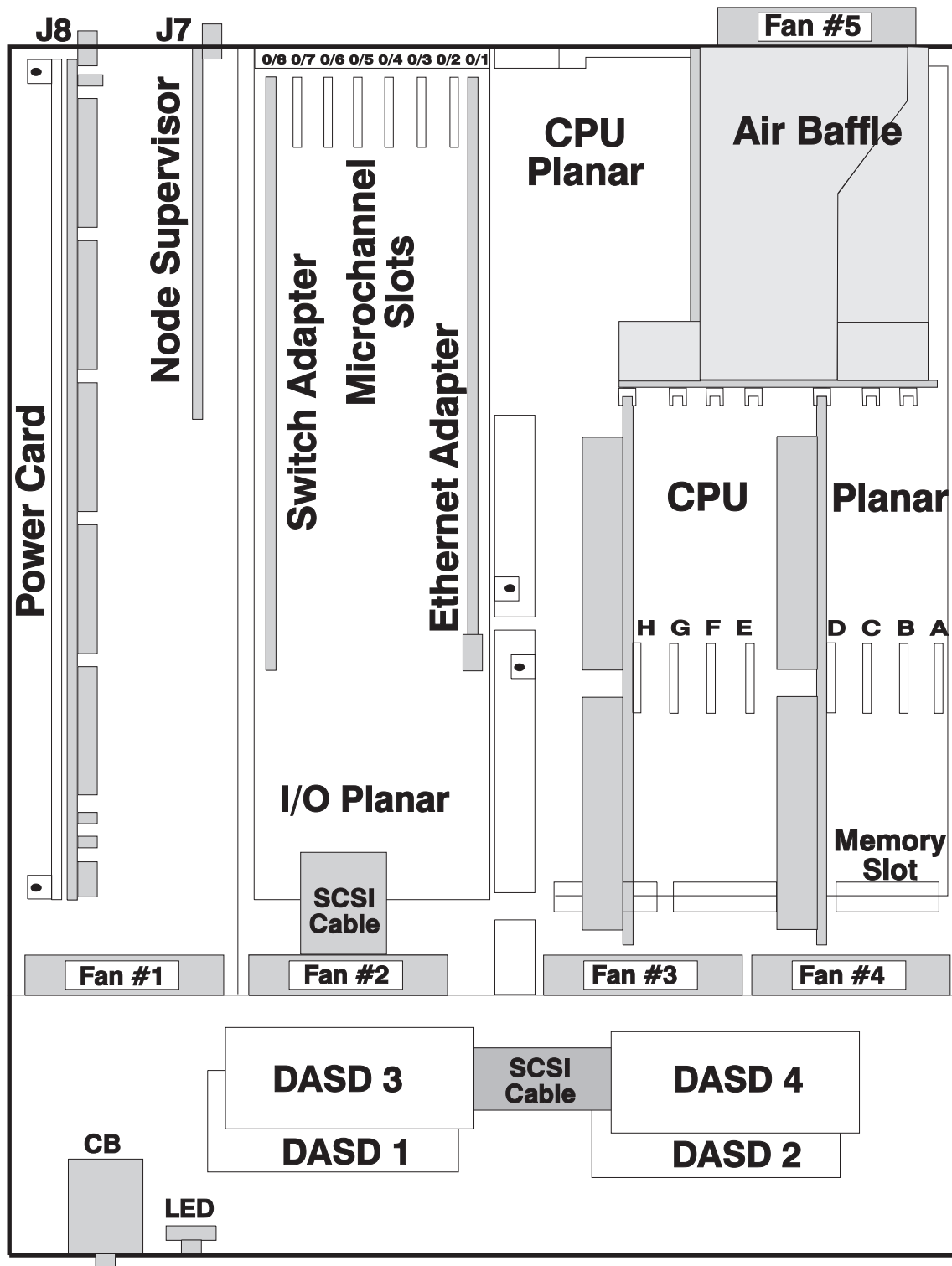
Figure 1-16. Top View of Wide Processor Node

Figure 1-17 on page 1-20 shows a top view of a RS/6000 SP 135 MHz wide processor node:
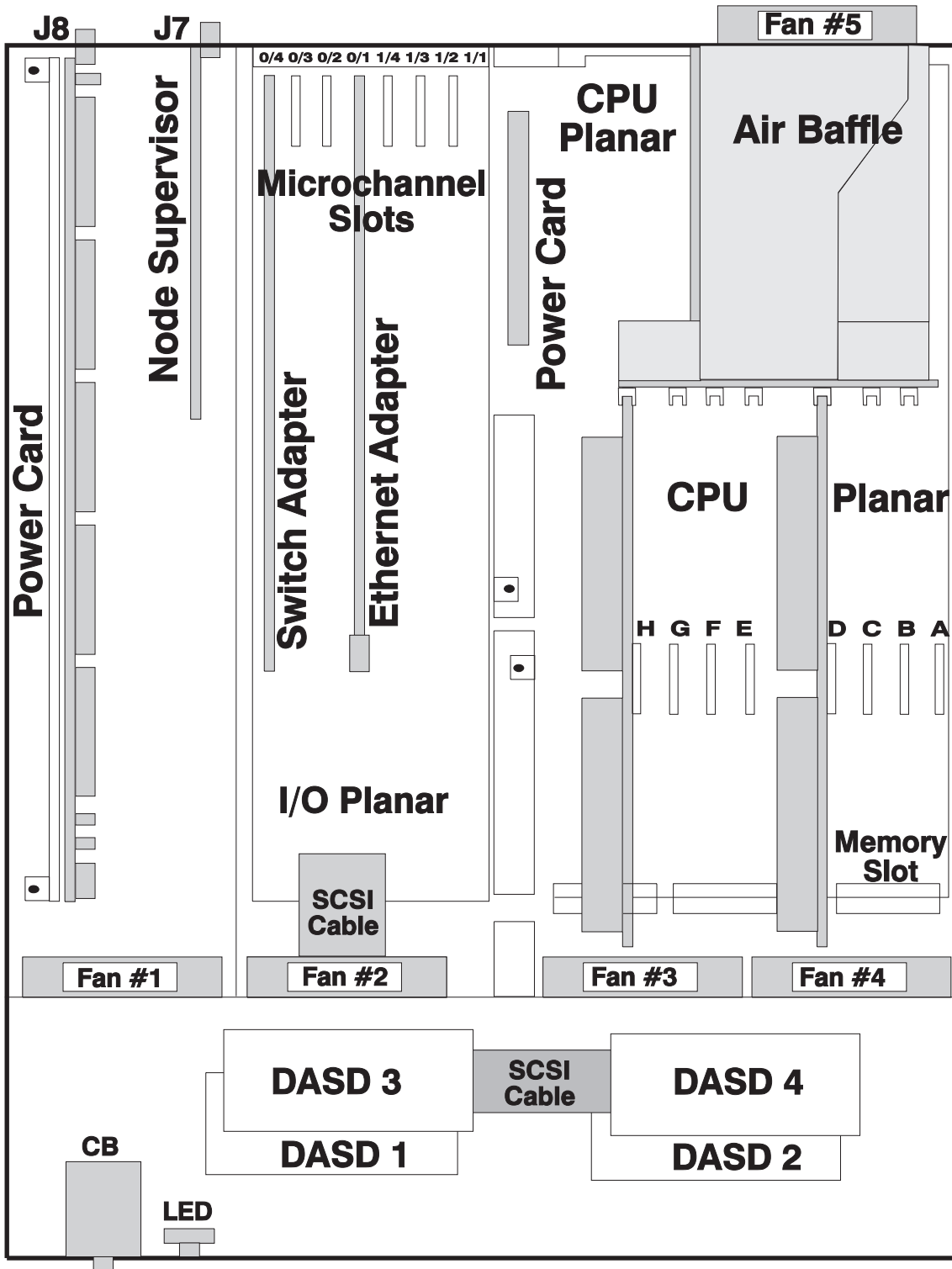
Figure 1-17. Top View of 135 MHz Wide Processor Node

J7   Pin 1

**Node
Supervisor
(SV)**

JS39   Pin 1

JS37   Pin 1

J102   Pin 1
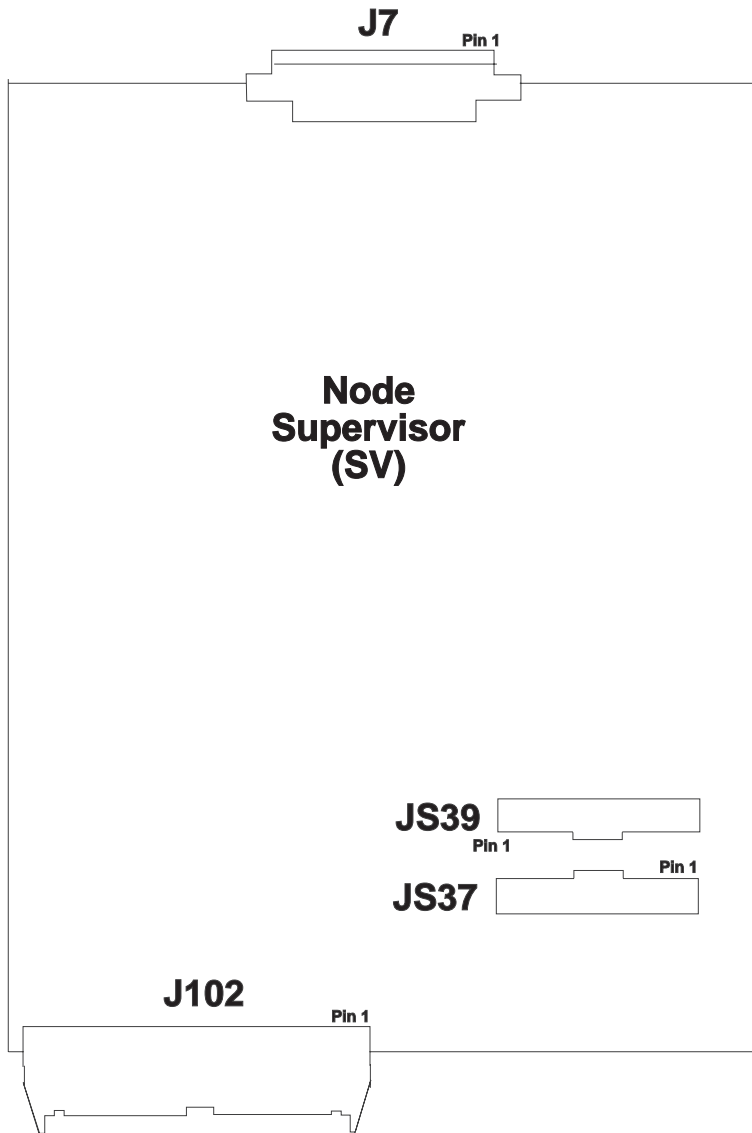
Figure   1-18 (Part 1 of 4). Wide Node Connector Locations
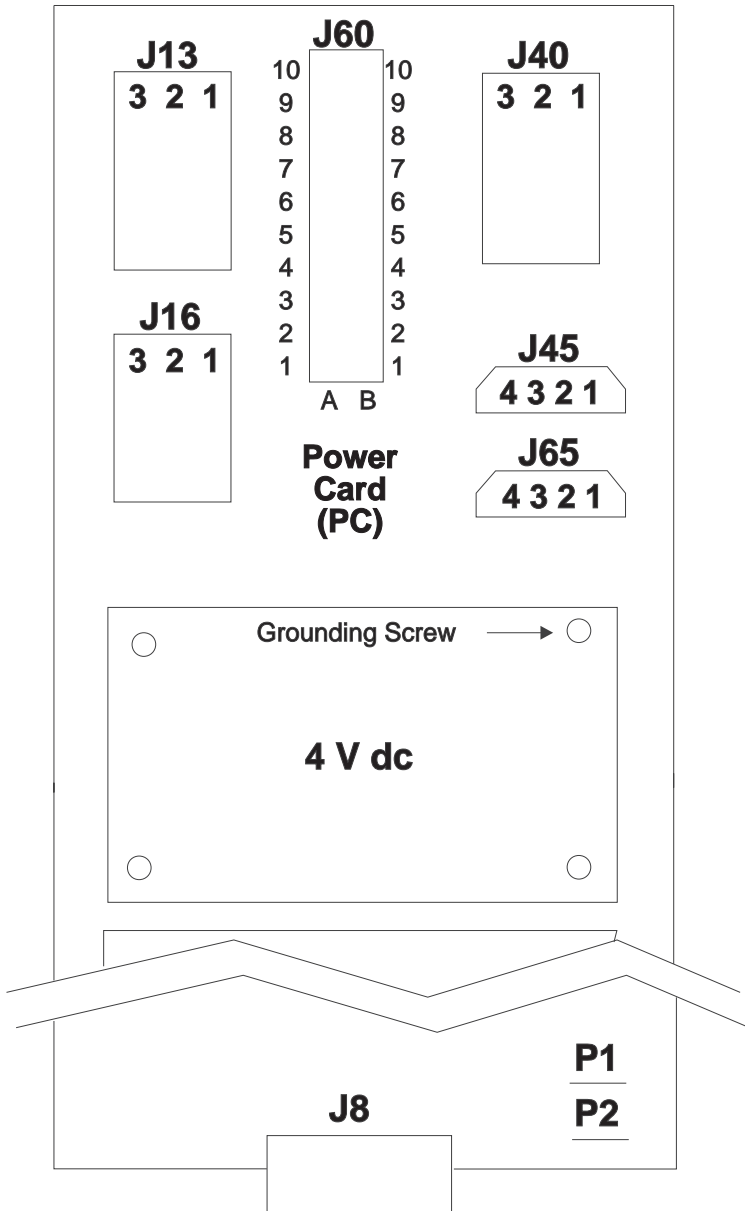
Figure 1-18 (Part 2 of 4). Wide Node Connector Locations
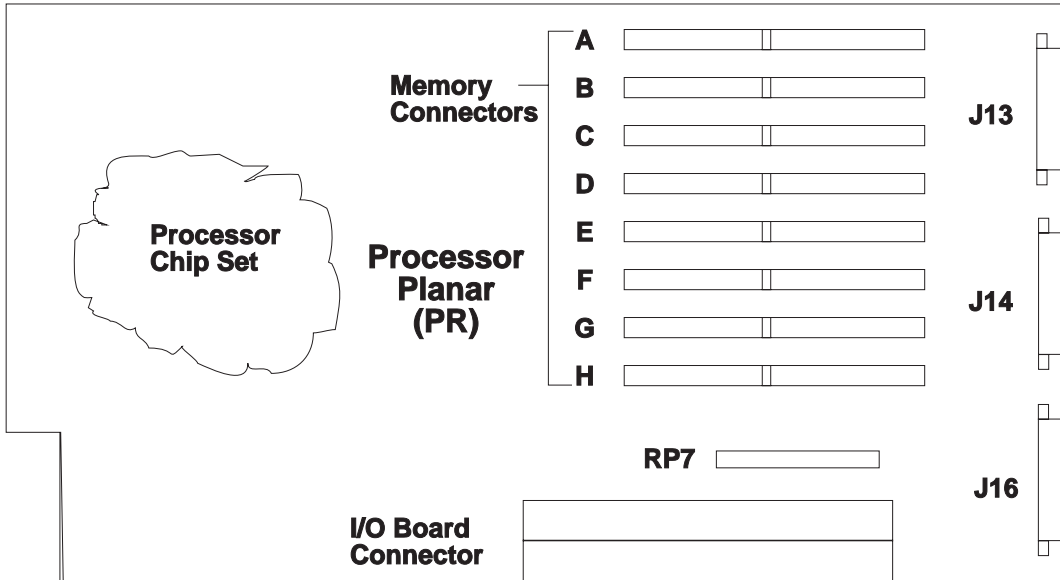
Figure 1-18 (Part 3 of 4). Wide Node Connector Locations
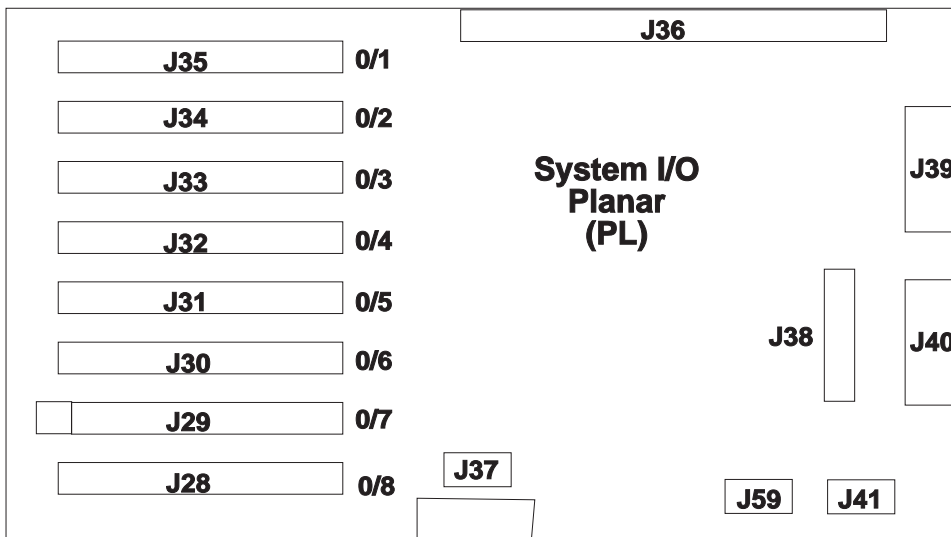
Figure 1-18 (Part 4 of 4). Wide Node Connector Locations
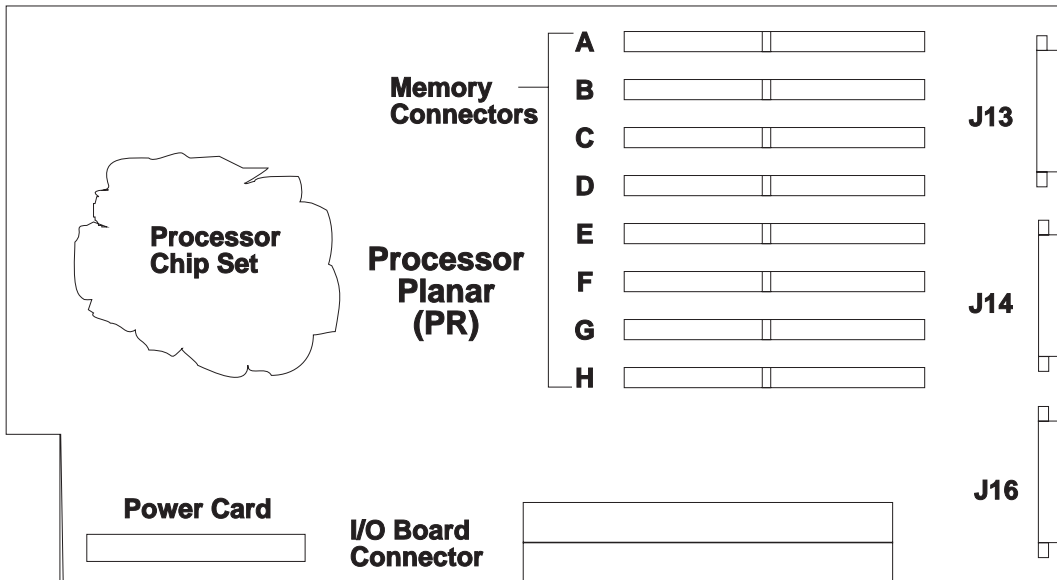
Figure 1-19 (Part 1 of 2). 135 MHz Wide Node Connector Locations
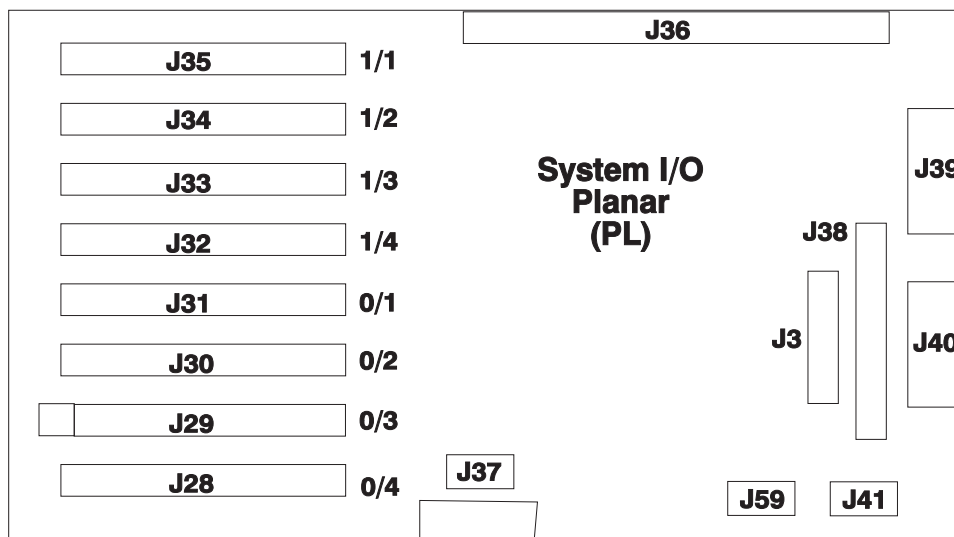
Figure 1-19 (Part 2 of 2). 135 MHz Wide Node Connector Locations

Wide Processor Node (NXX): This list shows the designations for the wide processor node:

PR: Processor planar

PL: System I/O planar

SV: Node supervisor

F1-F5:   Fans 1 - 5

LD: LED card

CB: Circuit breaker

ME: Memory card

MC: Micro Channel card

PC: Power card

EN: Ethernet card

D1-D4:   Direct access storage devices 1-4

BH: I/O bulkhead

604 or 604e High Processor Node Locations

Refer to *7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide* and the *7015 Supplemental Information* for more detailed information on the 604 or 604e high node components.

Figure 1-22 on page 1-27 shows a top view of a RS/6000 SP 604 or 604e high processor node, and Figure 1-20 shows a high-level component view of a 604 high processor node. Figure 1-21 on page 1-26 shows the Ethernet, MCA, SPS, and SCSI slots in the back of the node.
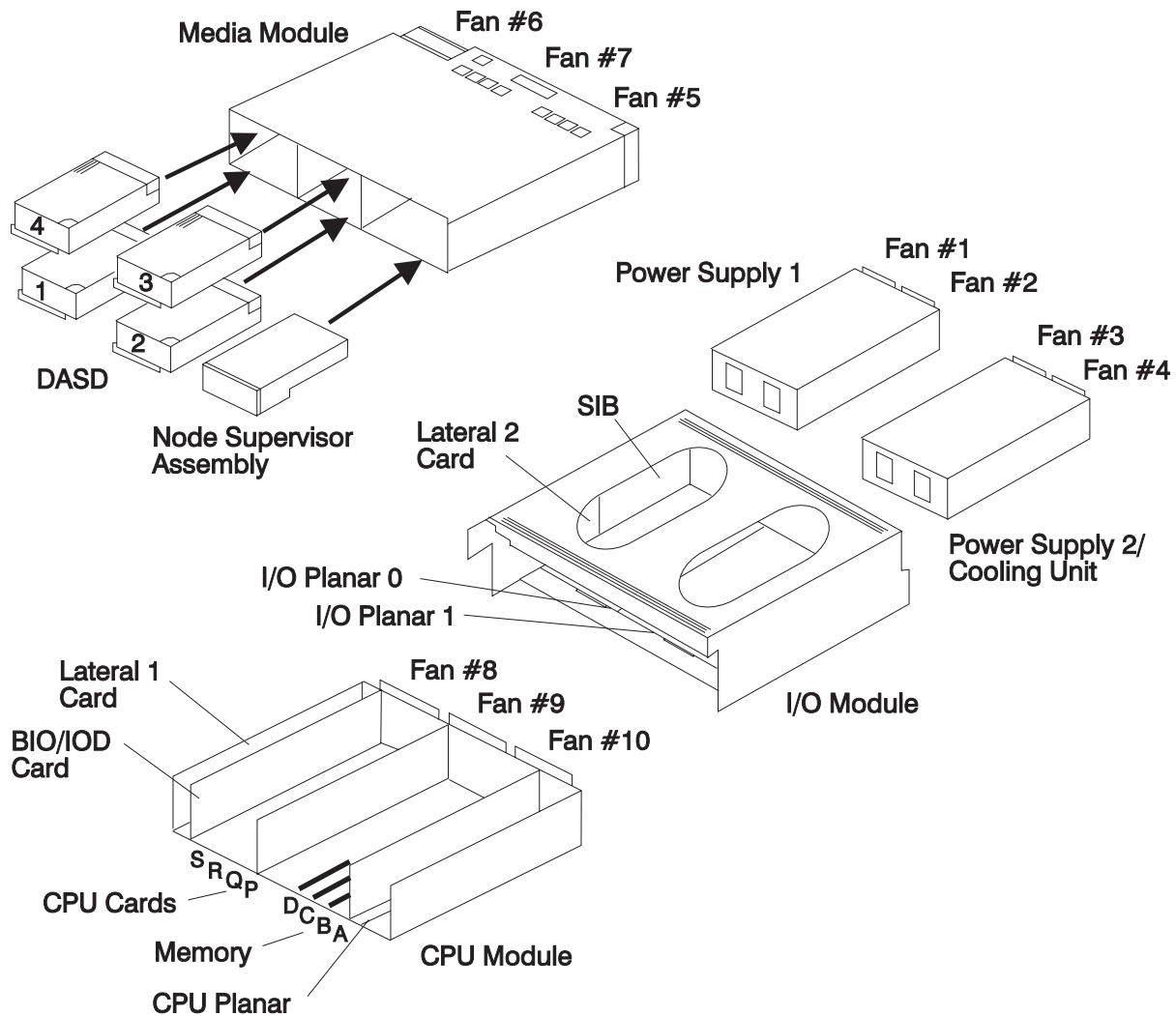
Figure   1-20. 604 or 604e High Node High Level Component Diagram
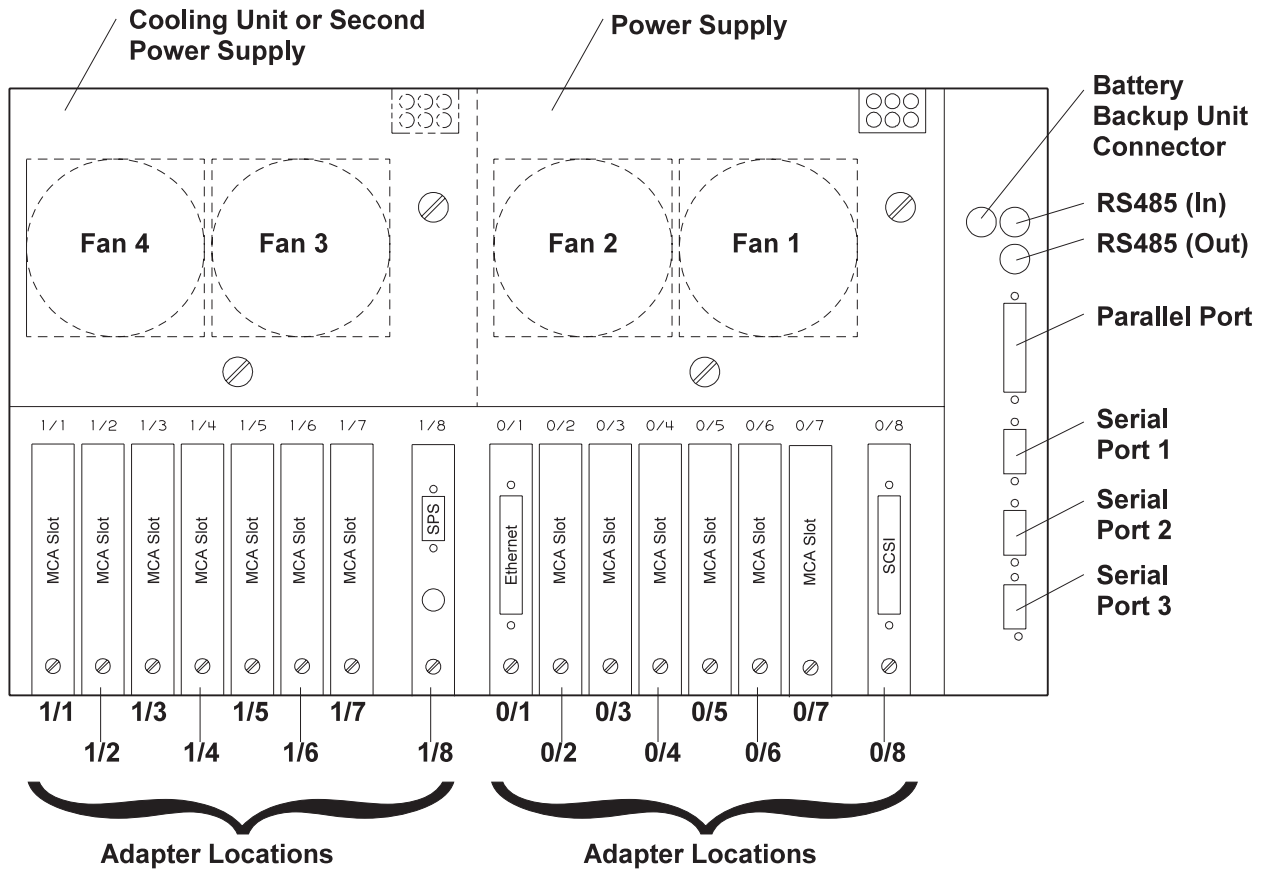
Figure 1-21. 604 or 604e High Node Rear View

CPU Module
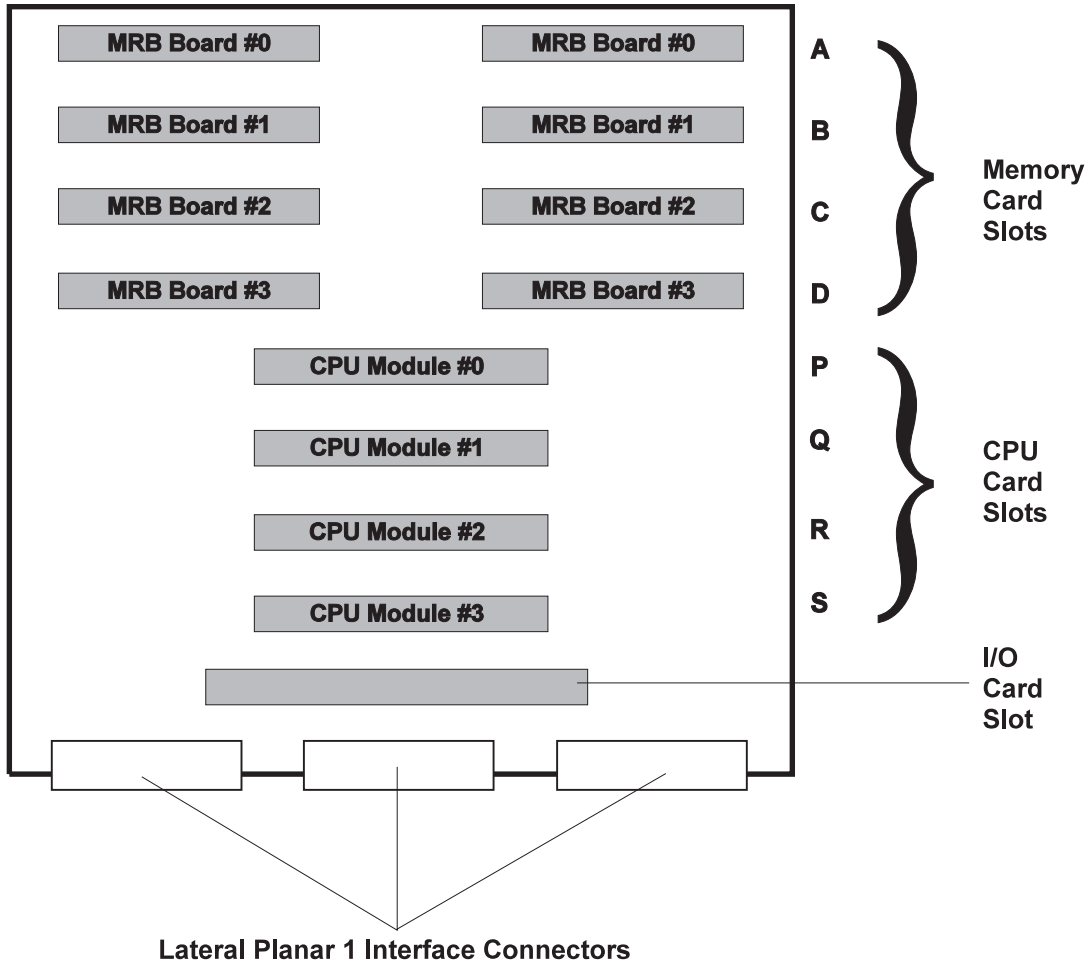
Figure 1-22. 604 or 604e High Processor Node System Planar Top View
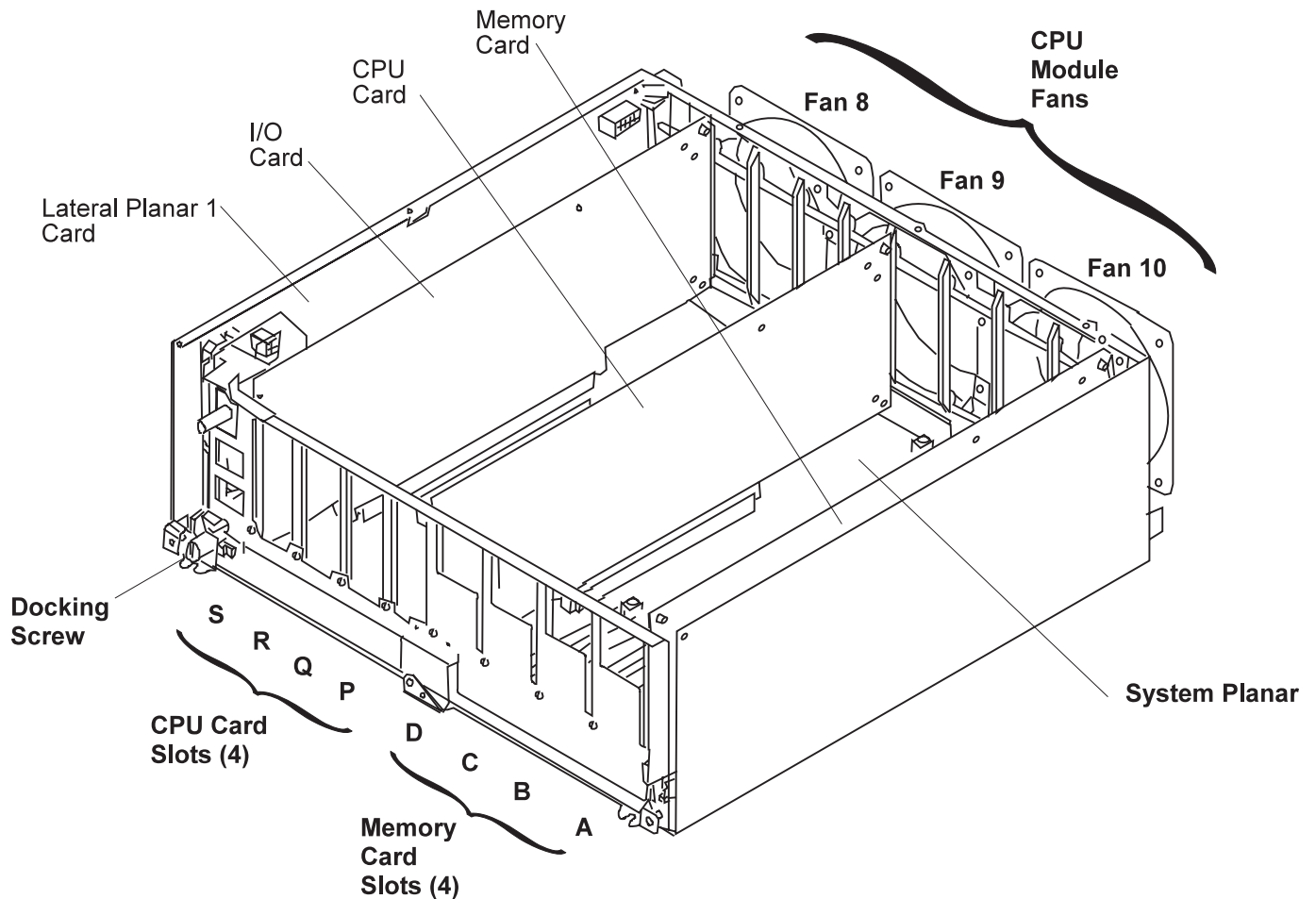
Figure   1-23. CPU Module Locations.   Top view with top cover removed.

Memory Cards: There are four types of memory card available for use with the 604 and 604e processor nodes: MRX card, RLX card, NFX card, and SF5 card.

The following figure shows the base MRX memory card.
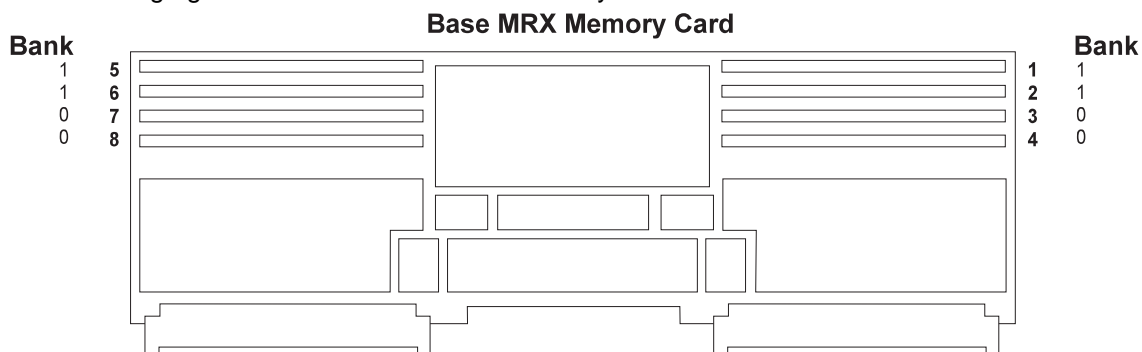
Memory cards must be installed starting from memory slot A. Additional memory cards must be installed using memory slot B first, then C, then D.

The system can be upgraded by installing up to three additional memory cards.

Two kinds of memory modules can be installed on memory cards:

• 8MB memory modules which use 4Mb technology.

- 32MB memory modules which use 16Mb technology.

The following figure shows a memory module.
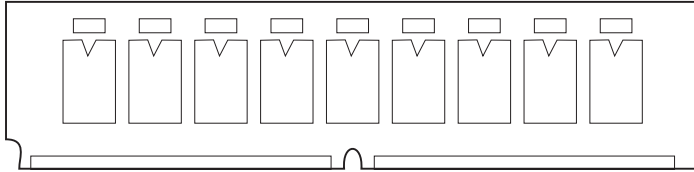
According to the type of memory module installed on the memory card, the total memory size is:

- If it has eight 8MB memory modules, the memory card has 64MB memory.
- If it has 32MB memory modules, the memory card has 256MB memory.

The following figure shows the other three types of memory card. A two bank (8 slots) RLX card, a four bank (16 slots) NFX card, and a four bank (16 slots) SF5 card. Each bank can house four memory modules kits. Each kit is composed of four memory modules each, which comply with the JEDEC standard for 168 pin, ECC, 60 ns, 5 volt memory modules.

Bank

1 5
1 6
0 7
0 8

Bank

1 1
2 1
3 0
4 0

Two Bank RLX Memory Card

Bank

2 9
1 .
2 .
1 .
3
0
3
0 16

Bank

1 2
. 1
. 2
. 1
   3
8 0
   3
   0

Four Bank NFX Memory Card

Bank

2 9
1 .
2 .
1 .
3
0
3
0 16

Bank

1 2
. 1
. 2
. 1
   3
8 0
   3
   0
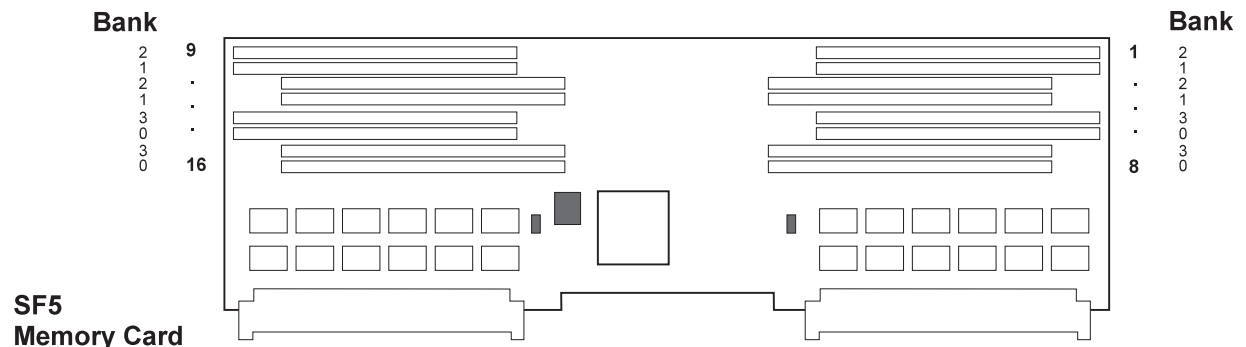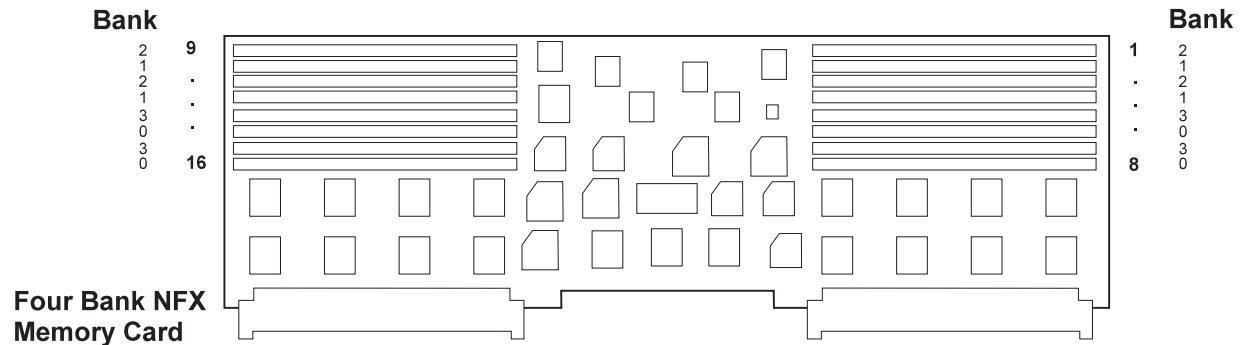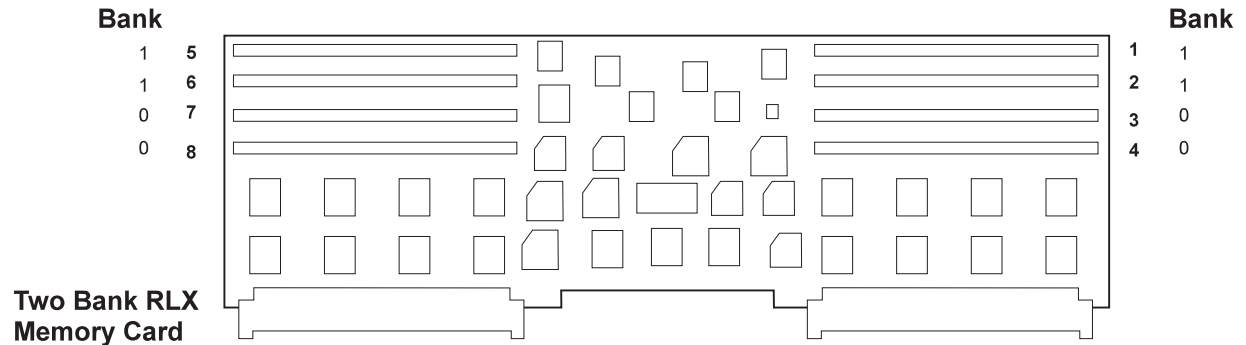
SF5 Memory Card

The following figure shows a standard memory module.
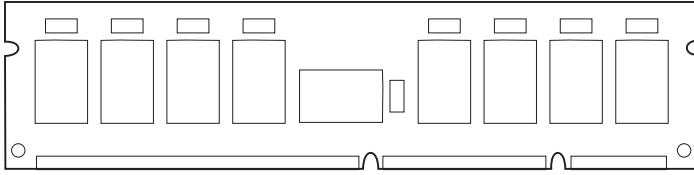
Table 1-2 shows the memory module kits supported by RLX, NFX, and SF5 cards for 604 and 604e processor nodes, and the resulting memory capacity for each kit.

Table 1-2. 604 and 604e Memory Module Kits		
Name of the Kit	**Description**	**Resulting Memory Capacity**
MM32	4 modules of 8MB each	32MB memory
MM64	4 modules of 16MB each	64MB memory
MM128	4 modules of 32MB each	128MB memory
MM256	4 modules of 64MB each	256MB memory

The maximum memory reachable with this kind of memory card is 1024MB, since up to four of kits (indicated in Table 1-2) can be installed on the memory card.

Do not install memory modules from different kits on the same RLX, NFX, or SF5 card.

According to both the size and number of memory module kits installed on the RLX, NFX, or SF5 cards, these can be divided into the following:

- **NF64** board, based on 4M bit technology, which gives 64MB memory. It houses two MM32 memory module kits.

- **NF128** board, based on 4M bit technology, which gives 128MB memory. It houses two MM64 memory module kits.

- **NF256** board, based on 16M bit technology, which gives 256MB memory. It houses two MM128 memory module kits.

- **NF512** board, based on 16M bit technology, which gives 512MB memory. It houses four MM128 memory module kits.

- **NF1024** board, based on 16M bit technology, which gives 1024MB memory. It houses four MM256 memory module kits.

Note: The maximum memory configuration yields a system with:

- 604 Node — 2048BM (4 x 512MB)
- 604e Node — 4096MB (4 x 1024MB)

Media Module
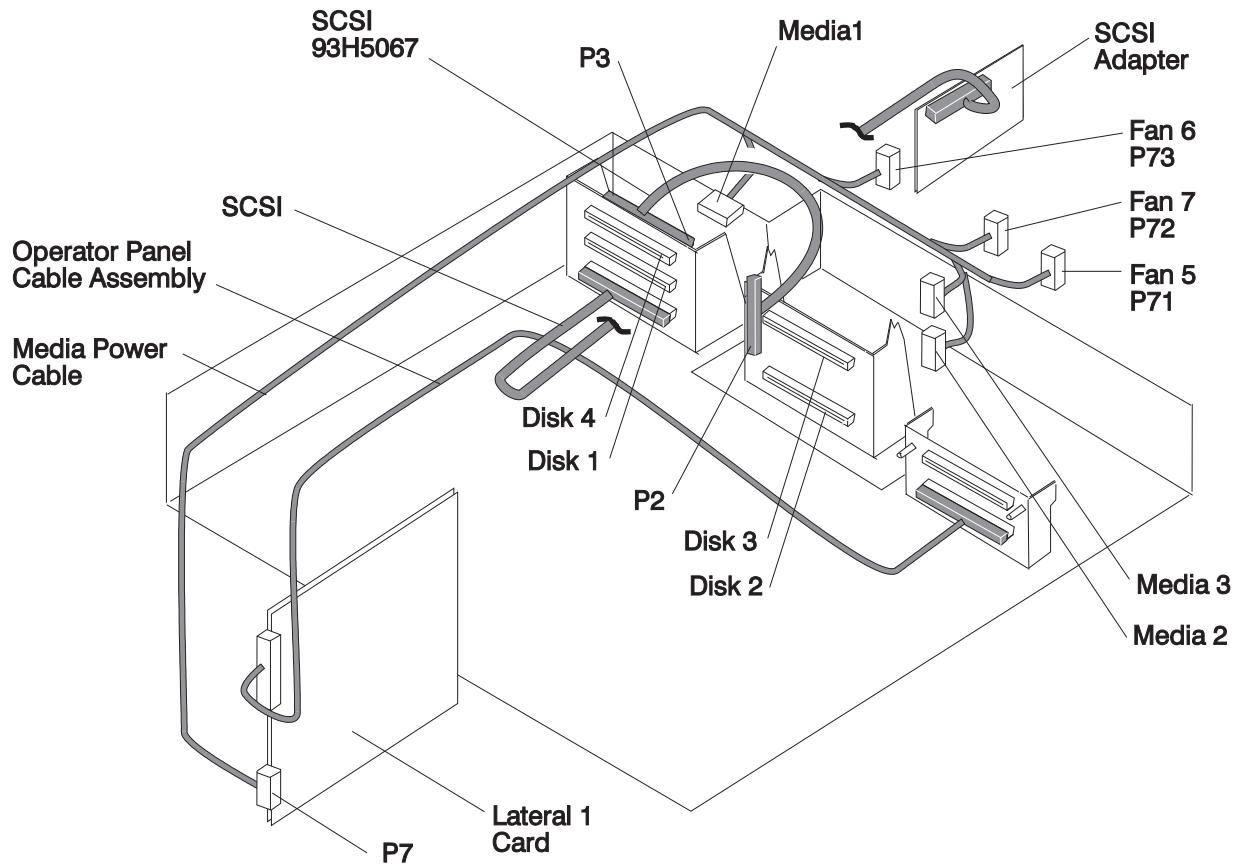
Figure 1-24. Media Module Locations

Attention: Use care when removing or replacing the media module in a 604e high node to prevent damage to the SCSI cable.
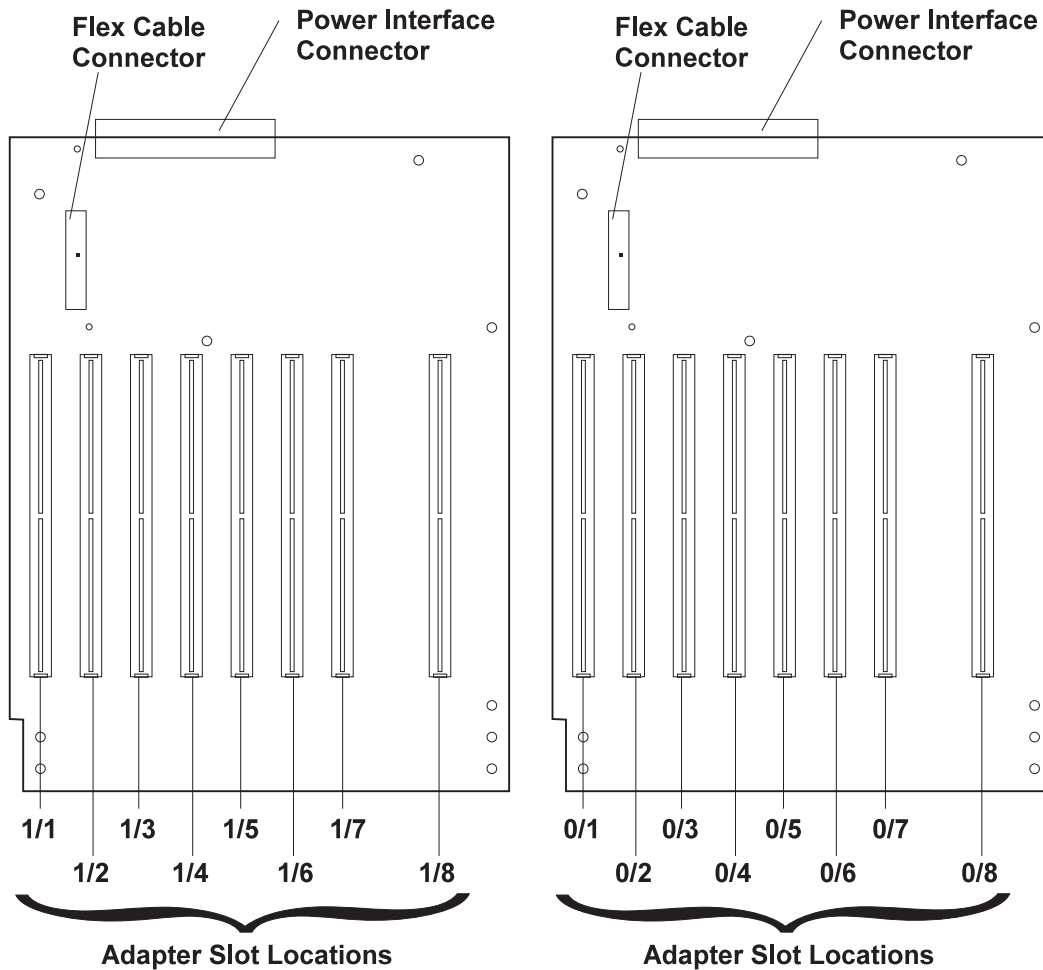
Figure   1-25. 604 and 604e Node I/O Planars, Top View

High Processor Node (NXX):   This list shows the designations for the high processor node:

PR: Processor planar

PL: System I/O planar

SV: Node supervisor

F1-F10:   Fans 1 - 10

CB: Circuit breaker

ME: Memory card

MC: Micro Channel card

PS: Power supply

EN: Ethernet card

D1-D3:   Direct access storage devices 1-3

BH: I/O bulkhead

332 MHz SMP Processor Node Locations

Figure 1-26 on page 1-33 shows a high level component diagram of a RS/6000 SP 332 MHz SMP processor node and Figure 1-27 on page 1-34 shows a top view.
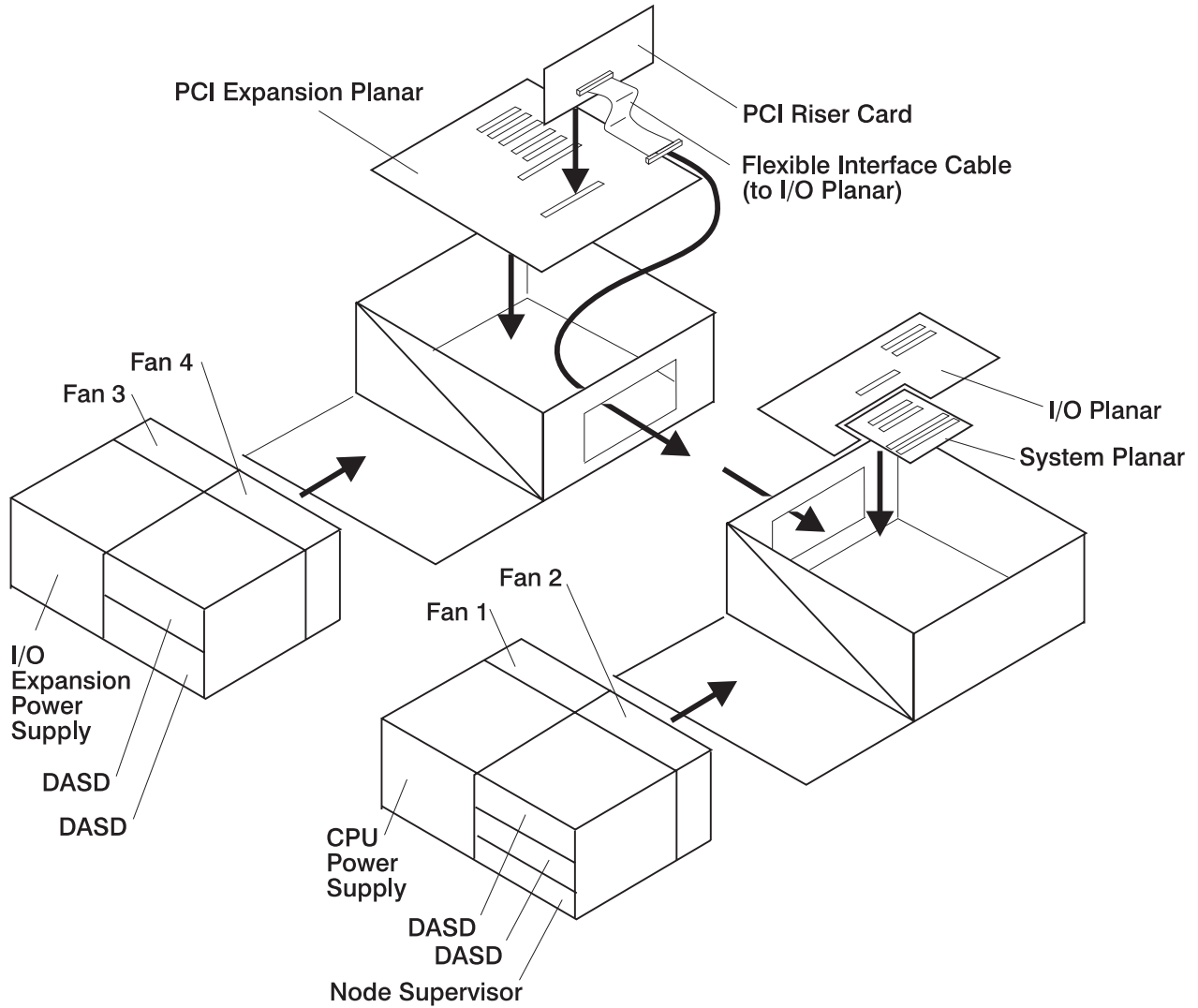
Figure 1-26. 332 MHz SMP Node High Level Component Diagram

Wide Node

Thin Node

I8 I7 I6 I5 I4 I3 I2 I1   I3 I2 I1

32-Bit PCI
64-Bit PCI
PCI Riser
PCI Expansion

32-Bit PCI

SPS MX

Memory   CPU
  2   1   1   2

System Planar

Service
Processor

I/O Planar

Interposer

Fan 3   Fan 4   Fan 1   Fan 2

I/O Expansion Power   CPU Power/Supervisor
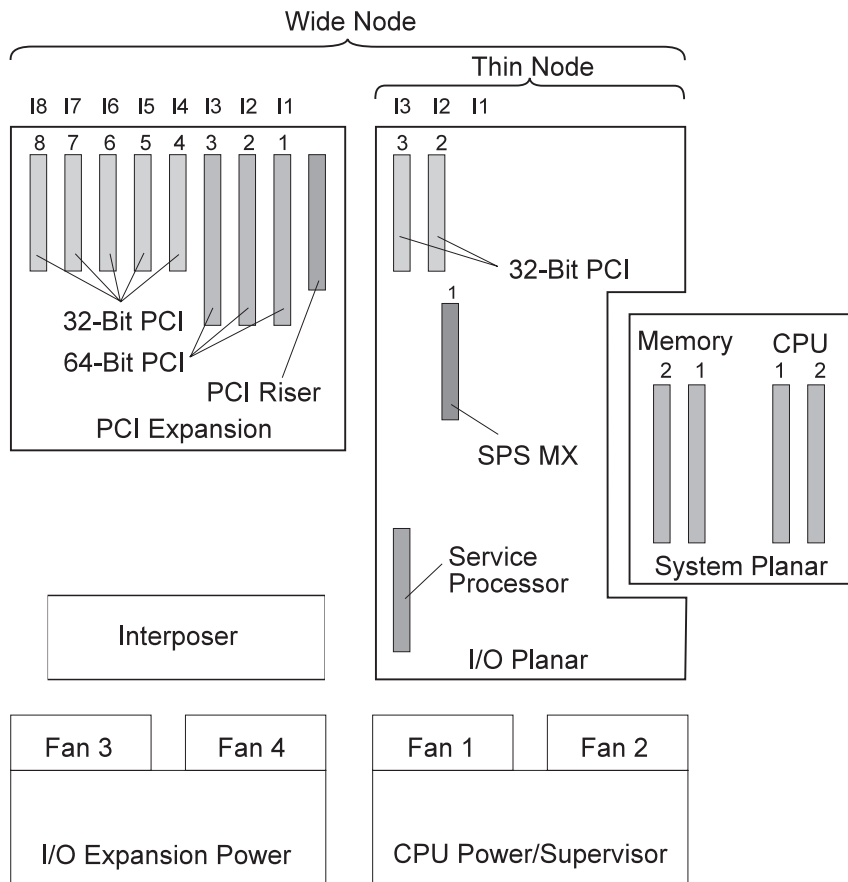
Figure   1-27. Top View of 332 MHz SMP Processor Node

I/O Expansion Node

Thin (CPU) Node

I8
I7
I6
I5
I4
I3
I2
I1

Power Connector

I3
I2
I1

S1 (Serial Port)

Ethernet

Node Supervisor

Power Connector
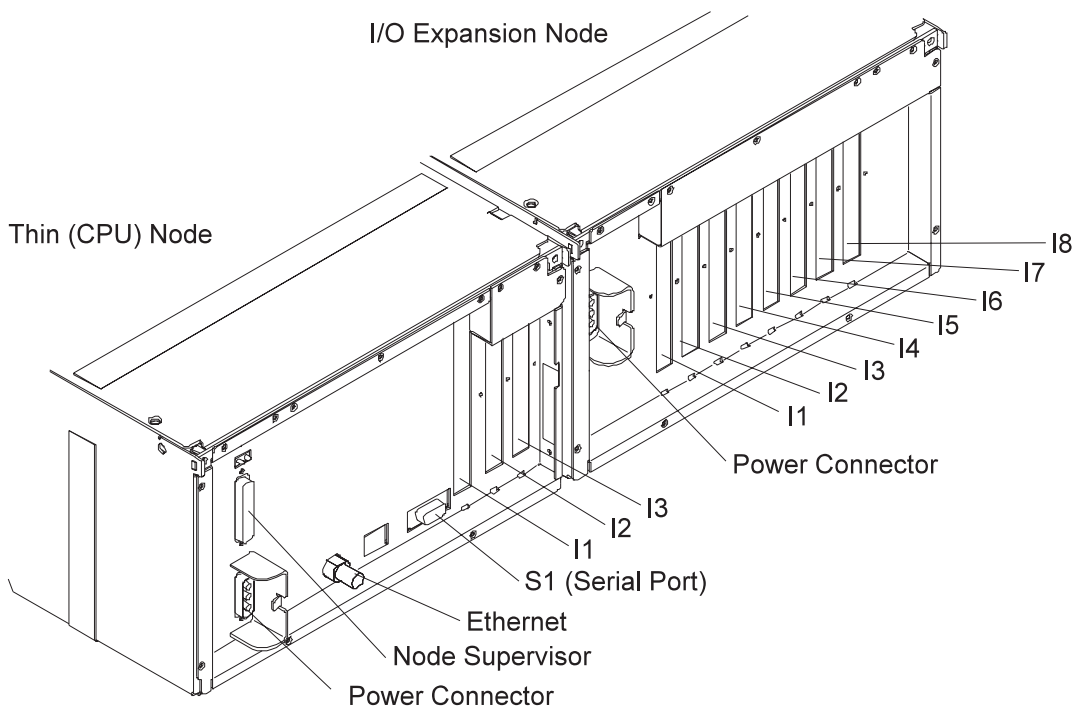
Figure   1-28. 332 MHz SMP Node Rear View

PCI Position I3

PCI Position I2

SP Switch MX
Position I1

PCI Riser Cable
Position

Expansion Control
Position

Service Processor
Position

Memory Position "A"

Memory Position "B"

Processor Position "C"

Processor Position "D"
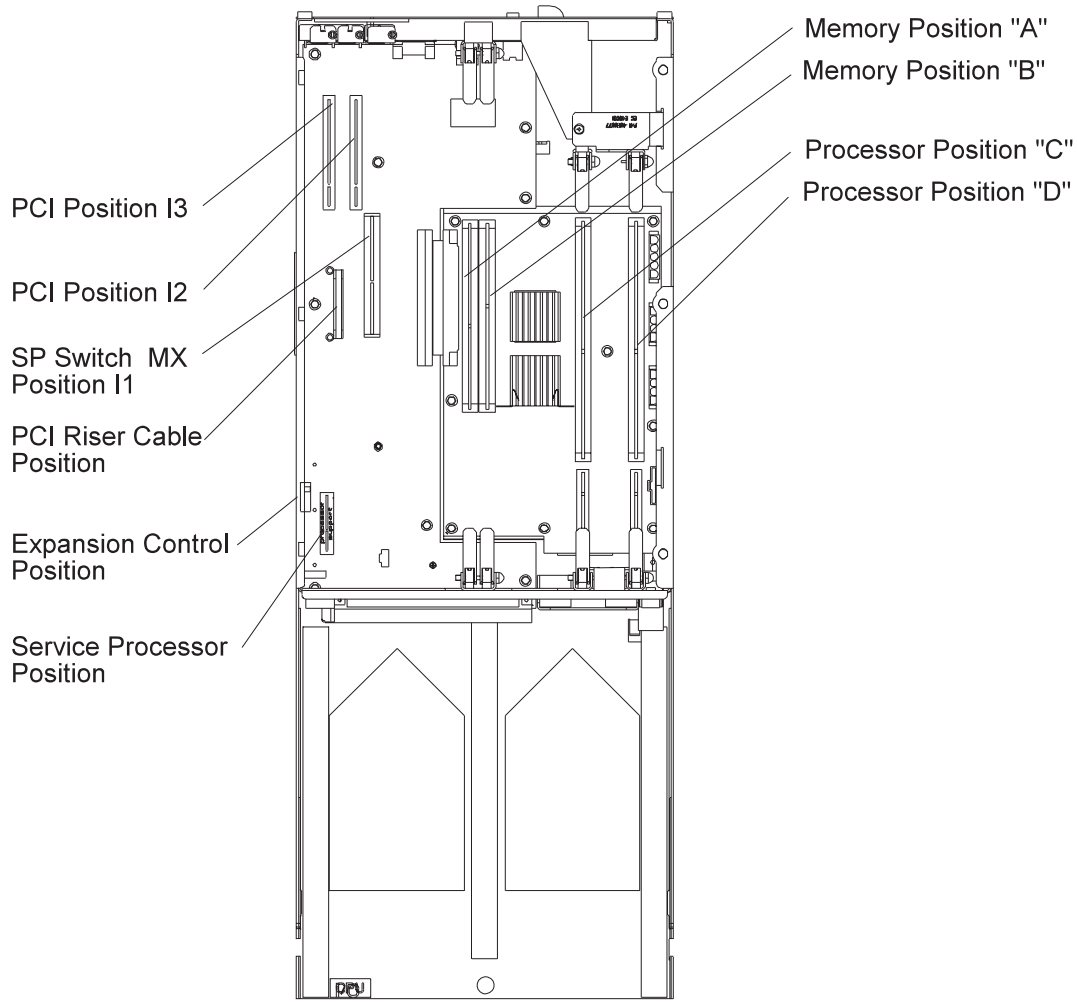
Figure   1-29. Top View of 332 MHz SMP Thin Processor Node

I8   I7   I6   I5   I4   I3   I2   I1

J8   J7   J6   J5   J4   J3   J2   J1

J11

J9

J12

J13

J14
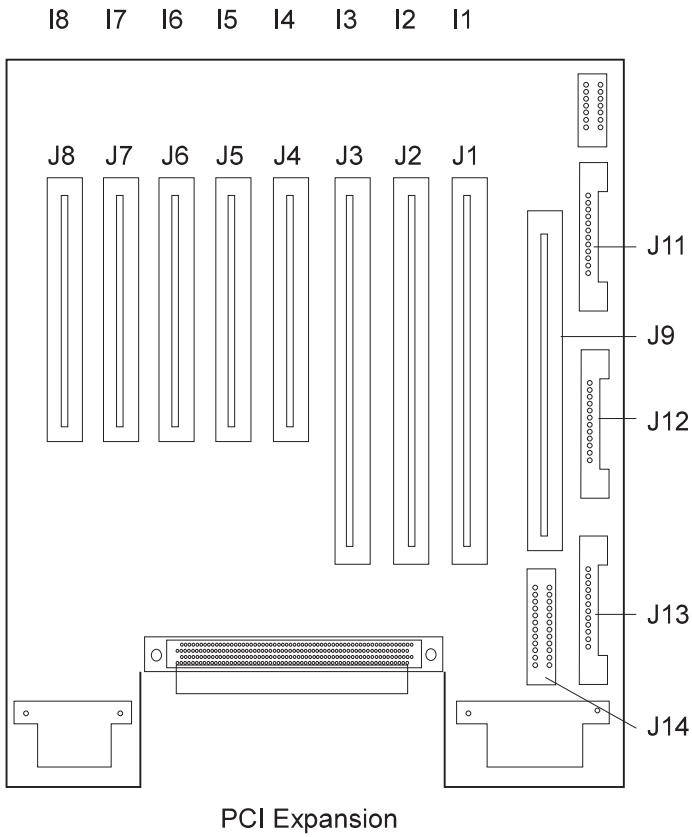
PCI Expansion

Figure   1-30. 332 MHz SMP Node I/O Expansion Planar

J1

PCI Riser Card

J2
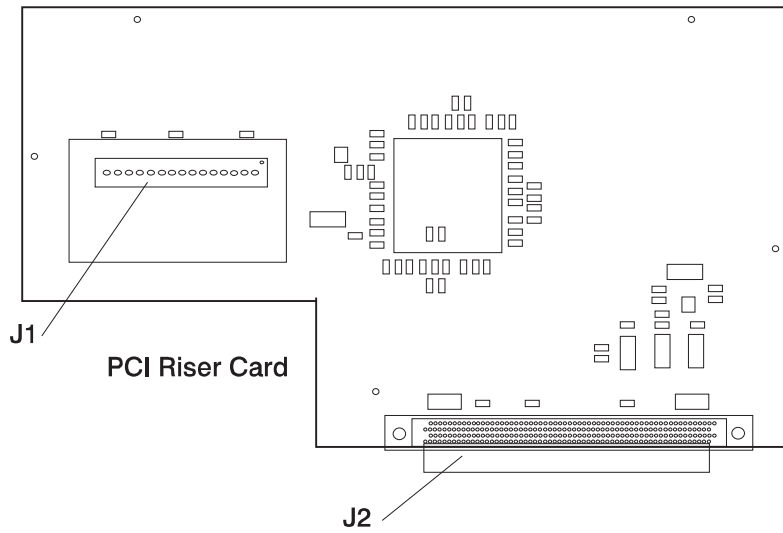
Figure   1-31. 332 MHz SMP Node Riser Card
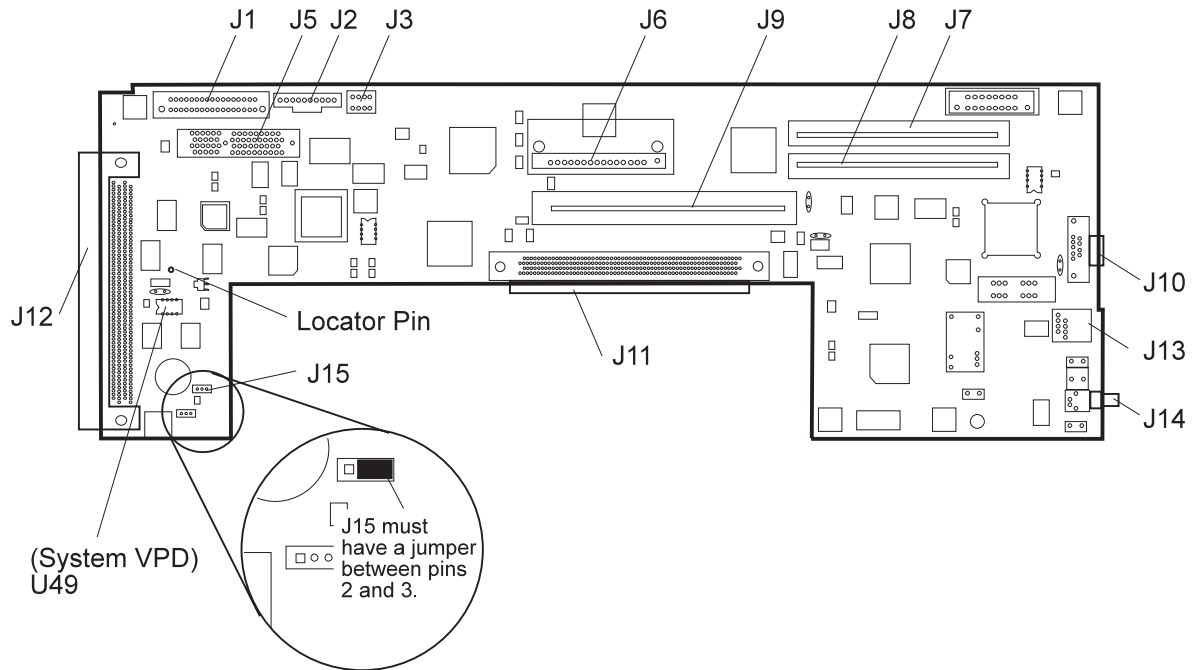
Figure   1-32. 332 MHz SMP Node I/O Planar

System Planar
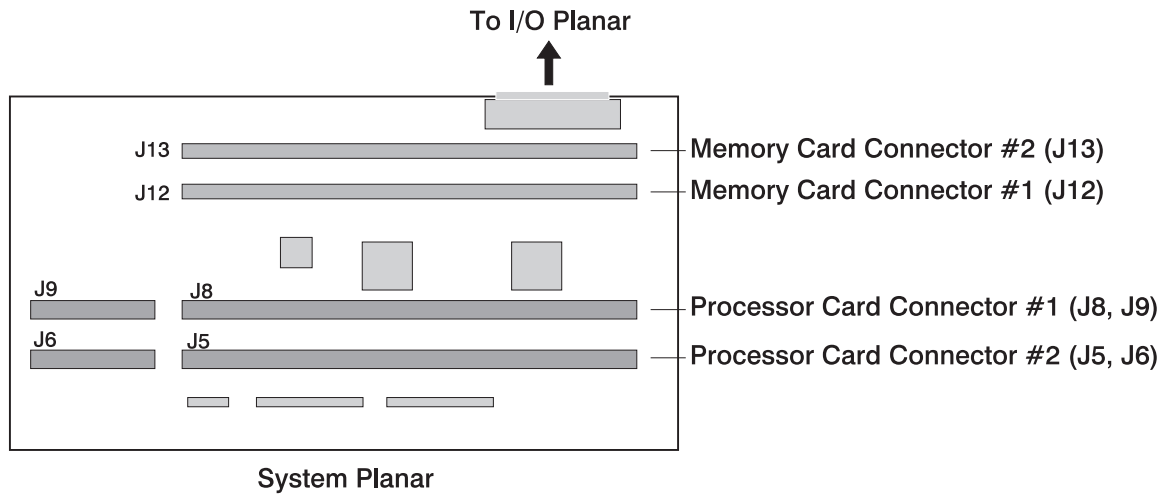
Figure   1-33. 332 MHz SMP Node Memory System Board

J5, J6   Processor card connector #2 (Processor - Slot 2)

J8, J9   Processor card connector #1 (Processor - Slot 1, Base Card)

J12   Memory card connector #1 (Memory - Slot 1)

J13   Memory card connector #2 (Memory - Slot 2)

Note: To IPL successfully, a processor card must be installed in processor slot 1.
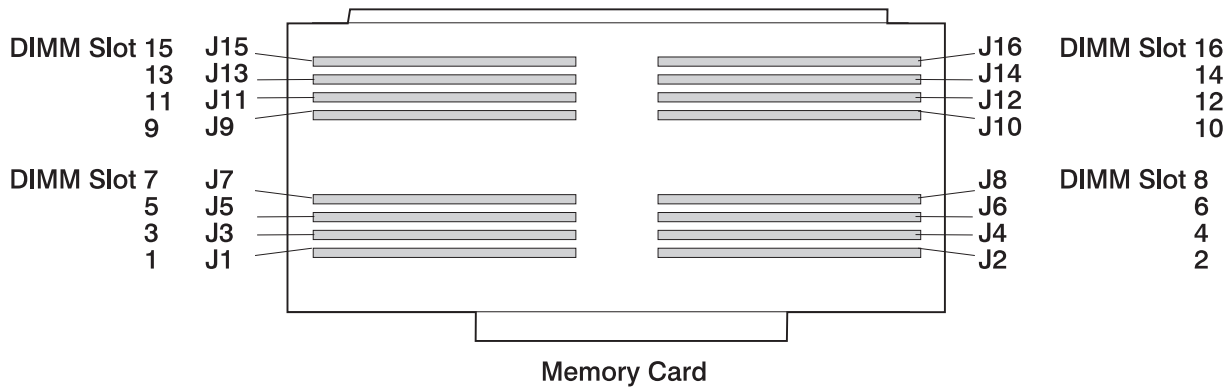
Figure 1-34. 332 MHz SMP Node Memory Card - DIMM Locations

POWER3 SMP Thin and Wide Node Locations

Figure 1-35 shows a high level component diagram of a RS/6000 SP POWER3 SMP wide processor node and Figure 1-36 on page 1-39 shows a top view.
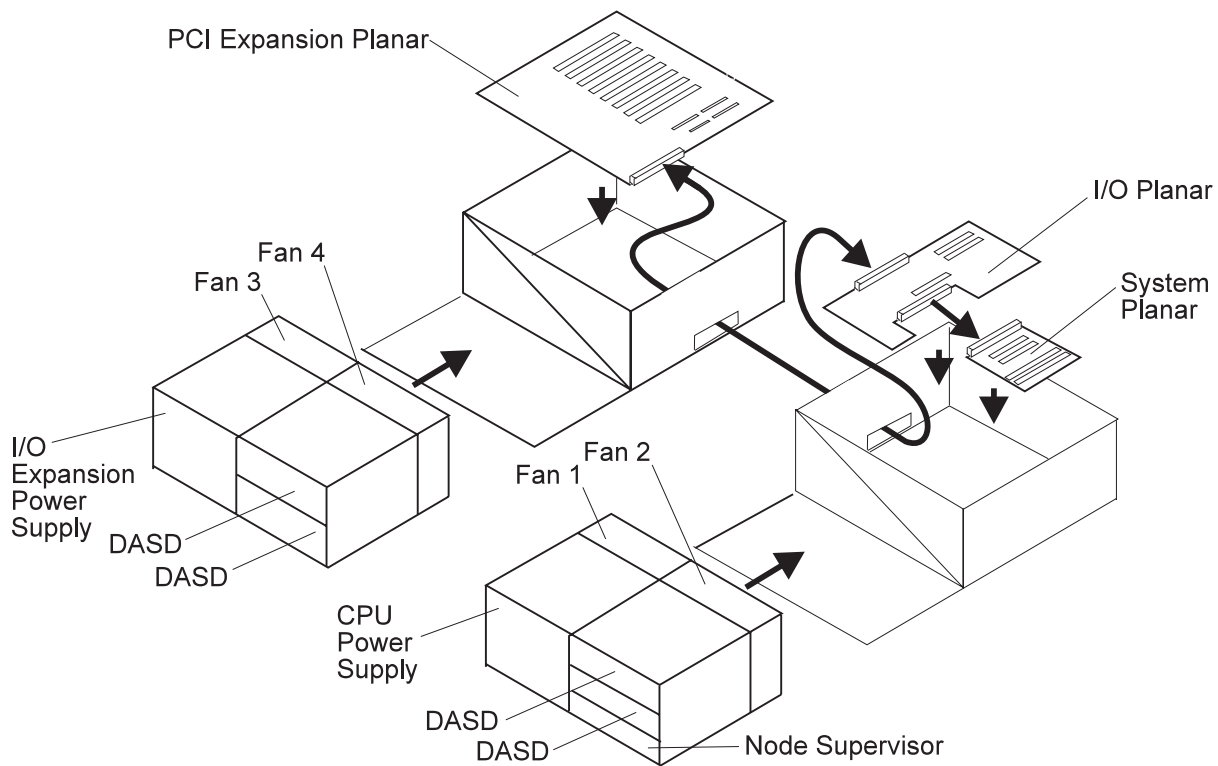
Figure 1-35. POWER3 SMP Wide Node High Level Component Diagram
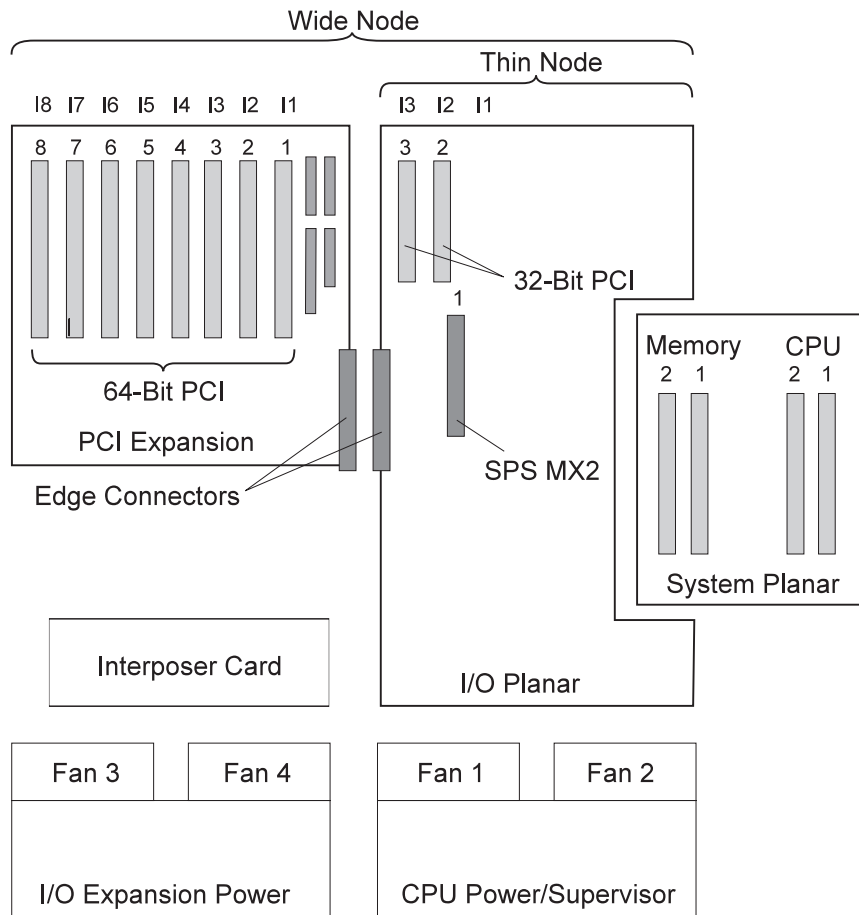
Figure 1-36. Top View of POWER3 SMP Wide Processor Node

I/O Expansion Node

Thin (CPU) Node

I8
I7
I6
I5
I4
I3
I2
I1

Power Connector

I3
I2
I1

S1 (Serial Port)

Ethernet

Node Supervisor

Power Connector
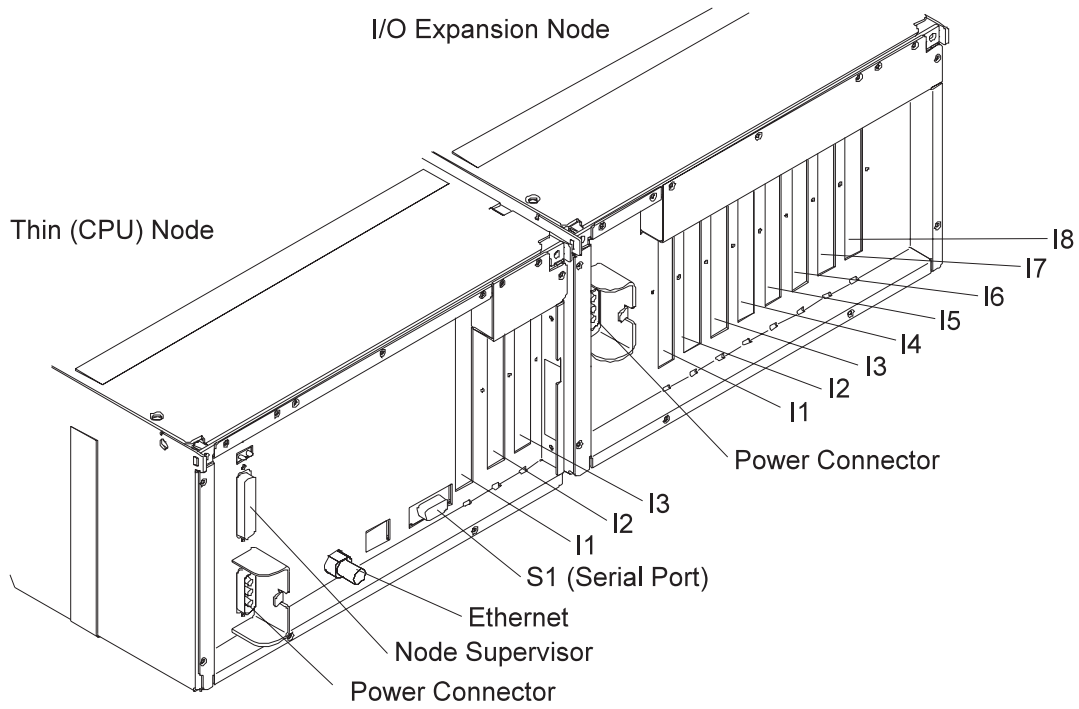
Figure   1-37. POWER3 SMP Wide Node Rear View

PCI Position I3

PCI Position I2

SP Switch MX2
Adapter Position I1

Memory Position "B"

Memory Position "A"

Processor Position "C"

Processor Position "D"

CPU
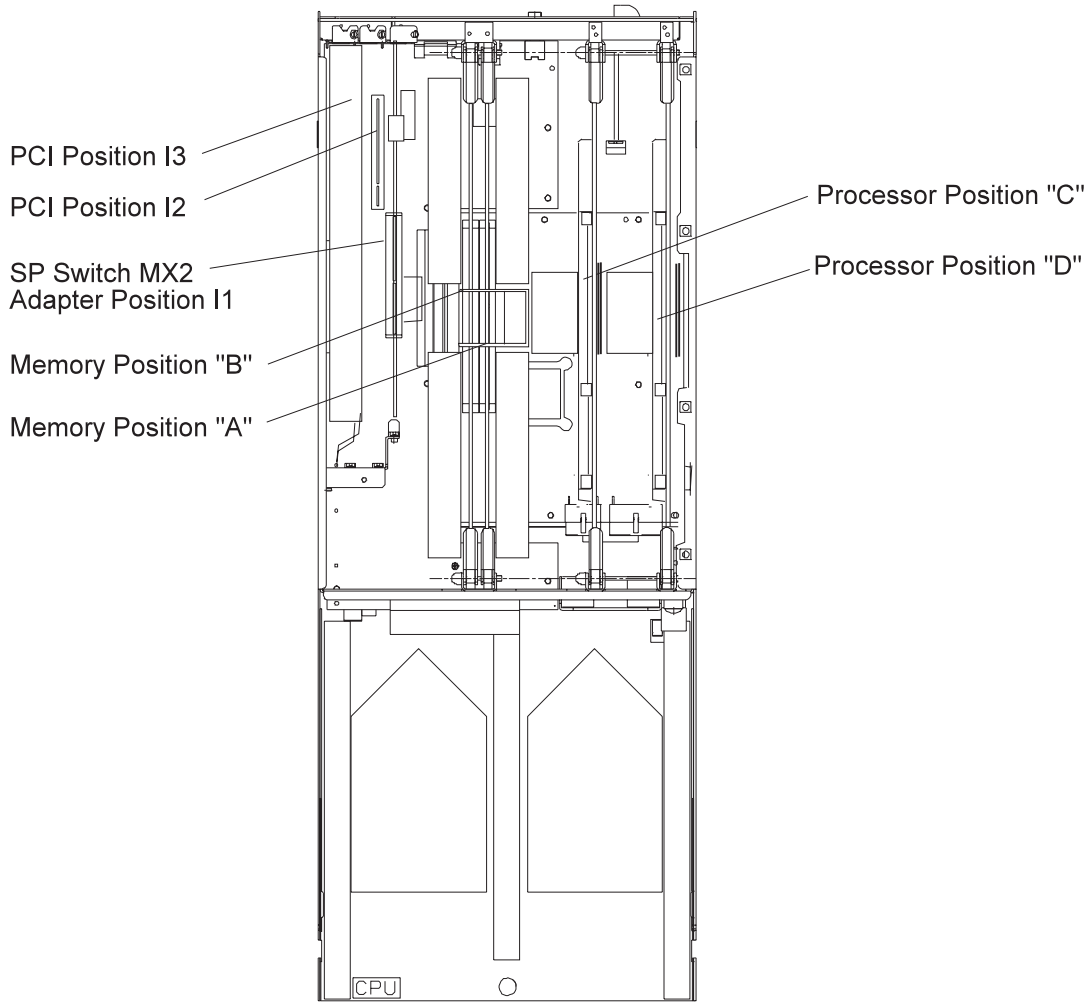
Figure 1-38. Top View of POWER3 SMP Thin Node

I8   I7   I6   I5   I4   I3   I2   I1

J8   J7   J6   J5   J4   J3   J2   J1

J14
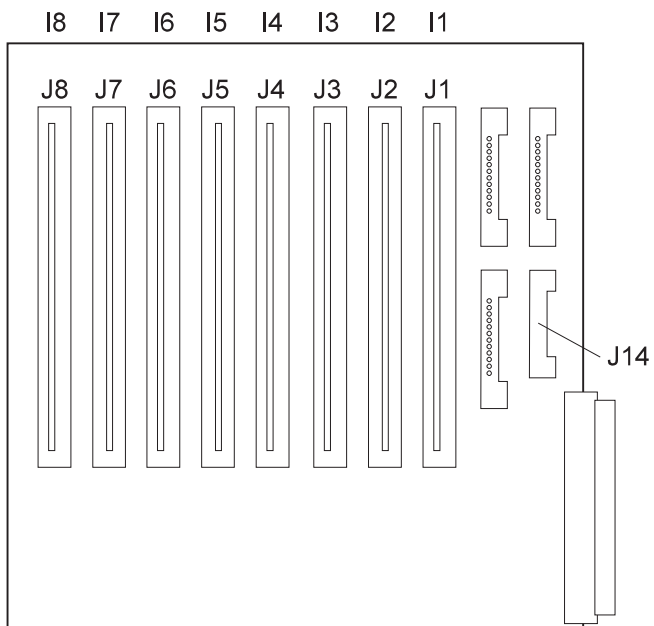
Figure 1-39. POWER3 SMP Wide Node I/O Expansion Planar
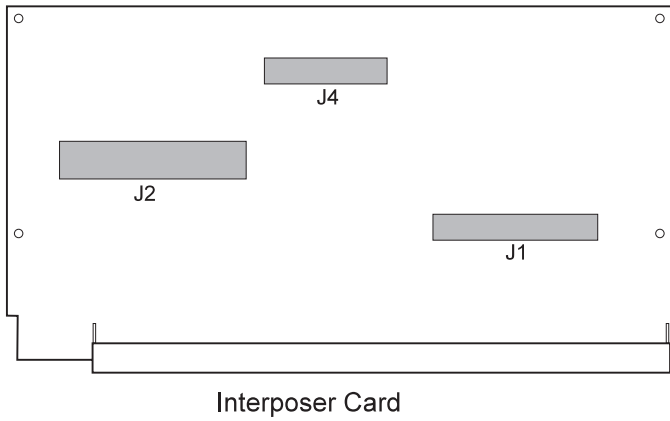
Figure 1-40. POWER3 SMP Wide Node Interposer Card
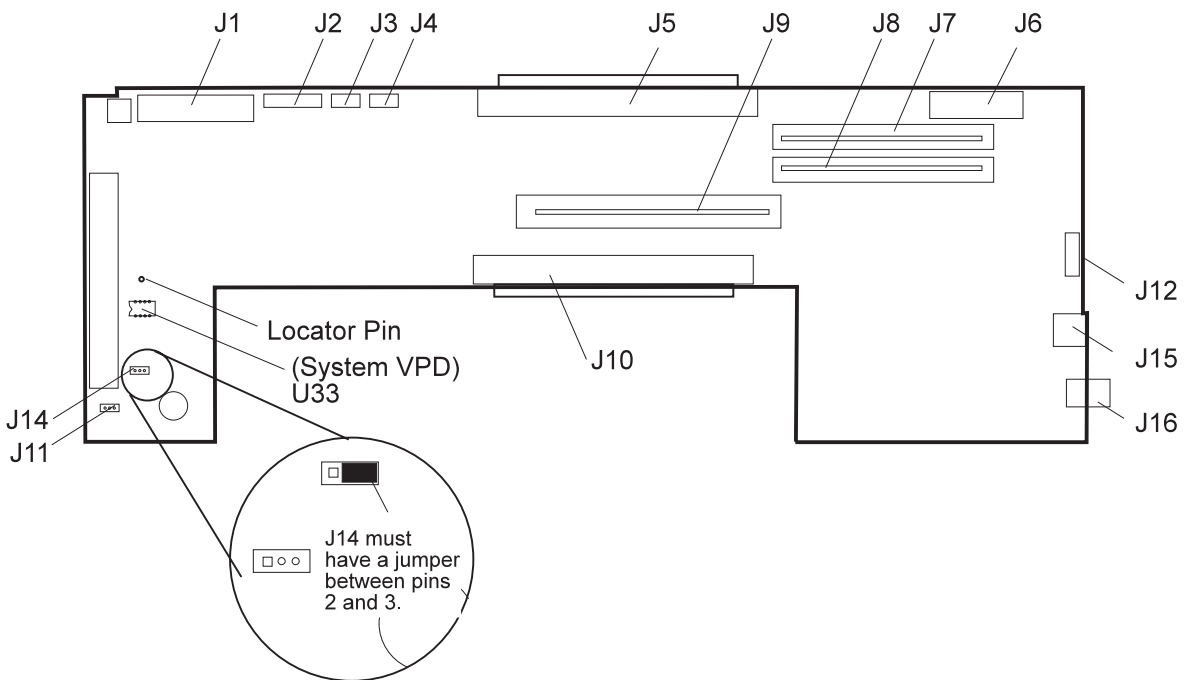
Figure 1-41. POWER3 SMP Thin Node I/O Planar
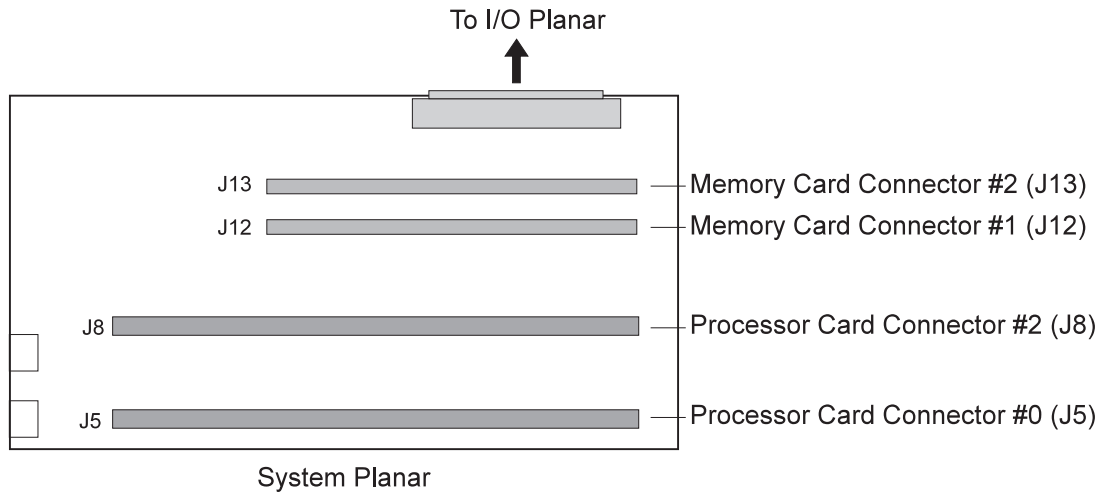
Figure   1-42. POWER3 SMP Thin Node Memory System Board
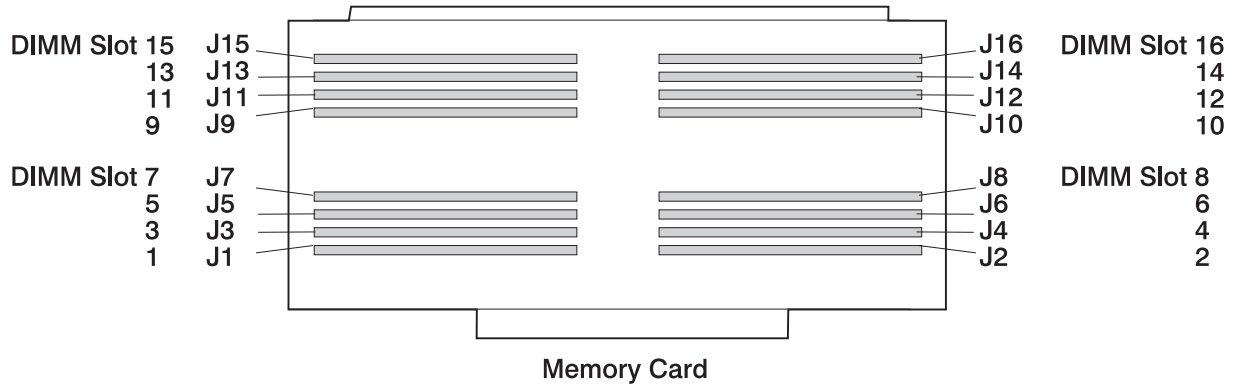
Figure   1-43. POWER3 SMP Thin Node Memory Card - DIMM Locations

Switch Assembly Locations

The following figures show the high-performance switch assembly:
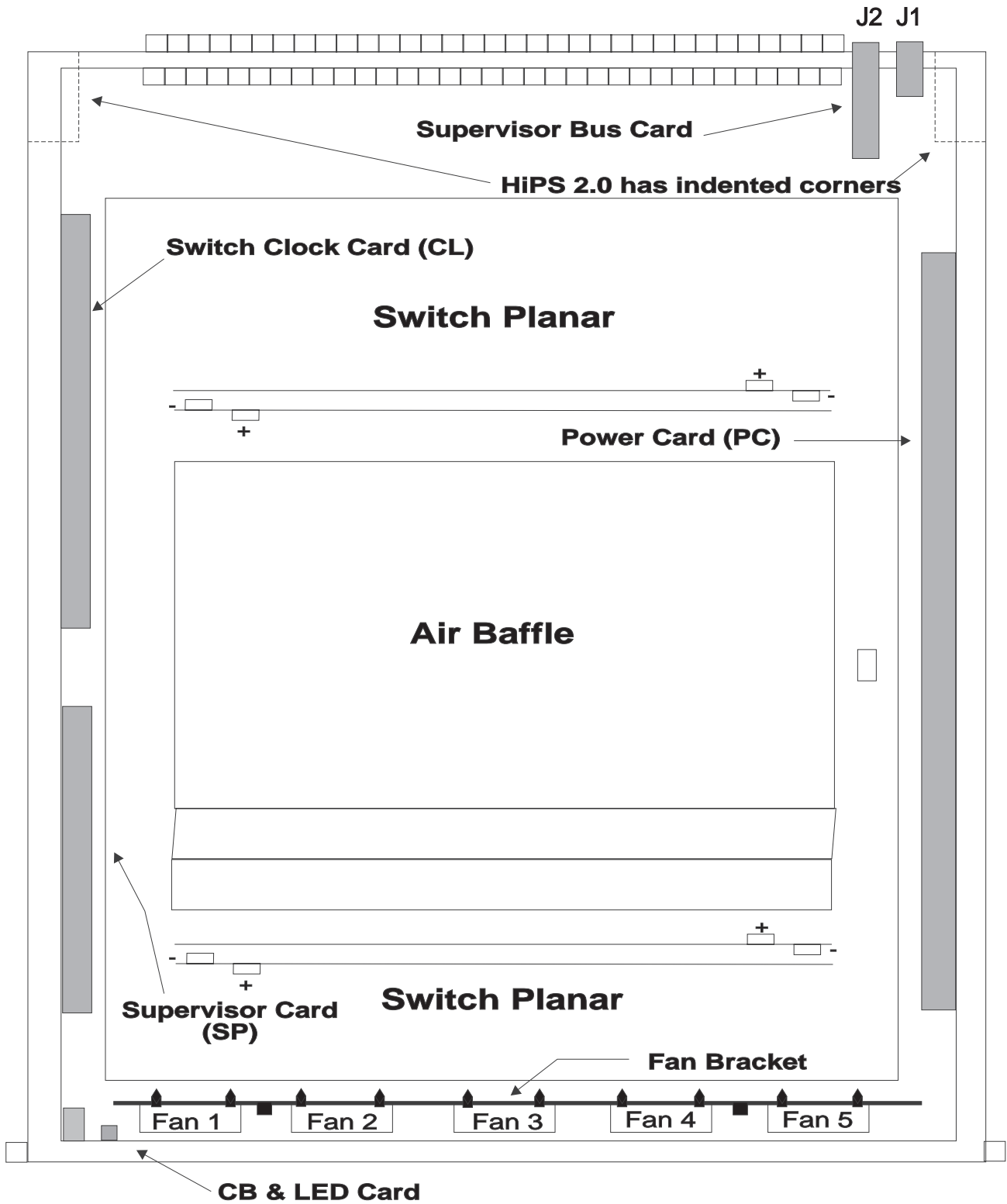
Figure   1-44. HiPS 2.0/HiPS 3.0 Assembly
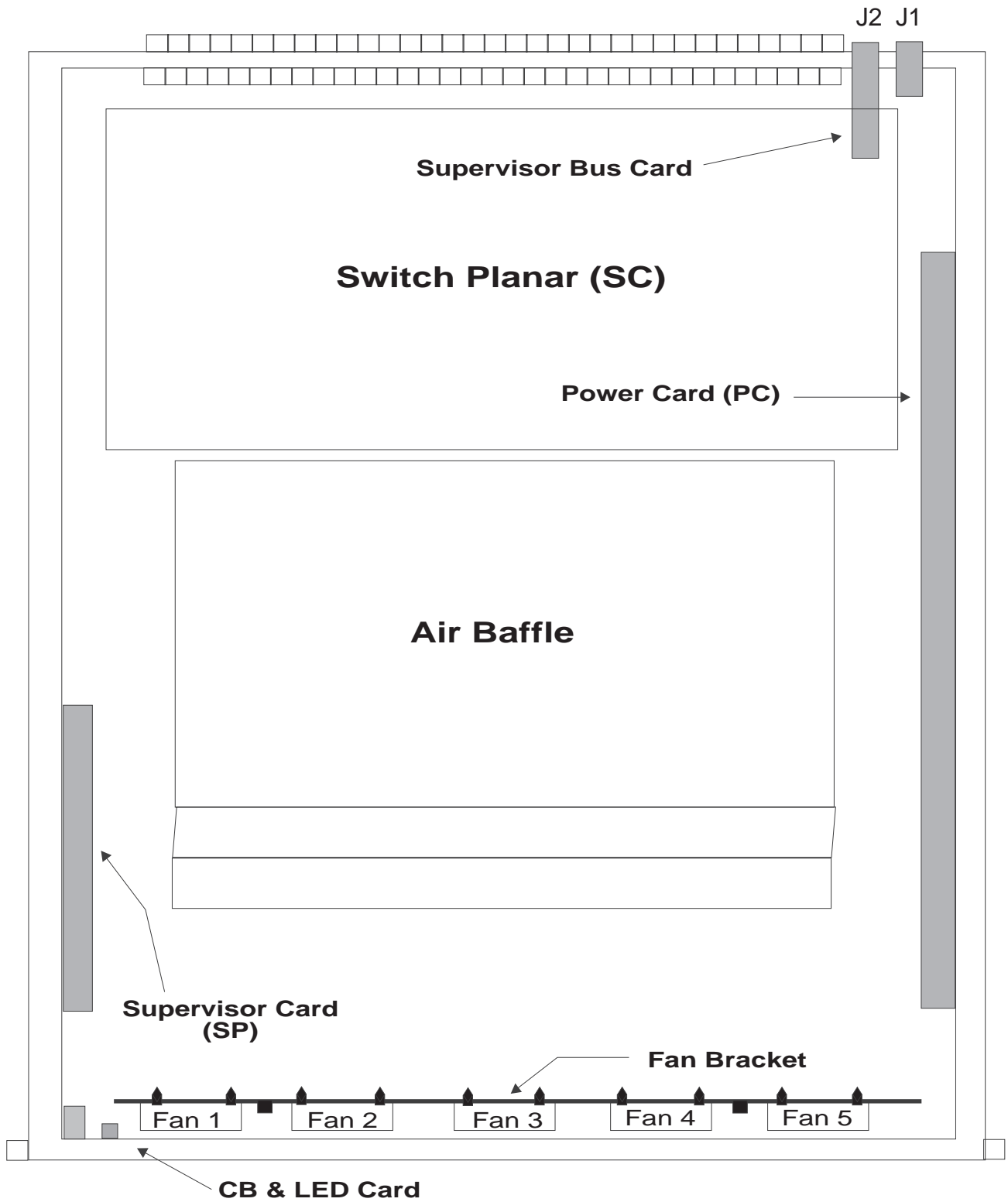
Figure 1-45. HiPS-LC8 Assembly

J1 J2

Supervisor Bus Card

Switch Planar

Air Baffle

Power
Supply 2

Supervisor
Card

Power
Supply 1

P6

P5

P4

Fan 5   Fan 4   Fan 3   Fan 2   Fan 1

CB & LED Card
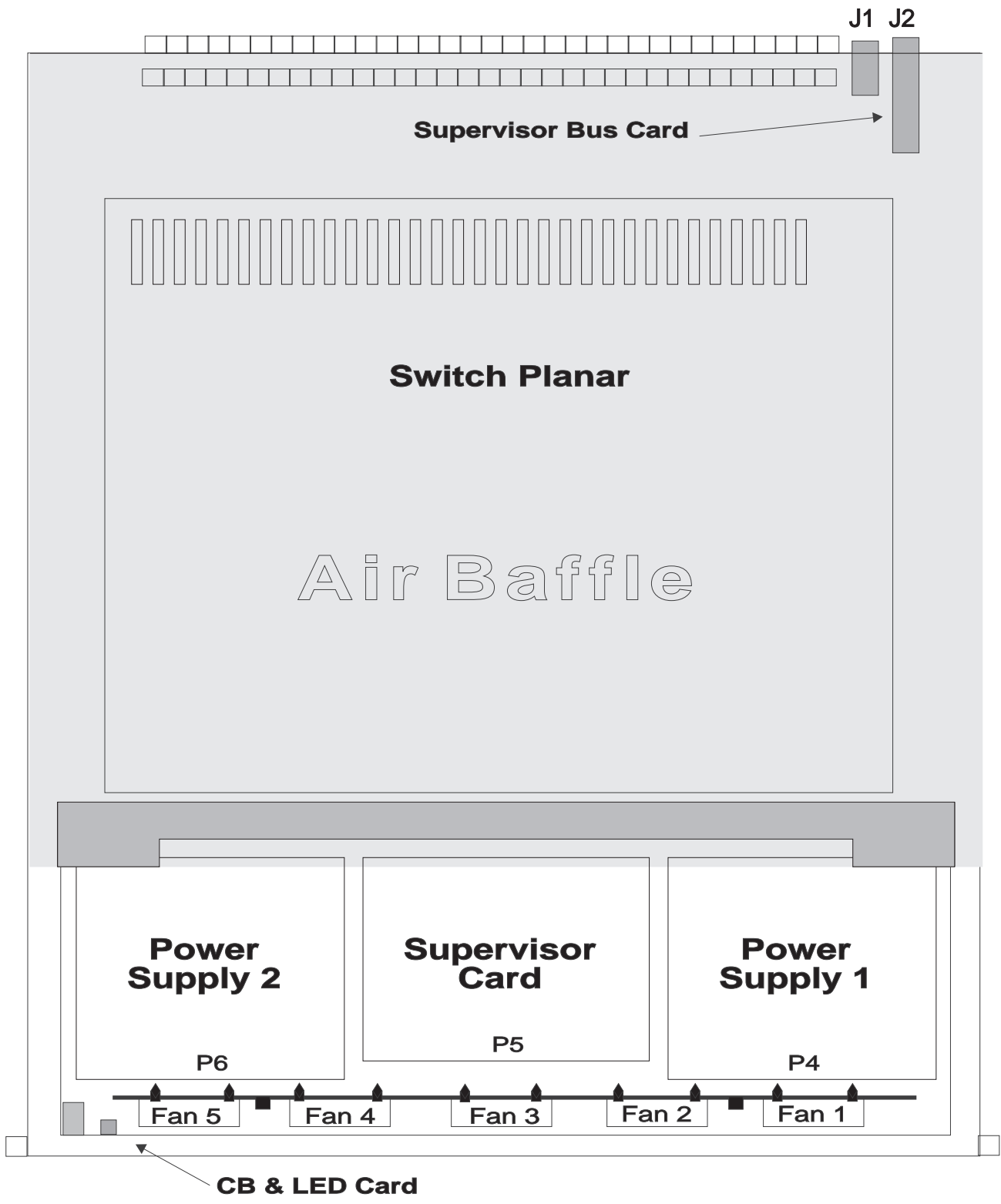
Figure 1-46. SPS/SPS-8 Assembly
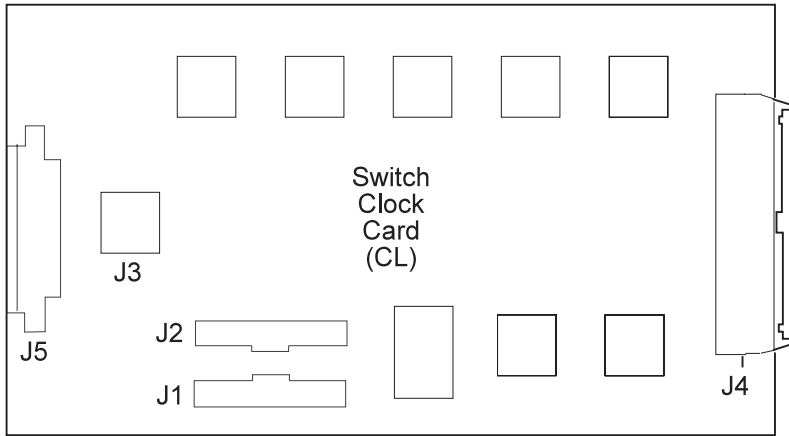
Figure 1-47 (Part 1 of 3). High-Performance Switch Assembly Locations
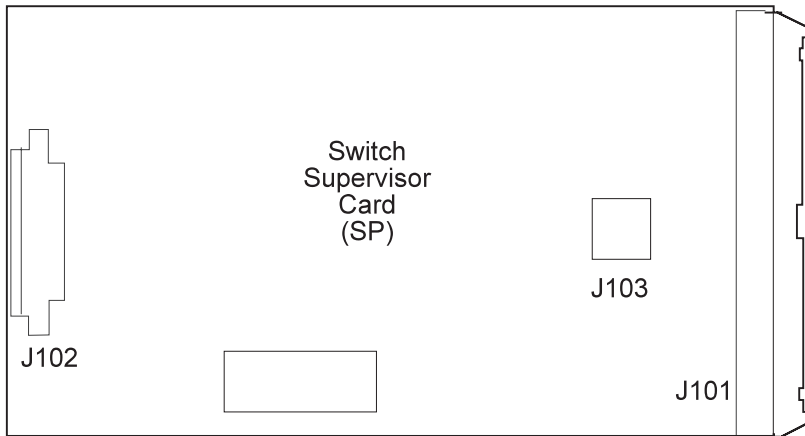
Figure 1-47 (Part 2 of 3). High-Performance Switch Assembly Locations
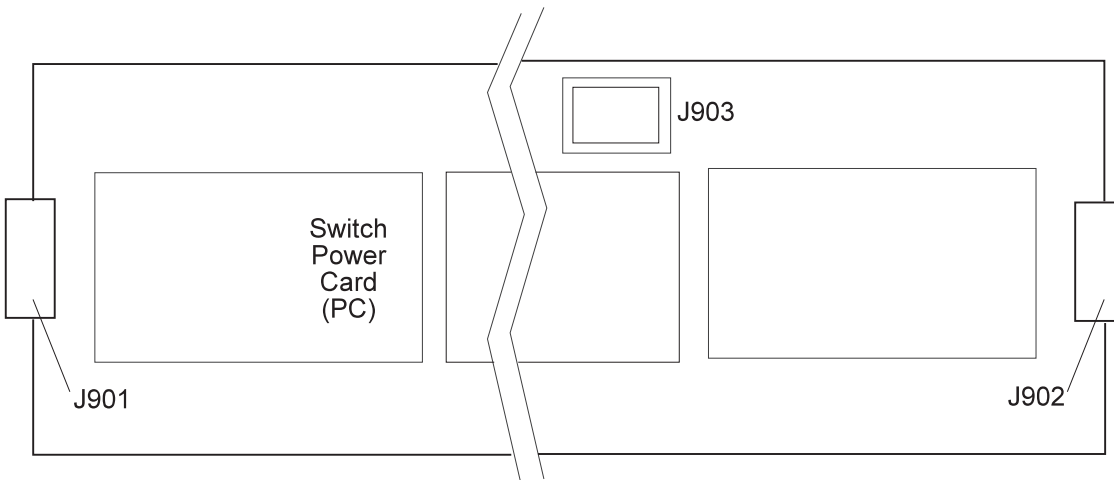
Figure 1-47 (Part 3 of 3). High-Performance Switch Assembly Locations

Switch Assembly (SXX):   This list shows the designations for the switch assembly:

SC: Switch Planar Card

PC: Power Card

SP: Supervisor card

CL: Clock Card

LD: LED Card

SB: Supervisor Bus Card

CB: Circuit Breaker

F1-F5:   Fans 1 - 5

BH   Bulkhead

From Jack	To Location	Description
Table 1-3. HiPS Supervisor Card Connector Descriptions		
J101	SB-J102	Supervisor Bus
J102	LD-J1/Fans 1-5/CL-J4	Power/Control/Sense
J103	PC-J903	Power

From Jack	To Location	Description
Table 1-4. HiPS Clock Card Connector Descriptions		
J1	BH-J36	External Clocks for HiPS 2.0
J1	SC-Clocks	External Clocks for HiPS 3.0
J2	BH-J35	Node Clocks for 2.0 only
J3	SC-GORE CLK	Gore Clock
J4	SV-J102	To Supervisor
J5	SC-BUSBARS	Power

From Jack	To Location	Description
Table 1-5. HiPS Power Card Connector Descriptions		
J901	BH-J1/CB/SV-J103	48 V Power
J902	SC-BUSBARS	+5 V/-5 V Power
J903	SV-J102	+5 V/-5 V/+12 V/+48 V/Control

Connector Details

Figure 1-48 on page 1-49 shows RS/6000 SP component connector details.

3x5 Power

3x4 Power

3x3 Power

2x1 Power

3x1 Power

4x1 Power

8x1 Power

4x1 DASD Power

2x13 Berg

2x25 Berg

3-pin Power

25-pin D-Shell

9-pin D-shell
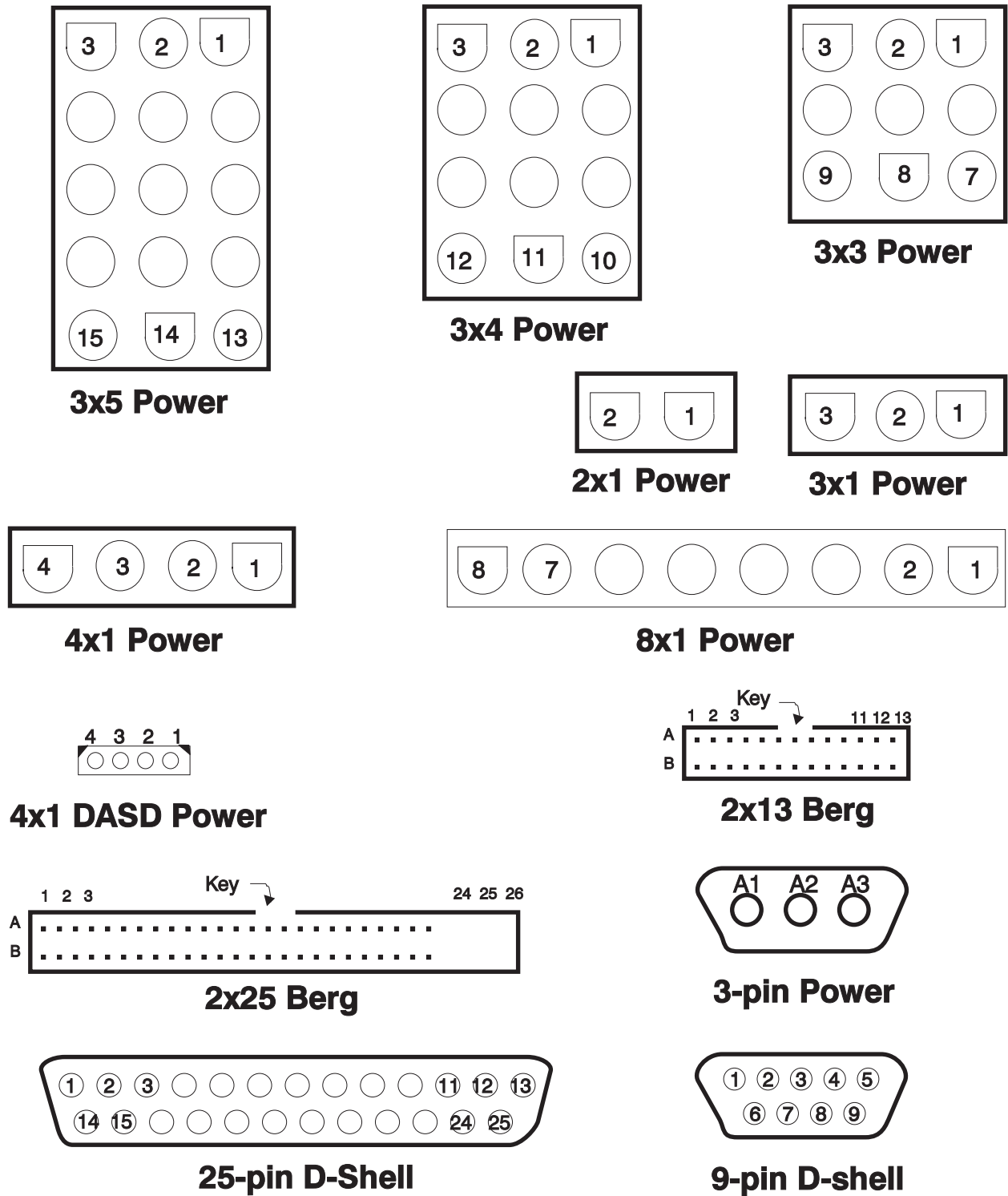
Figure 1-48. RS/6000 SP Connector Details (As Seen at Receiving Ends, Not at Cable Ends)

Cable Routing

Figure 1-49 on page 1-50 and Figure 1-50 on page 1-50 show back views of the RS/6000 SP frame, showing the horizontal and vertical paths of cable routing from connector-to-connector, with the depth amplified on the drawing.
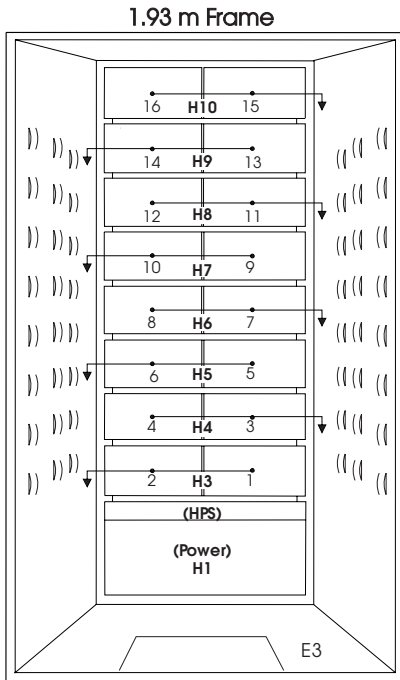
Figure 1-49. Frame Cabling Routing Path in Rear of RS/6000 SP Frame — 1.93 m Frame
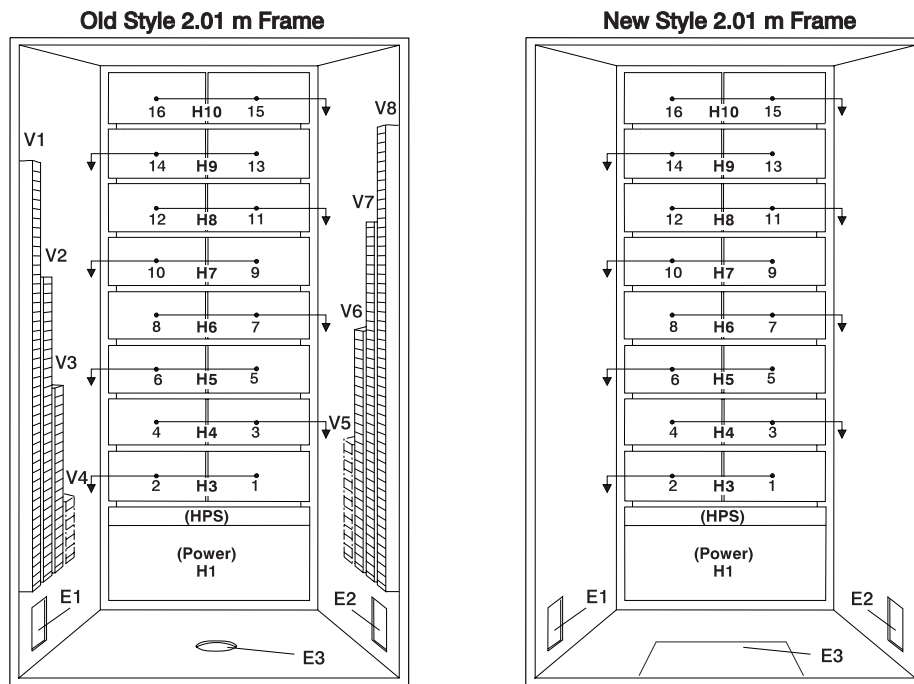
Figure 1-50. Frame Cabling Routing Path in Rear of RS/6000 SP Frame — 2.01 m Frame

Note: For a multi-switch frame (F/C 2030/1), refer to Figure 1-49.

Table 1-6 on page 1-51 shows external cable routing in a RS/6000 SP frame populated with 16 processor nodes. (Refer to "Cable Routing" on page 1-49 to see the routing paths.)

Slot Number (Node)	Cable Budget millimeters (inches)	Frame Entrance (New Style)	Frame Entrance (Old Style)	Vertical Routing (Old Style)	Horizontal Routing (Old Style)
1	1800 (71)	E3	E1	V4	H3
2	1500 (59)	E3	E1	V4	H3
3	1680 (66)	E3	E2	V5	H4
4	1980 (78)	E3	E2	V5	H4
5	2160 (85)	E3	E1	V3	H5
6	1850 (73)	E3	E1	V3	H5
7	2030 (80)	E3	E2	V6	H6
8	2340 (92)	E3	E2	V6	H6
9	2510 (99)	E3	E1	V2	H7
10	2210 (87)	E3	E1	V2	H7
11	2390 (94)	E3	E2	V7	H8
12	2690 (106)	E3	E2	V7	H8
13	2870 (113)	E3	E1	V1	H9
14	2570 (101)	E3	E1	V1	H9
15	2740 (108)	E3	E2	V8	H10
16	3050 (120)	E3	E2	V8	H10

Table 1-6. External Cable Routing

Cable Routing in a Multi-Switch Frame (F/C 2030/1)

Figure 1-51 on page 1-52 and Figure 1-52 on page 1-52 show back views of the RS/6000 SP multi-switch frame with frame extension, showing the horizontal and vertical paths of cable routing from connector-to-connector. The depths has been amplified on the drawing.

Note:

W1 consists of vertical raceways V1-V4.
W5 consists of vertical raceways V5-V8.
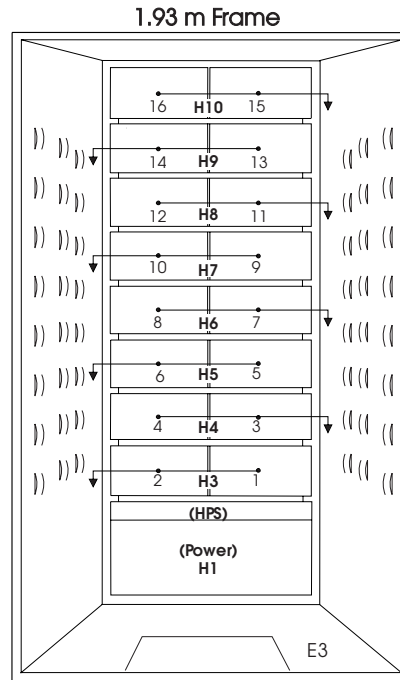
Figure 1-51. Frame Cable Routing Paths in Rear of RS/6000 SP Multi-Switch Frame (F/C 2030/1) — 1.93 m Frame
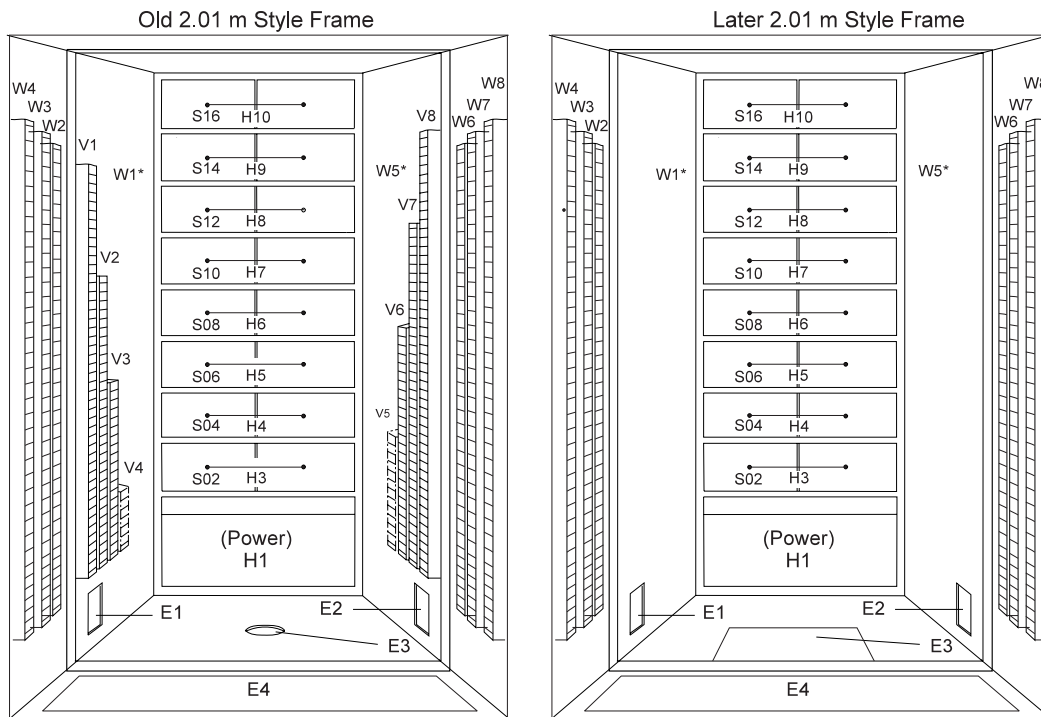
Figure 1-52. Frame Cable Routing Paths in Rear of RS/6000 SP Multi-Switch Frame (F/C 2030/1) — 2.01 m Frame

HiPS 2.0/3.0 Node Data Cables

Table 1-7 on page 1-53 describes the attachment locations and routing for the internal HiPS 2.0 or HiPS 3.0 switch data cables:

Cable Part Number	Plug From Location	From Horizontal Path	Vertical Path Raceway	To Horizontal Path	Plug to Location (See Note 1)
46G5971	E00-S00-BH-J4	H2	V1	H9	E00-N14-BH-PA
46G5972	E00-S00-BH-J6	H2	V1	H9	E00-N13-BH-PA
46G5973	E00-S00-BH-J8	H2	V2	H7	E00-N10-BH-PA
46G5974	E00-S00-BH-J10	H2	V2	H7	E00-N09-BH-PA
46G5975	E00-S00-BH-J12	H2	V3	H5	E00-N06-BH-PA
46G5976	E00-S00-BH-J14	H2	V3	H5	E00-N05-BH-PA
46G5977	E00-S00-BH-J16	H2	V4	H3	E00-N02-BH-PA
46G5978	E00-S00-BH-J18	H2	V4	H3	E00-N01-BH-PA
46G7035	E00-S00-BH-J20	H2	V5	H4	E00-N03-BH-PA
46G7036	E00-S00-BH-J22	H2	V5	H4	E00-N04-BH-PA
46G7037	E00-S00-BH-J24	H2	V6	H6	E00-N07-BH-PA
46G7038	E00-S00-BH-J26	H2	V6	H6	E00-N08-BH-PA
46G7039	E00-S00-BH-J28	H2	V7	H8	E00-N11-BH-PA
46G7040	E00-S00-BH-J30	H2	V7	H8	E00-N12-BH-PA
46G7041	E00-S00-BH-J32	H2	V8	H10	E00-N15-BH-PA
46G7042	E00-S00-BH-J34	H2	V8	H10	E00-N16-BH-PA

Table 1-7. HiPS 2.0/3.0 Node Data Cable Chart

Note:

• PA refers to HiPS adapter data connector.

Note: For external frame-to-frame cable locations, see Appendix A of *IBM RS/6000 SP: Maintenance Information Volume 1, Installation and Relocation*.

HiPS-LC8 Node Data Cables

Table 1-8 on page 1-54 describes the attachment locations and routing for the internal HiPS-LC8 switch data cables:

Cable Part Number	Plug From Location	From Horizontal Path	Vertical Path Raceway (See Note 3)	To Horizontal Path (See Note 3)	Plug to Location (See Notes 1 & 2)
93G1082	E00-S00-BH-J12	H2			E00-N(6)-BH-PA
93G1083	E00-S00-BH-J14	H2			E00-N(5)-BH-PA
93G1084	E00-S00-BH-J16	H2			E00-N(2)-BH-PA
93G1085	E00-S00-BH-J18	H2	V4	H3	E00-N(1)-BH-PA
93G1086	E00-S00-BH-J20	H2			E00-N(3)-BH-PA
93G1087	E00-S00-BH-J22	H2			E00-N(4)-BH-PA
93G1088	E00-S00-BH-J24	H2			E00-N(7)-BH-PA
93G1089	E00-S00-BH-J26	H2			E00-N(8)-BH-PA

Table 1-8. HiPS-LC8 Node Data Cable Chart

Notes:

1. PA refers to HiPS adapter data connector.

2. N(#) refers to consecutive numbering of processor nodes counting from slot 1 (rather than slot position). For example, in a frame of all wide nodes:

   N(1) = N01, N(2) = N03,...,N(8) = N15

3. Based on the physical slot number (1-16) of processor node N(#), use the corresponding vertical and horizontal routing from Table 1-6 on page 1-51 to route the switch data cables. For example, if N(4) is in physical slot 6, use the entry for slot number 6.

SPS Node Data Cables

Table 1-9 on page 1-55 describes the attachment locations and routing for the internal SPS switch data cables:

Table 1-9. SPS Node Data Cable Chart		
Cable Part Number	**Plug from Location**	**Plug to Location**
46H9710	E00-S00-BH-J7	E00-N01-BH-PA
46H9711	E00-S00-BH-J8	E00-N02-BH-PA
46H9712	E00-S00-BH-J26	E00-N03-BH-PA
46H9713	E00-S00-BH-J25	E00-N04-BH-PA
46H9714	E00-S00-BH-J9	E00-N05-BH-PA
46H9715	E00-S00-BH-J10	E00-N06-BH-PA
46H9716	E00-S00-BH-J24	E00-N07-BH-PA
46H9717	E00-S00-BH-J23	E00-N08-BH-PA
46H9718	E00-S00-BH-J31	E00-N09-BH-PA
46H9719	E00-S00-BH-J32	E00-N10-BH-PA
46H9720	E00-S00-BH-J18	E00-N11-BH-PA
46H9721	E00-S00-BH-J17	E00-N12-BH-PA
46H9722	E00-S00-BH-J33	E00-N13-BH-PA
46H9723	E00-S00-BH-J34	E00-N14-BH-PA
46H9724	E00-S00-BH-J16	E00-N15-BH-PA
46H9725	E00-S00-BH-J15	E00-N16-BH-PA
Note: "PA" refers to connector on SPS adapter.		

Note: For external frame-to-frame cable locations, see Appendix A of *IBM RS/6000 SP: Maintenance Information Volume 1, Installation and Relocation*.

SPS-8 Node Data Cables

Table 1-10 describes the attachment locations and routing for the internal SPS-8 switch data cables:

Table 1-10. SPS-8 Node Data Cable Chart		
Cable Part Number	**Plug from Location**	**Plug to Location**
46G9690	E00-S00-BH-J7	E00-N01-BH-PA
46G9691	E00-S00-BH-J8	E00-N02-BH-PA
46G9692	E00-S00-BH-J26	E00-N03-BH-PA
46G9693	E00-S00-BH-J25	E00-N04-BH-PA
46G9694	E00-S00-BH-J9	E00-N05-BH-PA
46G9695	E00-S00-BH-J10	E00-N06-BH-PA
46G9696	E00-S00-BH-J24	E00-N07-BH-PA
46G9697	E00-S00-BH-J23	E00-N08-BH-PA
Note: PA refers to connector on SPS adapter.		

Chapter 2. Service Procedures

Tools and Files Overview

The following three tables provide an overview of the tools, setup files, and tuning files used in the service procedures.

Table 2-1. Service Procedure Tools

Utility (see note)	Runs on	Description
fault_service_Worm_RTG	All nodes	Monitors the switch for faults. It restarts the switch if a fault is detected.
fs_monitor	All nodes	Monitors the adapter for interrupts that have not been serviced. This is required because of a hardware oversight in MSMU, in which there is a window in time that causes it to hold interrupts and then forget to introduce them.
rc.switch	All nodes	Starts the daemons and IP configuration tools.
Estart	Primary or Control Node	Tunes the switch and puts in into run phase. Also, kicks off the route table generator and distributes the routes to the nodes, by placing them in the **etc/SP** directory on the control node.
Estart_sw	Primary or Control Node	This is the primary-node command to start the RS/6000 SP High Performance Switch. **Estart_sw** is called by **Estart**. It is useful to note that the time-out variable (LIMIT) for the **Estart** process is located in this file. This may have to adjusted for systems that take longer to tune than in other systems.
Eprimary	All nodes	Sets a node as the primary node.
Eprotocol	All nodes	Stores switch protocol information in the System Data Repository for a node or a series of nodes. Also retrieves a topology files out of the SDR.
Eclock	Primary or Control Node	Controls the clock source for each switch board within an SP cluster.
ifconfig	All nodes	This sets up the IP interface to the switch.
Note: Unless otherwise noted, the directory for these utilities is **/usr/lpp/ssp/css**.		

Table 2-2. Setup Output Files

File (see note)	Location	Description
rc.switch.log	All nodes	Logs all information on the last run of **rc.switch**. It will indicate if this is a primary or secondary node, the associated switch chip information, and IP address information.
rc.switch.log.previous	All nodes	A copy the previous run of **rc.switch**.
expected.top.no_comments	All nodes	Used by **rc.switch** to more easily parse out chip connection information.
fs_daemon_print.file	All nodes	A log of the daemon.
fs_monitor.log	All nodes	A log of the monitor daemon.
css.snap	All nodes	Log files created by the switch support code.
Note: The directory for these utilities is **/var/adm/SPlogs/css**.		

Table 2-3. Tuning Output Files

File (see note)	Location	Description
daemon.stdout	Primary	Keeps a detailed account of the tuning process initiated by the **Estart** command. It includes data from every tuning operation since the current daemon on the primary node was initiated.
daemon.results	Primary	A record of how many nodes were initialized.
daemon.stderr	Primary	A record of which nodes were not initialized.
out.top	Primary	Reports errors from the last tuning procedure. It begins as a copy of the **topology** file and errors are indicated to the right of each entry.
out.top.old	Primary	A copy of **out.top** from the previous run.
router.log	Primary	The router log file generated by the route table generator after initialization.
router.log.*x*	All nodes	The route information for a particular node *x*.
Note: Unless otherwise noted, the directory for these utilities is **/var/adm/SPlogs/css**.		

Using the css.snap Script

The **css.snap** script collects log files created by switch support code (device driver, worm, fault-service, diags) into a single package.

Attention: css.snap uses a number of undocumented utilities to collect information. Some of these, like **read_regs** and the **tbXdump** routines, can be destructive when used on a running system. After using **css.snap** to collect diagnostic information, it's best to run **/usr/lpp/ssp/css/rc.switch** in order to reset/reload the switch adapter and eliminate residual effects of these utilities. This procedure should be used only under the direction of the IBM Support Center.

Note: **css.snap** is located in the **/usr/lpp/ssp/css** directory.

Under normal circumstances, it will collect the following:

```
cable_miswire
cable_miswire.old
core                   (fault service daemon dump file)
css.snap.log
css_dump.out
daemon.stderr
daemon.stdout
dtbx.trace
dtbx.failed.trace
errpt.out              (most recent 'errpt -a' and 'errpt' entries)
flt
fs_daemon_print.file
fs_dump.out
netstat.out            (current 'netstat -I css0' and 'netstat -m')
out.top
rc.switch.log
regs.out
router.log
scan_out.log
scan_save.log
tb_dump.out
vdidl.out
worm.trace
```

The files ending in **.out** are produced by running the appropriate command to dump internal (in memory) trace information or dump data to a file. The completed output file will be found in **/var/adm/SPlogs/css/css.snap.[date-time]tar.Z**.

css.snap avoids flooding **/var** by following these rules:

- If less than 10% of **/var** is free, **css.snap** exits.

- If the CSS portion of **/var** is more than 30% of the total space in **/var**, **css.snap** erases old snap files until the CSS share sinks below 30%. If successful, **css.snap** proceeds. If not, it exits.

css.snap is called automatically from the fault-service daemon when certain serious errors are detected. It can also be issued from the command line by service personnel when a switch or adapter related problem is indicated.

Kerberos Authentication (SP code level 1.02 and higher)

The following section describes how to work with Kerberos authentication with SP code level 1.02 and higher.

Overview

Kerberos is an AIX tool used to authenticate users to use the system monitor and other functions of an SP2 system. It serves to authenticate users for various system services, and is required as part of the SP code level 1.02. Without proper authentication, certain functions of the system monitor and other functions will not work. This authentication is independent of any other authentication of the system, meaning that having root AIX access is not adequate.

Authorization has a time limit. Access is done by registering a ticket, which has an expiration time (configurable, but with maximum of 21.25 hours). Upon expiration of a ticket, authentication ends. You can refresh your ticket at any time to update the expiration time/date.

Functions

klist   **Checking your access list**

Lists the tickets and services, along with expiration time and date. Check the expiration times carefully to see if the authentication is still active.

kinit   **Obtaining access**

When you supply a correct Kerberos UserID and Password, you are authenticated. This allows you to perform certain commands and certain system monitor actions. You can issue this command before a ticket expires to refresh the expiration time/date.

Helpful Hints

1. You can check with the system administrator to see if it is possible to obtain a separate Kerberos userid for use in servicing the system.
2. Whenever you begin service on the system, check the access list using **klist** to make sure you have an active (not expired) ticket and that the expiration time/date is adequate to complete service actions. You can refresh your ticket using the **kinit** command.
3. If the system monitor appears to stop functioning (cannot power on/off processor nodes, reset button does not work, or so on) check your access list using **klist** to make sure that the ticket has not expired. You can authenticate your userid again using the **kinit** command.

Running Diagnostics in a Processor Node

Use the following procedures for processor nodes that can be IPLed in NORMAL or SERVICE mode.

Note: If resource is not available, you must use "SERVICE Mode (From Disk)" on page 2-7 or "Basic Stand-Alone Mode (From Network Boot)" on page 2-7 to test the device.

NORMAL Mode (Concurrent Diagnostics)

Use the following procedure for processor nodes that have already been IPLed in NORMAL mode.

Note: If the processor node has a *root* password, that password is required to perform Step 2 below. Running diagnostics from SERVICE modes does not require a *root* password.

1. Open a TTY console or telnet session to this processor node.

   TTY console:
   a. From the system monitor on the control workstation, open the node front panel display for this processor node
   b. Click on the "Open TTY" button

   Telnet session:
   a. From the control workstation, find an available AIX window
   b. Click on the AIX window, then type "telnet *nodename*" and press **ENTER**
2. Log on as *root*. Ask the customer to supply or type the password, if required
3. Type "export TERM=aixterm" and press **ENTER**
4. Type "diag" and press **ENTER**
5. Press **ENTER** to continue
6. To run advanced diagnostics against a device/system, follow these procedures:
   a. Select "Advanced Diagnostic Routines" option, then press **ENTER**
   b. Select "System Verification" option, then press **ENTER**
   c. Select the device from the system, then press **ENTER**
7. Return to the MAP you came from.

SERVICE Mode (From Disk)

Use the following procedure for processor nodes that can be IPLed in SERVICE mode or booted using a "maintenance" image.

Note: If node is currently in use (IPLed in NORMAL mode), ask the customer to remove it from the active configuration before continuing.

1. Open a TTY console on the control workstation using the Perspectives display:
   a. Select the applicable "Node Number" in the correct frame
   b. Select "Notebook"
   c. Select "Node Status"
2. Boot from local disk:
   a. For thin or wide node:
      1) Set the mode switch to SERVICE by clicking on the "Service" button
      2) Reboot the node by powering off/on the node
   b. For 604 or 604e high node:
      1) Open the TTY console
      2) Issue **ssb**
      3) Select "1 Set Flags"
      4) Check for "1 BUMP Console Present disabled"
      5) Change "2 Autoserve IPL" to "ENABLE"
      6) Change "6 FAST IPL" to "DISABLE"
      7) Exit the BUMP menu
      8) Power on the node
      9) When the diagnostic menu appears, it might ask you to set the terminal type. If so, select "Initialize Terminal" option, and define the terminal type as "LFT".
   c. For 332 MHz Symmetric MultiProcessor (SMP) and POWER3 SMP thin and wide nodes:
      1) Reboot the node (power the node off, wait briefly, then power the node on)
      2) Immediately after the words "memory" and "keyboard" are displayed, press and hold the **6** key (for a few seconds) on the TTY console
      3) Enter any requested passwords
      4) When the diagnostic menu appears, it might ask you to set the terminal type. If so, select "Initialize Terminal" option, and define the terminal type as "LFT".
3. If booting from Ethernet LAN ("maintenance" image), make sure that the processor node has been set up to boot using a "maintenance" image. See "Selecting a Processor Node Boot Response" on page 2-10.

   a. If necessary, open the TTY console by clicking on the "Open TTY" button

   b. When the diagnostic menu appears, it might ask you to set the terminal type. If so, select "Initialize Terminal" option, and define the terminal type as "LFT".

   c. To run advanced diagnostics against a device/system, go to step 6 in "NORMAL Mode (Concurrent Diagnostics)" on page 2-6

Basic Stand-Alone Mode (From Network Boot)

Note: Use this method for AIX 4.1.3 or higher along with PSSP 2.1 and higher.

The following procedure describes how to perform a verification test of most devices on one or more processor nodes. Some Micro Channel adapters are not supported.

This procedure should be performed from a window on the control workstation.

1. From the system monitor on the control workstation, open the node front panel display for this processor node
2. If booting from Ethernet LAN ("diag" image), make sure that the processor node has been set up to boot using a "diag" image. See "Selecting a Processor Node Boot Response" on page 2-10.

    Note: The command should be:

    ```
        spbootins
      -r diag frame# slot# 1
    ```

3. Make sure the TTY console is closed
4. From the "Global Controls" window:
    a. Make sure that no processor nodes are selected, then click on the processor node(s) which you are going to verify
    b. Click on "Network Boot" button
    c. Click on "Do Command" button
5. Open TTY console by clicking on the "Open TTY" button on the node front panel for this processor node
6. A diagnostic menu appears when the processor node has completed IPL
7. When you have completed diagnostics, you can power off the processor node
8. After completion, you can set the boot response for the processor node(s) to an appropriate value. Refer to "Selecting a Processor Node Boot Response" on page 2-10 for more information.

Extended Stand-Alone Mode (From Network Boot)

Note: Use this method for nodes running AIX 3.2.5 or lower.

The following section describes how to load and use an extended diagnostics image. This procedure requires additional software (shipped on an EC tape). Use only under the direction of support personnel; it might also require permission of customer to perform certain steps.

Supported Functions: This image is designed specifically to support functions that cannot be provided by any other method:

1. Diagnostics on HIPPI adapters
2. Diagnostics on S/370 Channel Emulator adapters
3. Disk Format/Certify of DASD
4. Microcode download

Loading Image From Tape to Control Workstation: Perform the following procedures to load image from tape to control workstation:

1. Make sure tape drive is connected to the control workstation, and both are powered on
2. Determine the *device_name* of this tape drive (for example, rmt0)
3. Insert the EC tape into tape drive
4. From an available AIX window, type the following commands:

    ```
    cd /usr/lib/boot    tar -xvf /dev/device_name
    ```

5. The files then load from the tape drive
6. When complete, check file by typing:

    ```
    ls -l net.image.console
    ```

    The result is:

    ```
    -rw-r--r--    1 root    system  5592064 May 19 14:01 net.image.console
    -rwxr-xr-x    1 root    system  1228    Mar 30 13:57 net.image.console.README
    ```

Setting Up the Boot Server: Perform the following procedures to set up the boot server:

1. From the control workstation, enter:

   ```
   splstdata -a
   ```

2. For each processor node, look under the column labeled "server" or "srvr" for the boot server number
3. If number is '0', skip to step 7
4. Find the node number corresponding to this number, and get its host name
5. Telnet to this boot server host name:

   tn *hostname*

6. FTP the file from the control workstation:

   cd /usr/lib/boot
   ftp *CWS_hostname*
          image
          cd /usr/lib/boot
          mget net.image.console*
          quit

7. Export the following directories:
   - **/etc/lpp**
   - **/etc/SP** (probably already exported)
   - **/usr/lib**
   - **/usr/lpp**
   - **/usr/share/lib**

   a. Enter:

       smitty mknfsexp

   b. For each processor node and for each directory in the above list, enter the following:

                 [Entry Fields]

     * PATHNAME of directory to export [*directory***]**

     * MODE to export directory read-mostly

      HOSTNAME list. If exported read-mostly [*nodename***]**

      Anonymous UID [-2]

      HOSTS allowed root access [*nodename***]**

      HOSTS & NETGROUPS allowed client access []

      Use SECURE option? [no]

     * EXPORT directory now, system restart or both [now]

      PATHNAME of Exports file if using HA-NFS []

Using Image on Processor Node(s): Perform the following procedures to use image on processor node(s):

1. Make sure the processor node(s) is off
2. Edit "/etc/bootptab" file to select this image by:
   a. Enter:

       vi /etc/bootptab

   b. Find the line(s) for the processor node(s) you are going to boot, then change the field:

   ```
   ... :bf=/tftpboot/NODE_IP_ADDRESS: ...
   ```

to:

```
... :bf=/usr/lib/boot/net.image.console: ...
```

   c. Make sure to remove any "#" characters from the beginning of the lines
3. Perform "IPLing Processor Node(s) from Network Device (Two Different Methods)" on page 2-11, using the manual method
4. From the TTY console(s), you might have to press the **1** and **Enter** keys to enable the console
5. In this TTY console, enter the following command:

   diag

6. Continue with diagnostic menus. Some additional information:
   • **HIPPI MCA**: Appears as "hippi0" in device list
   • **S/370 Channel Emulator MCA**: Appears as "chna0" in device list
   • **Disk Format/Certify**: Select "Service Aids", select "Disk Media", select "Format Disk" or "Certify Disk", select appropriate device from list
   • **Microcode Download**: Select "Service Aids", select "Microcode Download", select appropriate device from list, then select "Download the latest level of microcode"
7. When you have completed diagnostics, you might need to power off the processor node. No shutdown is required

Cleaning Up the Control Workstation: Perform the following procedures to return the control workstation to its original state:

1. Unexport the directories:
   a. Enter:

      smitty rmnfsexp

   b. For each directory except **/etc/SP**, enter the directory name
2. Set the boot response for the processor node(s) to an appropriate value. Refer to "Selecting a Processor Node Boot Response" for more information
3. You might have to optionally remove the diagnostic boot image by entering:

   rm /usr/lib/boot/net.image.console

Selecting a Processor Node Boot Response

The following procedure describes how to select the boot response for a single processor node.

1. Determine the physical frame number (*frame#*) and slot number (*slot#*) of the processor node you want to change by entering:

   splstdata -n

2. Check the current boot response for this processor node boot by entering:

   splstdata -b

   For this processor node, check for a *response* field with a value from the table below; make note of this value, so you can return the processor node to this original value
3. If the *response* field is "disk", check the *install_disk* field to determine which disk it will IPL from.
4. Determine which boot response (*response*) you need to use:

Table 2-4. Selectable Processor Node Boot Responses	
response	**Description**
disk	Configures the processor node to boot from its local disk.
install	Configures the processor node to: boot over the Ethernet LAN, install AIX on the local disk, customize the processor node, then reboot from its target disk. **Note:** Ensure that the target disk is functioning.
customize	Configures the processor node to update node-specific information on its local disk, i.e. IP addresses.
maintenance	Configures the processor node to boot over the Ethernet LAN in maintenance mode. A maintenance menu is then displayed from which the user can select further actions.
diag (see note)	Configures the processor node to boot over Ethernet LAN in diagnostics mode. A diagnostics menu is then displayed from which the user can select further actions: • Diagnostic Routines • Service Aids • Advanced Diagnostic Routines
Note: Supported only with AIX 4.1.3 or higher and PSSP 2.1 or higher.	

5. From an available window on the control workstation, enter the following command, filling in the variables (in *italics*) with the appropriate values:

   spbootins -r *response frame# slot#* **1**

6. Make sure that the tty is closed before performing the network boot.
7. If selecting a response of "install", "customize", "diag", or "maintenance": From the "Global Controls" panel on the control workstation, click on the "Net Boot" button, click on this processor node, then click on the "Do Command" button.
8. If selecting a response of "disk": From the system monitor, power off/on processor node.
9. The processor node should now boot using the selected boot response.

Note: Remember to set the *response* field back to the original value from Step 2 once you have completed service. To do so, enter the following command, where *response* is the original value:

   spbootins -r *response frame# slot#* **1**

You can check the current *response* value by repeating step 2.

Examples of **spbootins** command:

• To configure frame# 2, slot# 2 to boot in diagnostics mode:

   spbootins -r diag 2 2 1

• To configure frame# 1, slot# 4 to boot from its local disk:

   spbootins -r disk 1 4 1

IPLing Processor Node(s) from Network Device (Two Different Methods)

Perform one of the following procedures to make a processor node IPL from network:

Method One: Network Boot Method

1. From the system monitor "Global Controls" window: Make sure no processors are selected, then click on the processor node(s) you are going to boot from a network.
2. Click on "Network Boot" button.
3. Click on "Do Command" button (twice).
4. IPL from network device should now begin. LEDs will remain at **231** until IPL image is completed transfer.

   Note: If Packets Received always shows "00000", there is a network or configuration problem.

Method Two: Manual (Hand-Conditioning) Method

1. If applicable, have customer shutdown the processor node(s).
2. From the system monitor "Display Layouts" window, open "Node Front Panel Layout".
3. From the node front panel, put processor node(s) in SECURE mode by clicking on the "Secure" button.
4. From the node front panel, power-on processor node(s) by clicking on the "On" button, then on the confirmation window.
5. Click on "Open TTY" button to open TTY console(s).
6. When the LEDs reach **200**, click on the "Service" button, then **immediately** click on "Reset" button and on the confirmation window.
7. The LEDs should show **1xx**, then proceed to **26x**.
8. From the TTY console, look for "MAIN MENU". If you get a "SELECT LANGUAGE" screen, select language if necessary, then enter "99" to return to main menu.

   ┌─ **High Node** ──┐

   On the Maintenance Menu:

   • Enter "6" to select System Boot

   Note: Refer to "604 or 604e High Node SystemGuard Maintenance Menu Access" on page 2-40 to access the maintenance menus.

   └──┘

   ┌─ **332 MHz SMP or POWER3 SMP thin and wide node** ──────────────────────┐

   On the System Management Services Menu:

   • Enter "2" to select Multiboot

   • Enter "4" to select Boot Devices

   • Enter "3" to select 1st Boot Device.

   Note: For menu display format and other information, see "Service Processor Menus" on page 2-56 .

   └──┘

9. Enter "1" to "Select BOOT (Startup) Device".
10. From the "SELECT BOOT (STARTUP) DEVICE" menu, select the number corresponding to the network that you will be IPLing from. Normally this is one of the following:
    • Thin processor node: **Ethernet: Built-In**
    • Wide processor node: **Ethernet: Slot 0/1, BNC connector (1-pin)**
    • 604 or 604e high processor node: **Ethernet: Slot 0/1, BNC connector (1-pin)**

      Note: On the wide and 604 or 604e high processor node, be careful to choose BNC (1-pin) in the slot that corresponds to *EN0*.

    • 332 MHz SMP or POWER3 SMP thin or wide node: **Ethernet: Built-In**

11. When you get to the "SET OR CHANGE NETWORK ADDRESSES" menu, make sure that either all addresses show "000.000.000.000" (IPL from anywhere) **or** the "Client address" (node IP address), "BOOTP server address" (IP address of workstation containing IPL image), and optional "Gateway address" are correct.

   Note: If IP addresses are modified, make sure to later reset them to appropriate values; otherwise, Network Boot function might not work properly.

12. When you have completed this menu, enter "99" to return to the main menu.
13. From the "MAIN MENU", you might optionally run the step "Send Test Transmission (PING)" to test network connection. The test requires that you supply IP addresses.
14. From the "MAIN MENU", enter "4" to "Exit Main Menu and Start System (BOOT)".
15. From the node front panel, put the processor node in NORMAL mode by clicking on the "Normal" button.
16. From the "STARTING SYSTEM (BOOT)" menu, press ENTER to continue.
17. IPL from network device should now begin. LEDs will remain at **231** until IPL image has completed transfer.

   Note: If Packets Received always shows "00000", there is a network or configuration problem.

Updating the Ethernet Hardware Address

Perform the following steps to update the Ethernet hardware address:

1. If necessary, have customer shut down and power off the processor node.
2. Close the console TTY window (if opened).
3. Delete node entry from **/etc/bootptab.info** file on the control workstation. (Do this if the file exists and the node entry in the file exists.)
4. Use the **sphrdwrad** command to obtain the new Ethernet hardware address:
   a. Determine *frame#* and *slot#* of this processor node.
   b. Issue the following command from the control workstation:

        sphrdwrad *frame# slot#* **1**

5. Copy the collected address into **/etc/bootptab.info**
6. If the node was powered down, power it back on.

Checking Errors Using "errpt"

The following section describes how to use the **errpt** command to access error log information and how to interpret the information in the error log.

Using the "errpt" Command

Note: You can also use **smit errpt**.

errpt −**?**   Will return a list of various parameters with descriptions.

errpt −**a** −**N sphwlog** │ **pg**
                Shows detailed list of RS/6000 SP-specific hardware errors.

errpt −**a** −**N sphwlog** −**T PERM** │ **pg**
                Shows detailed list of RS/6000 SP-specific hardware failures requiring service action (for example, shutdown condition)

errpt −**a** −**N sphwlog** −**T TEMP** │ **pg**
                Shows detailed list of RS/6000 SP-specific hardware warnings.

Interpreting "errpt" Output for "sphwlog" Errors

The following describes how to read various relevant sections of the results of an "errpt –a ..." command. For an example, refer to "Sample "errpt –a ..." Output Report" on page 2-14.

Date/Time Date and time that event was logged.

Node Id Workstation where the information was logged; not processor node.

Type Indicates status/priority of the error. For hardware errors:

- PERM (Permanent)—Used to indicate higher priority errors where service is required (for example, shutdown condition or frame supervisor not responding)
- TEMP (Temporary)—Used to indicate lower priority errors, where a momentary or minimal impact condition has occurred; maintenance could be deferred (for example, warning condition)
- UNKN (Unknown)—Used for informational messages (for example, node has been powered off)
- PEND (Pending)—Used to indicate conditions expected to impact system availability soon.

Resource Name
"sphwlog" refers to items logged for RS/6000 SP-specific errors.

Error Description/Probable Causes/Failure Causes/Recommended Actions
Use this section for quick reference; however, Maintenance Analysis Procedures (MAPs) in Volume 2 should be used to perform full service action since they provide more detailed analysis and procedures.

Diagnostic Explanation
To interpret, look for the following key items:

1. "Condition cleared" (end of line)—indicates error condition no longer present. Error has been fixed or has cleared on its own; check for intermittent conditions.
2. Severity:
   - "Failure"—indicates higher priority problem, (for example, shutdown)
   - "Warning"—indicates lower priority problem.
3. Component:
   - "Frame #:0"—indicates error concerns frame #.
   - "Node #:#" — indicates error concerns frame #, node in slot address #, respectively.
   - "Switch #:#" — indicates error concerns frame #, switch in slot address #, respectively.
4. Variable—refers to specific variable on which condition was detected (for example, "nodefail1").
5. Error message—specific message indicating the problem that was detected (for example, "Supervisor not responding for slot."). This message is used by the MAPs to help isolate and service this error.

Sample "errpt –a ..." Output Report

```
ERROR LABEL:     SPMON_EMSG101
ERROR ID:        A1843F1E

Date/Time:       Wed Sep 14 13:29:38
Sequence Number: 9217
Machine Id:      000016691C00
Node Id:         workstn3
Class:           H
Type:            PERM
Resource Name:   sphwlog
Resource Class:  NONE
Resource Type:   NONE
Location:        NONE


Error Description
UNABLE TO COMMUNICATE WITH REMOTE NODE

Probable Causes
SYSTEM I/O BUS

Failure Causes
SYSTEM I/O BUS

        Recommended Actions
        CHECK CABLE AND ITS CONNECTIONS

Detail Data
DETECTING MODULE
LPP=PSSP,Fn=splogd.c,SID=1.8,L#=666,
DIAGNOSTIC EXPLANATION
0026-101 Failure; Frame 1:0; nodefail1; Supervisor not responding for slot.
-------------------------------------------------------------------------
```

Diagnosing a Machine Check

Machine checks occur for processor data bus parity errors (and uncorrectable ECC errors). Machine checks also occur for some internal 60x processor errors.

Determining Validity

Most machine check entries are valid in the AIX error log. They are labeled

`Machine_Check_604`

However, if the error label is not `Machine_Check_604`, then it is not a valid machine check. (For example, NVRAM was drained and the resulting corrupted data looked like a non-SMP machine check.)

Determining Type of Machine Check

Machine checks are recorded for Data Bus Parity Error, Uncorrectable ECC Errors, and certain internal processor errors.

Note: Retain HSF H123277 shows how to decode machine checks and corrective actions.

To decode the type of error you need the value of the MACHINE STATUS SAVE/RESTORE REGISTER 1. The value is found under the Detail Data for the Machine Check. For example, the following register:

`1002 9030`

The left-most bit is **bit 31**. The right-most bit (least-most bit) is **bit 0**. Bits 21, 20, 17, and 16 represent the type of checkstop that occurred:

Bit 21 = 1   CPU internal data cache parity error

Bit 20 = 1   CPU internal instruction cache parity error

Bit 17 = 1   CPU data bus parity error

Bit 16 = 1   CPU address bus parity error

Note: On a 604 high node, Bit 17 = 1 shows a machine check occurred. On a 604e high node, Bit 17 is not used (and will equal 0).

In the preceding example register (`1002 9030`), the 1002 is decoded as:

0001 0000 0000 0010

      Bit 17
      (bit = 1, Bus Data Parity Error)

      Bit 19

Determining Which CPU Caused the Machine Check

Note: Retain HSF H163707 shows how to evaluate machine checks using surveillance timeout data collection for the 332 MHz SMP thin and wide node.

A stanza in the Machine Check Error Log labeled:

`Central Processing Unit Number`

Under this stanza is the number of the CPU which caused the machine check (0—1 is on the first processor card, 1—2 is on the second processor card, and so on).

If this stanza is not present in the checkstop file, then find the CPU causing the machine check using Bits 30—27 of the MACHINE STATUS SAVE/RESTORE REGISTER 1 (which was previously used to determine the type of machine check). For example, if the register showed:

`1002 A030`

The first 16 bits (1002) represent:

0001 0000 0000 0010

    Bit 27

    Bit 30

Bits 30—27 are `0010`, which gives CPU2 (numbered from 0—15, where Card 0 has CPUs 0 and 1, Card 1 has CPUs 2 and 3, and so on).

Correcting a Machine Check

For any case other than the Data Bus Parity Error, replace the processor card containing the CPU that produced the error.

For a 604 Data Bus Parity Error, there are two possible causes:

1. There was an actual data bus parity error caused by the processor card containing the CPU with the error.
2. The main memory received an uncorrectable ECC error. (By design, the Data Cross bars can force bad parity at the 604 to cause the machine check.)

To determine the cause, look in the error log for entries that took place at the time of the machine check. Search for another entry, with a memory card as the resource type, which shows an unrecoverable memory error (and calls out a specific memory card and DIMM).

- If there is one, handle the problem as a memory error.

- If there is none, assume the problem is caused by the processor. Replace the processor card containing the CPU that caused the error.

Supervisor Bus Swap Procedure

The following procedure isolates a problem with processor node or switch assembly communication to the control workstation:

1. Locate *problem* unit (processor node or switch assembly) and a *good* unit near it (unused, if possible). Ensure that both units are not in use. Switch the circuit breakers off on both units.
2. Detach supervisor harness from the rear of both units.
3. Attach supervisor extender cable (IBM P/N 54G3014) to the *problem* supervisor bus cable connector (processor node: Nxx-BH-P7; switch assembly: Sxx-BH-P2), then connect the other end to the *good* unit (thin and wide processor node: Nyy-BH-J7; switch assembly: Syy-BH-J2; 604 or 604e high processor node: supervisor adapter cable; 332 MHz SMP or POWER3 SMP thin and wide node: Nyy-BH-J7).
4. Watch green and yellow LEDs at front of the processor node or switch assembly for Supervisor Self-test pass or fail condition. Refer to the correct test, listed in Node/Switch Supervisor Self-Test, for the processor node or high-performance switch assembly.
5. Verify supervisor bus cables are returned to their original locations if good, or while installing replacement if a defective cable was found.

Verification Test for Supervisor Bus

This test is used to verify that a service operation on the supervisor subsystem (for example, frame, node, and/or switch supervisors) was successful in restoring the system to full functionality.

Note: If a frame supervisor card was replaced or its code was reloaded, enter:

```
hmcmds -G setid x:0
```

(where *x* is the frame ID number) prior to running these tests.

Perform All Relevant Tests from the System Monitor

1. **Verify Frame Supervisor:**
   a. From the control workstation, open the "Frame Environment"window for the frame that was serviced. (Window might already be open.)
   b. Make sure the "controllerResponds" shows green status. If it shows red, the verification test failed; return to the Supervisor Subsystem MAP to continue service.
2. **Verify Node Supervisor:**
   a. From control workstation, open the "All-Node Display" and select "commFail" variable for display. (Window might already be open.)
   b. Make sure the commFail window shows green for all processor nodes. If any processor shows red, the verification test failed; return to the Supervisor Subsystem MAP to continue service.
3. **Verify Switch Supervisor:** (Perform if the frame that was serviced contains a switch feature.)
   a. From control workstation, open the Switch Front Panel Layout window for the frame/switch assembly that was serviced. (Window might already be open.)
   b. Make sure the "nodefail17" shows green status. If it shows red, the verification test failed; return to the Supervisor Subsystem MAP to continue service.
4. If the previous steps did not detect any problems, the Verification Test for Supervisor Bus passed; return to the MAP you came from.

Node/Switch Supervisor Self-Test

The following procedures will help you perform self-test on the node or switch supervisor cards. Upon completion of this test, return to the procedure that sent you here.

If this is a wide node, thin node, or switch assembly:

1. Power off processor node or switch assembly from the circuit breaker on the front of the unit.
2. Detach supervisor harness from connector at back of the unit. Detaching the supervisor harness removes the 12 volt power from the supervisor card.
3. Reinsert the supervisor harness to perform the supervisor card self-test.
4. Check green and yellow LEDs on front of the unit.

   This self-test should indicate one of the following conditions for the processor node:

```
┌─ Self-test Conditions ──────────────────────────────────────────┐
│                                                                  │
│  Pass sequence                                                   │
│                                                                  │
│            1. Both LEDs light (about 10 seconds)                 │
│            2. Green LED stays lit, while yellow LED goes off      │
│               (about two seconds)                                │
│            3. Green LED stays lit, while yellow LED flashes node  │
│               address                                            │
│            4. Both LEDs turn off (about two seconds)             │
│            5. Both LEDs light (about one second)                 │
│                                                                  │
│  Fail conditions                                                 │
│                                                                  │
│            • Green and Yellow LEDs never light                   │
│                                                                  │
│            • Yellow LED flashes wrong address                    │
│                                                                  │
└──────────────────────────────────────────────────────────────────┘
```

If this is a 604 or 604e high node:

1. Disconnect the node supervisor adapter cable from the node supervisor card assembly.
2. Locate LED 5. See Figure 2-1 on page 2-19.

Normal Mode — 4 ○ — ○ 8 — Not Used
Secure Mode — 3 ○ — ○ 7 — Not Used
Service Mode — 2 ○ — ○ 6 — Not Used
Node Power Status — 1 ○ — ○ 5 — Environment Status or Base Code Active
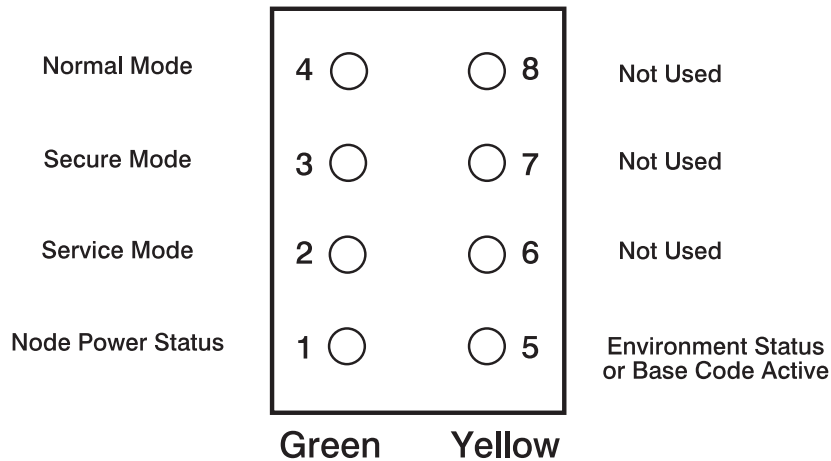
Green   Yellow

Figure   2-1. 604 and 604e High Node LEDs

3. Reconnect the node supervisor adapter cable to the node supervisor card assembly.
4. Check the green and yellow LEDs on the node supervisor card.

This self-test should indicate one of the following conditions for the processor node:

Self-test Conditions

Pass sequence

1. All 8 LEDs will be on for 10 seconds
2. LED 5 will flash node address
3. All 8 LEDs will be on for 1 second

Fail conditions

- Green and Yellow LEDs never light
- LED 5 flashes wrong address

Base Code

1. All 8 LEDs will be on for 10 seconds
2. LED 1 will flash node address
3. LED 5 is On.

If this is a 332 MHz SMP or POWER3 SMP thin or wide node:

1. Disconnect the node supervisor cable from the rear of the node.
2. Locate LED 5. See 2-20.

Figure 2-2. 332 MHz SMP and POWER3 SMP Thin and Wide Node LEDs

3. Reconnect the node supervisor cable at the rear of the node.
4. Check the green and yellow LEDs on the node supervisor card.

This self-test should indicate one of the following conditions for the processor node:

Self-test Conditions

Pass sequence

  1. All 8 LEDs will be on for 10 seconds
  2. LED 5 will flash node address
  3. All 8 LEDs will be on for 1 second

Fail conditions

  • Green and Yellow LEDs never light

  • LED 5 flashes wrong address

Base Code

  1. All 8 LEDs will be on for 10 seconds
  2. LED 1 will flash node address
  3. LED 5 is On

Verification Tests Using Perspectives

Node Supervisor Verification

From the Hardware Perspectives window:

1. Click on "Add Pane"
2. Click on "Frames/Switches"
3. In the Frames/Switches pane, click on the frame that is to be checked
4. Click on "Notebook" (top-left)
5. Check for "Node Fail=0"

   If a value of 1 is returned, the verification test failed

Check for **IBM.PSSP.SP_HW.Frame.controller_responds**. A value of 1 is a pass condition. A value 0 shows the verification test failed.

Switch Supervisor Verification

The switch supervisor is verified just as the node supervisor (see "Node Supervisor Verification" on page 2-20), on node 17.

Base Code Verification

Perform the following procedure to check for supervisor conditions that require action.

1. From the control workstation window, enter:

   smitty supervisor

2. The following menu is displayed:

   ```
         Check For Supervisors That Require Action (Single Message Issued)
   >     List Status of Supervisors (Report Form)
         List Status of Supervisors (Matrix Form)
         List Supervisors That Require Action (Report Form)
         List Supervisors That Require Action (Matrix Form)
         Update *ALL* Supervisors That Require Action (Use Most Current Level)
         Update Selectable Supervisors That Require Action (Use Most Current Level)
   ```

   Select the second option, "List Status of Supervisors (Report Form)"
3. A frame, similar to the following example, is displayed:

spsvrmgr:	Frame	Slot	Supervisor State	Media Versions	Installed Version	Required Action
	1	0	Active	u_10.3c.0706 u_10.3c.0707 u_10.3c.0709	u_10.3c.0709	None
		4	Active	u_10.36.0700 u_10.36.0701 u_10.36.0703	u_10.36.0703	None
		7	Active	u_10.3e.0700 u_10.3e.0701 u_10.3e.0703	u_10.3e.0703	None
		17	Active	u_80.09.0609 u_80.09.060b	u_80.09.060b	None

Updating the Node Supervisor Code

1. If they are not already on, turn the node's circuit breakers to the On ('1') position.
2. Enter:

   smitty supervisor

3. Select "List Supervisors That Require Action"
4. Note the frame number and slot number
5. Hit PF3 (Cancel).
6. Select "Update Selectable Supervisors That Require Action"

7. Enter the frame number and slot numbers to be updated.

   Note: This will take at least 12 minutes to complete.

8. Perform "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 before returning to the procedure that directed you here.

Checking Network (LAN) Status

Use the following procedure to check network (LAN) status:

> **Notes**
>
> 1. Topology should show red (problem) status for any processor nodes/frames with a network problem. Refer to the "Using the System Monitor" chapter of *IBM RS/6000 SP: Maintenance Information Volume 1, Installation and Relocation* for more information.
> 2. The network types (with adapter name) are as follows:
>   - Ethernet (en)
>   - HiPS (css)
>   - Token Ring (tr)
>   - FDDI (fi)

1. If not already opened, open the Topology window from the control workstation.
2. From the Display Manager window, click on "SP" option, then select the "Topology" option.
3. To determine your SSP code level from an AIX window, enter:

   ```
   lslpp -ah ssp.basic
   ```

4. Go to one of the following two sections, depending on your SSP code level.

SSP Code Level 1.00 or 1.01

1. From the System Monitor window, double-click on the "SP" system experiencing the problem (should be lit red).
2. From the SP window, double-click on the frame experiencing the problem (should be lit yellow or red).
3. In the Frame window, check for yellow or red indications on the processor node connections to the network(s).
4. In the Frame window, find the network's IP address by tracing the line from the yellow or red indicator to the network address label (series of four numbers separated by dots—example: 129.64.31.0).
5. From the smit window, select "List LAN Database Information" to list adaptor information and look for entry(s) where the first three sets of number match those of the network IP address. (The fourth number is unimportant.) You will get lines such as the following:

   ```
   1  en0  129.64.31.1  ...
   ```

6. The adapter name is the second column of information in the list.
7. Go back to the procedure from which you came.

SSP Code Level 1.02 or Higher

1. Select the appropriate LAN from the list by clicking on that choice.
2. Click on "Display LAN" to display LAN status.
3. Go back to the procedure from which you came.

Selecting Appropriate Switch Clocks

The following procedure describes how to select a clock source for a switch assembly, followed by an explanation on how to determine which clock source to use on each assembly.

Attention: Changing switch clocks will interrupt use of the switch feature; therefore, switch clocks should be reselected only due to a component failure or scheduled service of part of the machine. Even momentary interruption of the switch clocks (which occurs when reselecting switch clocks), might require recovery step(s) to bring all the processor nodes on-line. In this case, use of all processor nodes in the frame or frame(s) might be interrupted during the recovery procedure.

Selecting the Switch Clock Source

1. Manual method for any SP system:

   From an AIX window, enter:

   spmon -G -m i framex
   spmon -G -m 1 framex
   spmon -G -m 2 framex
   spmon -G -m 3 framex

2. **Topology** file method:
   a. From an AIX window, enter:

      Eclock

      (The display will tell you the current clock topology.)
   b. To select an alternate clock topology, enter:

      Eclock -a *filename*

      Refer to *IBM RS/6000 SP: Command and Technical Reference* for more information on the correct file name to use.

Determining the Correct Switch Clock Source

All switch assemblies in the system must run off the same clock source. The following procedure describes how to determine the correct clock settings for each switch assembly based on standard cabling configurations:

1. Determine the number of logical frames in the system.
2. Determine which clock choice to use for the system.
3. Locate the appropriate box in Table 2-5 on page 2-24, using the number of logical frames and the master clock choice.
4. Based on information in this box, set the switch clock source for each logical frame.
   Lxx-   represents the logical frame number
   Sxx-   represents a multi-switch frame

   i or 0, **1**, **2**, or **3** indicates the appropriate clock setting for that logical frame:
   i or 0   Internal Clock (HiPS or SPS)
   1   Input 1 (BH-J3 for HiPS, BH-J3 for SPS)
   2   Input 2 (BH-J5 for HiPS, BH-J4 for SPS)
   3   Input 3 (BH-J7 for HiPS, BH-J5 for SPS)

Table 2-5. Setting Switch Clock Sources				
Model	Number of Logical Frames	Master Clock Choice		
		1	2	3
30x	1-4	L01-S00 = i L02-S00 = 1 L03-S00 = 1 L04-S00 = 1	L01-S00 = 1 L02-S00 = i L03-S00 = 2 L04-S00 = 2	L01-S00 = 2 L02-S00 = 2 L03-S00 = i L04-S00 = 3
30x	5	L01-S00 = i L02-S00 = 1 L03-S00 = 1 L04-S00 = 1 L05-S00 = 2	L01-S00 = 1 L02-S00 = i L03-S00 = 3 L04-S00 = 2 L05-S00 = 2	L01-S00 = 2 L02-S00 = 3 L03-S00 = i L04-S00 = 3 L05-S00 = 3
40x	4-8	S01-S02=i All others = 1	S01-S06=i All others = 2	S01-S10=i All others = 3
Note: On an 8-port switch, the clock always equals 0. See samples in **/etc/SP**.				

Ethernet LAN Isolation Procedure

Determine which type of Ethernet cabling is present on your system (coax or Twisted Pair) and then use the appropriate procedure below to check for and isolate a cabling failure.

Ethernet Coax LAN

1. Determine the topology (cabling) of the Ethernet coax LAN.

   Note: Ensure that there is a terminator at each end of the Ethernet LAN.

2. Disconnect an Ethernet T-adaptor (with cable attached) from an RF shunt at the last point along the Ethernet LAN.
3. Using a digital multimeter, measure the resistance between the center pin of the T-adapter and the metal casing of the cable connector. Disconnect the T-adapter and repeat this measurement between the center pin and the metal casing of the T-adapter.
4. Both measurements in Step 3 should be in the range 35 - 65 ohms. If both measurements are within range, there is no permanent cabling problem. Check cable connections along this LAN and tighten as necessary.
5. If either measurement in Step 3 is out of range, there is an Ethernet cabling problem on that leg of the network. Reconnect the cable to the RF shunt, and pick another point on the failing leg.
6. Return to Step 2, until you have located the failing part or connection.
7. Reseat or replace parts as required.
8. Return to the MAP that directed you here.

Ethernet Twisted Pair LAN

Since individual customer LAN hardware and topologies can vary, use the following procedure as a guide to isolating cabling failures on an Ethernet Twisted Pair LAN:

1. Determine the topology (cabling) of the ETHERNET TWISTED PAIR LAN.

   Example of common topologies:

   Thin Node From node riser card to transceiver to TP cable to hub to TP cable to transceiver to control workstation Ethernet MCA.

> **Wide Node**   From node E-NET MCA to transceiver to TP cable to HUB to TP cable to transceiver to control workstation E-net MCA.

2. If this is a single node failure, suspect any hardware (including the node itself) from the node to the hub.
3. If this is a multiple node failure, suspect any hardware (including the nodes and control workstation themselves) from the nodes to the HUB, and from the HUB to the control workstation.
4. Return to step 2 until you have located the failing part or bad connection.
5. Reseat or replace parts as required.

When the System Monitor Log Is Not Working

The following procedure can be used to manually check for hardware problems and verify fixes when the system monitor log is not functioning properly or is not accessible.

1. From the system monitor open the Display Layouts window.
    a. Make sure the system monitor Display Manager window is open. If it is not, enter:

        `/usr/lpp/ssp/bin/spmon -gui`

       Note: On older machines, the command can be:

            `/usr/lpp/sysmon/sp1mon`

    b. From the Display Manager window, click on the "SP" option.
    c. From the pulldown menu, click on the "Display Layouts" option.
2. Enter the frame number of the frame you are checking. Then:

    - **To check frame status**: Click on "Frame Diagnostic Panel" option, then click on "Display Frame Layout".

    - **To check a processor node's status**: Enter the number of the processor node you are checking, click on "Node Diagnostic Panel" option, then click on "Display Node Layout".

    - **To check a switch assembly's status**: Click on "Switch Diagnostic Panel" option, then click on "Display Frame Layout".

3. Look for red or yellow indications on the "Diagnostic Panel".

    - **Red** status indicates a serious problem, such as a "shutdown" condition.

    - **Yellow** status normally indicates a warning condition.

Removing and Restoring Switch Resources

This procedure can be performed to allow customer to use a switch feature while extended service actions are performed on an individual frame of a multi-frame system with the switch feature.

DO NOT PERFORM this procedure unless the required service operation will take the switch out of the switch configuration for a minimum of two hours (for example, a part must be ordered or a switch assembly or frame must be repeatedly powered on/off) and/or the customer specifically requests it.

Care should be taken to understand the consequences on any partitions that might be sharing switch resources. See "Viewing Switch Partitions" on page 2-27.

Attention: This procedure is intended to allow the customer to use the switch feature during extended repair action. The customer must stop all parallel jobs prior to starting the repair. Once the repair is complete, the customer must stop all parallel jobs again to reconfigure the switch to include the resource again. If the service action is expected to be complete in a short period of time (for example, two hours or less), this additional interruption of all parallel jobs will probably cost the customer more time than was saved by use of the switch feature during that short period.

Removing a Switch Assembly from the Active Configuration

1. Identify the switch which is to be removed from the active configuration for an extended period of time. Display the clock selection for this switch assembly and record it for later use. See "Selecting Appropriate Switch Clocks" on page 2-23.
2. **If the primary processor node (usually in Frame 1) is connected to the switch identified in step 1**, the customer must select an **available** processor node to be the new primary processor node. The primary node is set by the **Eprimary** command. Refer to *IBM RS/6000 SP: Administration Guide* for more information.
3. **If the master clock selected for the switch is from the switch assembly identified in Step 1**, the customer must reselect a new master clock. Refer to "Selecting Appropriate Switch Clocks" on page 2-23.
4. Have customer stop all current parallel jobs and suspend all parallel jobs on the job queue.
5. Put circuit breaker at the front of switch assembly in the Off ('0') position.
6. The customer can re-initialize the switch using the **Estart** command. The frame and processor nodes which were removed in this procedure will appear in the **out.top** file with error messages; however, the remainder of the switch resources are now available for customer use.
7. If switch re-initialization was successful, the customer can start running parallel jobs again.
8. Return to MAPs to continue service action(s).

Restoring a Switch Assembly to the Active Configuration

1. Identify the switch assembly which is to be restored to the active configuration.
2. Have customer stop all current parallel jobs and suspend all parallel jobs on the job queue.
3. Make sure that the circuit breaker at the front of the switch assembly in the Off ('0') position.
4. Connect all cables to the switch assembly. Pay attention to the labels on the cables.
5. Put the circuit breaker at the front of the switch assembly in the On ('1') position.
6. Use switch front panel or the **Eclock** command to select the appropriate clock input for this switch assembly. For SSP code level 1.02 and higher, use the **Eclock -r** command.
7. If this is an HiPS configuration, run **rc.switch** on all of the nodes, otherwise continue with the next step.
8. If the primary processor node was changed during the isolation procedure, the customer can change the primary processor node back to the original selection; however, this is NOT required. The primary node is set by the **Eprimary** command. Refer to *IBM RS/6000 SP: Administration Guide*, for more information.
9. **If the master clock was changed during the isolation procedure**, the customer can reselect the clocks on all other switches; however, this is not suggested. (The previous clock selection for this switch assembly was recorded for possible use. See "Selecting Appropriate Switch Clocks" on page 2-23.)
10. The customer can re-initialize the switch using the **Estart** command. Cables connected to the switch assembly and processor nodes which were restored in this procedure should appear in the **out.top** file without any error messages.
11. If switch re-initialization was successful, the customer can start running parallel jobs again.
12. Return to MAPs to continue service action(s).

Viewing Switch Partitions

Open the System Monitor window and click on the "View" option to display any partitions.

Notes:

 1. The HiPS-LC8, Model 2AX, and PSSP level 1.02 and below do not support switch partitioning.

With switch partitioning, the nodes are grouped under a partition name. Partitioning allows the SP to have different software levels installed, and to isolate groups of nodes from each other. The **Estart** command, fault service, and applications see only a single partition.

Fencing Nodes:

 1. Click on "View" to select one of the partitions, then click on "SP" to display an options menu.
 2. Click on "Global Controls" to display the frame(s) and node(s) in this partition.
 3. Click on the node you want to fence, then click on the "Shutdown" option. Now click on the "Do Command" option to display options.
 4. Click on "Fence" and then click on "Shutdown" to shutdown the node.

> **Note:** Selecting "Enable Autojoin" during this sequence will automatically place the node back into the operations of the partition on successful power on of the Node. It is suggested that "Autojoin" *not* be selected at any time when performing a service action.

Unfencing Nodes:

 1. If necessary, follow the first 2 steps under "Fencing Nodes" above.
 2. Ensure that the node is selected.
 3. Click on "On" and then click on "Do Command". This will power on the node and run power-on diagnostics.
 4. Click on "Unfence" and then click on "Do Command" to place the node into operation in the partition.

Efence of Primary and Primary Backup Nodes

By design, **Efence** of primary and primary backup nodes is not allowed.

If you attempt to **fence** either of these nodes, you will get the following responses:

```
Efence: 0028-147 Node number designates the Primary Node.
Efence: 0028-166 Node number designates the Primary Backup Node.
```

You should assign a new primary or primary backup node and initiate a restart to be able to remove these nodes from the network for service. (Refer to *IBM RS/6000 SP: Scalable POWERparallel Switch Support for the IBM PSSP for AIX*, GC23-3998.)

Service Position Procedures

Note: When preparing to place processor node(s) and/or switch assembly(s) into service position, ensure that the customer has removed the processor node(s) and/or switch assembly(s) from the active configuration.

Placing a Thin Processor Node into Service Position

1. Remove the two hold down screws located at the rear of the processor node.
2. Remove all mounting screws that hold the front cover in place, and remove the front cover.
3. When removing the 48 V cable connector at J8, place protective cover p/n 48G3055 (from ship group) over the plug end.
4. Remove supervisor cable from J7 and disconnect all other cables and T-connectors from the back of the node.
5. Remove the processor node from the frame.
6. Remove the processor node top cover.

Replacing a Thin Processor Node from Service Position

1. Reinstall the processor node top cover.
2. Reinstall the processor node in the frame.
3. Reattach supervisor cable to J7 and reconnect all other cables and T-connectors to the back of the node.
4. Remove protective cover p/n 48G3055 from the cable end and install the 48 V power cable in J8. Store protective cover with the ship group tools.
5. Reinstall the front cover and reinstall all front cover mounting screws.
6. Reinstall the two hold down screws located at the rear of the processor node.

Placing a Wide Processor Node into Service Position

1. If there are nodes immediately above the wide node processor being serviced, install circuit breaker protection cover(s) (p/n 04H9439, in ship group) on the node(s) above (two covers on two thin nodes or one cover on one wide node).

   Attention: Be very careful when installing the circuit breaker cover, because the circuit breaker is spring-loaded towards the Off position. Accidentally putting a circuit breaker in the Off position could impact customer applications.

2. Remove the drawer release screws located at the rear center of the processor node (*not* the bottom hold-down screws).
3. Remove all front hold-down screws that hold the processor node in place.
4. When removing the 48 V cable connector at J8, place protective cover p/n 48G3055 (from ship group) over the plug end.
5. Remove supervisor cable from J7 and disconnect all other cables and T-connectors from the back of the node.
6. Extend the node drawer into the open service position.
7. Install the stiffeners (p/n 93G1058) on each side of the processor node drawer. Stiffener (and service ladder) are part of the ship group tools.

Replacing a Wide Processor Node from Service Position

1. Remove the stiffeners (p/n 93G1058) from each side of the processor node drawer. Store stiffener (and service ladder) with the rest of the ship group tools.
2. Release side latches and push node drawer into the closed position.
3. Reinstall all front hold-down screws that hold the processor node.
4. Remove protective cover p/n 48G3055 from the cable end and install the 48 V power cable in J8. Store protective cover with the ship group tools.
5. Reattach supervisor cable to J7 and reconnect all other cables and T-connectors to the back of the node.

6. Reinstall the drawer release screws located at the rear of the processor node.
7. Remove circuit breaker protection cover(s) (p/n 04H9439) from the node(s) immediately above and return them to the ship group.

Placing a 604 or 604e High Processor Node into Service Position

Attention: Removing the front panel will shut down the node. The LED will show '888-103-409-0980'.

1. Set both circuit breakers (below the node front panel) in the Off ('0') position.
2. Remove the power cables connected to power supply(s)/cooling unit.
3. If performing service on the media or CPU modules, remove the node front panel cover and the front access plate.
4. If performing service on the I/O module or power/cooling units, remove the rear panel cover.

Replacing a 604 or 604e High Processor Node from Service Position

1. Replace removed access plates and panel covers. Pay strict attention to the front panel, depressing the interlock switch.
2. Reconnect the power cables to power supply(s)/cooling unit.
3. Set both circuit breakers (below the node front panel) in the On ('1') position.

Placing a 332 MHz SMP or POWER3 SMP Thin and Wide Node into Service Position

1. Set the power assembly circuit breaker(s) in the Off ('0') position.
2. Set the 48-volt distribution cable in-line circuit breaker(s) in the Off ('0') position.
3. Remove the 48-volt distribution cable(s) from the rear of the processor node.
4. Remove the supervisor cable from the rear of the processor node.
5. Record the location and remove all other cables from the rear of the processor node.
6. Remove the node front cover panel by loosening the 4 screws.
7. If necessary, unplug the 4-drop DASD cable from the I/O expansion assembly.
8. Remove the retaining screw at the front of the power assembly(s) and retain for later use.
9. Pull the power interlock bar(s) forward and down to unlatch and remove the power assembly(s).
10. Remove the retaining screws at the rear of the node and retain for later use.
11. Remove the logic portion of the node assembly by sliding it out the front of the frame.
12. Place the assembly on an electrostatic-safe mat to continue service.

Replacing a 332 MHz SMP or POWER3 SMP Thin and Wide Node from Service Position

1. Install the logic portion of the node assembly by sliding it in the front of the frame.
2. Secure the rear of the node using the retaining screws previously removed from the rear of the node.
3. Install and latch the power assembly(s) by lifting and pushing froward on the power interlock bar(s). Ensure the power interlock tab(s) is engaged by pushing in on the tab(s)
4. Secure the front of the power assembly(s) using the retaining screws previously removed from the power assembly(s).
5. If necessary, plug the 4-drop DASD cable in the I/O expansion assembly.
6. Install the node front cover panel and tighten the 4 screws.
7. Install the supervisor cable in the rear of the processor node.
8. Install the 48-volt distribution cable(s) in the rear of the processor node.

9. Install all other cables that were removed from the rear of the processor node.
10. Set the 48-volt distribution cable in-line circuit breaker(s) in the On ('1') position.
11. Set the power assembly(s) circuit breaker(s) in the On ('1') position.

Placing a Switch Assembly into the Service Position

If this is an HiPS 2.0, HiPS 3.0, or HiPS-LC8:
1. Set circuit breaker in the Off ('0') position.
2. Detach all cables from the rear of the switch assembly, noting where the external frame cables and wrap plugs are attached.
3. Remove the four screws from the front of the switch assembly.
4. If this is a multi-switch frame (F/C 2030/1):
   a. Extend switch drawer into open service position.
   b. Install the stiffeners on each side of the switch drawer.
5. Remove the high-performance switch assembly from the front of the frame.
6. Remove switch assembly top cover.

If this is a SPS or SPS-8:
1. Set circuit breaker in the Off ('0') position.
2. Remove power (J1) and supervisor (J2) cables from rear of switch assembly.
3. Remove the four screws from the front of the switch assembly.
4. Remove the SPS front panel assembly from the inner chassis by pulling at the side of the front panel assembly.
5. If the inner chassis or supervisor power cable need to be replaced:
   a. Detach all cables from the rear of the switch assembly, noting where the external frame cables and wrap plugs are attached.
   b. Remove the inner chassis from the outer chassis sleeve by pushing on the inner chassis from the rear of the switch assembly.

Replacing a Switch Assembly from the Service Position

If this is an HiPS 2.0, HiPS 3.0, or HiPS-LC8:
1. Reinstall switch assembly top cover.
2. Reinstall the high-performance switch assembly into the front of the frame.
3. If this is a multi-switch frame (F/C 2030/1):
   a. Remove the stiffeners from each side of the switch drawer.
   b. Release side latches and push switch drawer into the closed position.
4. Reinstall the four screws from the front of the switch assembly.
5. Reattach all cables to the rear of the switch assembly.
6. Set circuit breaker in the On ('1') position.

If this is a SPS or SPS-8:
1. If the inner chassis or supervisor power cable needed to be replaced:
   a. Replace the inner chassis into the outer chassis sleeve.
   b. Reattach all cables to the rear of the switch assembly.
2. Reinstall the SPS front panel assembly into the inner chassis, being careful to align the guide pins of the P1 connector to the inner chassis weld. Then apply light even pressure at the sides of the front panel assembly.
3. Reinstall the four screws into the front of the switch assembly.
4. Reattach power (J1) and supervisor (J2) cables to the rear of switch assembly.
5. Set circuit breaker in the On ('1') position.

Resetting the Clock and Bootlist After Servicing a Node

When servicing a node, the node becomes disconnected from its power source for a period of time. Since nodes normally do not have a real battery, the NVRAM will loose it's memory when disconnected from power for about 10 minutes (sometimes less). This will cause the date to be reset to January 1, 1970, and the bootlist to be cleared. This can cause some problems with booting.

It is **highly recommended** to reset the clock and bootlist before booting the node. This is done as follows:

1. Before powering down the node to be serviced, display the current bootlist:
   a. Run diagnostics (**diag**)
   b. Choose the "Service Aids" panel
   c. Choose the "Display/Alter Bootlist" panel
   d. Choose "Normal Mode"
   e. Choose "Display Current Bootlist"

   This will display the current bootlist.
2. Power down the node, service it, and hook it back into the frame.
3. On the control workstation, run **spbootins** to set the node to boot in maintenance mode. For example, if it is node 12 of frame 2, enter:

   ```
   spbootins -r maintenance 2 12 1
   ```

4. On the control workstation, netboot the node:
   a. Enter **spmon -g**
   b. Choose the "SP" menu option
   c. Choose "Global Controls"
   d. Choose the node to be booted
   e. Choose "netboot"
   f. Choose "Do Command"
5. When this boots, a console window will pop up on your display. Follow the prompts:
   a. "Start Maintenance Mode for System Recovery"
   b. "Access a Root Volume Group"
   c. "Continue"
   d. Choose correct disk from the list
   e. Access this volume group and start a shell
6. In the maintenance shell, set the date command. For example, to set the date to August 3, 1995, do "date 0803123095"
7. In the maintenance shell, set the boot list.
   a. Run diagnostics (**diag**)
   b. Choose the "Service Aids" panel
   c. Choose the "Display/Alter Bootlist" panel
   d. Choose "Normal Mode"
   e. Choose "Alter Current Bootlist"
   f. Set the bootlist the way it was before the node was serviced
8. Close the console window
9. On the control workstation, set the node to boot from disk. For example:

   ```
   spbootins -r disk 2 12 1
   ```

10. On the control workstation, use the Global Controls panel to power off the node and then power it back on.
    a. Enter **spmon -g**
    b. Choose the "SP" menu option
    c. Choose "Global Controls"
    d. Choose the node to be booted
    e. Choose "Off"

f. Choose "Do Command"

g. Choose "On"

h. Choose "Do Command"

The node will now boot from the device that you specified in step 7 with the correct time.

Working with an HACWS Configuration

In a system with a High-Availability Control Workstation (HACWS) configuration, each frame will have a dual-port frame supervisor and there will be a **primary** control workstation and a **backup** control workstation. The dual-port frame supervisor (with a Y serial cable) allows a serial cable connection to each of the two control workstations. Only one workstation (primary or backup) can be **active** at a time; the other workstation must be **inactive**.

The HACWS feature uses HACMP software to coordinate the control workstation function between the Primary and Backup control workstations. HACMP must be running on both control workstations in order for a failover to occur. Whichever workstation starts HACMP first will normally become the active control workstation. The following procedures make use of HACMP commands to control the state of the HACWS configuration.

Making a Particular Control Workstation Active/Inactive

The following procedure can be used to make the currently active workstation fail over to the other currently inactive workstation. This is useful to allow maintenance on the primary active workstation or to restore the system to the default configuration after maintenance on the primary control workstation.

Note: This procedure does **not** change which is the primary or backup control workstation. Rather it changes the current state.

1. Perform "Checking HACWS State of Control Workstations" to verify the HACWS state of both control workstations.
2. HACMP must be running on both workstations; perform "Starting HACMP and PSSP Code on Control Workstation(s)" on page 2-33 if necessary. Do not worry about which is the active or inactive workstation at this time.
3. To swap the state of the active/inactive control workstations: from the currently active workstation, perform "Stopping HACMP and PSSP Code (with Optional Failover)" on page 2-33 with shutdown mode of "takeover". Wait for completion of **clstop** command (about 2-10 minutes).
4. If maintenance is required on the inactive workstation, perform it here.
5. Perform "Starting HACMP and PSSP Code on Control Workstation(s)" on page 2-33 to start HACMP on the workstation that was shutdown.

Checking HACWS State of Control Workstations

The following procedure allows you to check the status of each control workstation:

- Check HACMP status (to make sure HACMP is running):

  1. On each workstation, enter:

         smitty clshow

  2. Make sure subsystems "clstrmgr", "clinfo", and "clsmuxpd" all show "active" in the Status field. The "active" status indicates HACMP is active on this workstation.
  3. If status is "inoperative", refer to "Starting HACMP and PSSP Code on Control Workstation(s)" on page 2-33.

- Check HACWS state of this workstation (primary/backup, active/inactive):

1. On the workstation, enter:

   ```
   lshacws -s
   ```

2. Check the return for one of the following:

HACWS_PRIM_ACT_CWS	This is an active primary control workstation.
HACWS_PRIM_INACT_CWS	This is an inactive primary control workstation.
HACWS_BACK_ACT_CWS	This is an active backup control workstation.
HACWS_BACK_INACT_CWS	This is an inactive backup control workstation.

   Note: Here "active" indicates that the PSSP code recognizes this as the currently selected (active) control workstation for the system.

- If desired, check the SDR for information concerning HACWS:

   1. On the workstation, enter the following:

      ```
      splstdata -e |
      pg
      ```

   2. Check for information in fields such as:

active_cw	Indicates which workstation is recognized as currently active: primary ("control_workstation") or backup ("backup_cw").
control_workstation	Indicates hostname of the primary control workstation.
backup_cw	Indicates hostname of the backup control workstation.

Starting HACMP and PSSP Code on Control Workstation(s)

The following procedure describes how to start HACMP on both primary and backup control workstations.

Note: Make sure that HACMP is currently running or is started first on the workstation you want to be the **active** control workstation. Then start it on the other workstation.

1. On the workstation, enter:

   ```
   smitty clstart
   ```

2. In the menu, change the "Startup Cluster Information Daemon?" field to "true".

   Note: Unless otherwise directed, do **not** change the "Start now, on system restart or both" field. Any choice other than "now" can have unexpected side effects on the customer's system environment.

3. Press ENTER to start HACMP (and PSSP) on this workstation. Wait for completion before using HACMP and PSSP commands (about 2-10 minutes).

Stopping HACMP and PSSP Code (with Optional Failover)

The following procedure describes how to stop HACMP in one of three shutdown modes:

graceful   Shuts down HACMP and PSSP code gracefully, **without failover** to the other workstation.

takeover   Shuts down HACMP and PSSP code gracefully, **with failover** to the other workstation. The other workstation must have HACMP running in order for the takeover to succeed.

forced   Shuts down HACMP and PSSP code **immediately**, **without failover** to the other workstation.

1. On the workstation, enter:

   ```
   smitty clstop
   ```

2. Select the appropriate "Shutdown mode", normally "graceful" or "takeover", depending on whether you want the other workstation to take over as the active control workstation.

> **Note:** Unless otherwise directed, do **not** change the "Start now, on system restart or both" field. Any choice other than "now" can have unexpected side effects on the customer's system environment.

3. Press ENTER to stop HACMP (and PSSP) on this workstation. Wait for completion before using HACMP and PSSP commands (about 1-5 minutes); takeover will take about 2-10 minutes longer.

Monitoring Activity/Completion of clstart and clstop Commands

The following procedure can be used to monitor the status/activity following **clstart** or **clstop** command.

1. On the workstation, enter:

   ```
   tail -f /tmp/hacmp.out
   ```

2. One of the following messages should appear when the command has **completed** on the workstation. The State ("active" or "inactive") refers to the state of that control workstation **before** the command is issued.

Command (State)	Message
clstart (active)	SPCW_APPS COMPLETE at *timestamp*
clstart (inactive)	*timestamp* EVENT COMPLETED: node_up_complete *hostname*
clstop (active)	*timestamp* EVENT COMPLETED: node_down_complete *hostname*
clstop (inactive)	*timestamp* EVENT COMPLETED: node_down_complete *hostname*

> **Note:** Press Ctrl-C to return to the AIX prompt.

Installing Firmware Updates on SP Nodes

Firmware updates (for example, IPL ROS updates for SP nodes or system and service processor firmware updates for 332 MHz SMP or POWER3 SMP thin and wide nodes), are available at **http://www.rs6000.ibm.com/support/micro/download.html**. Alternatively, you can search AIXTOOLS for the latest versions of the firmware updates. (for example, look for **P2SC_IPL** on AIXTOOLS for the latest version of IPL ROS on SP Nodes.)

Follow the instructions in the README file within the package.

Installing Adapter Microcode Packages

Certain adapters are shipped with an adapter firmware diskette. For factory configured systems, the microcode is installed on the SP nodes. However for field installations the adapter firmware must be installed.

This adapter firmware must be installed on the SP nodes along with the adapter. The following procedure outlines the adapter microcode installation. Updates are periodically made to microcode and your service representative can search AIXTOOLS for the latest version of Adapter Microcode.

The following 3 adapters **require** functional microcode to be installed:

Adapter	Package
ESCON Control Unit Adapters Feature 2756	ESCON
BLKMUX S/370 Control Unit Feature 2755	BLKMUX
FDDI Adapters Features 2723, 2724, 2725, 2726	FDDI

These adapters **might** need updating to the latest level in their FLASH EPROM:

Adapter	Package
SSA Adapters Features 6214, 6216, 6217, 7133 Drives	SSAFLASH
SCSI Adapters Features 2412, 2415, 2416	ECA192
Note: The ECA192 instructions differ from the above and are included with the ECA192 Package.	

Note: This procedure is similar to that used for performing software updates (PTF's) to SP nodes. You can Refer to *RS/6000 SP Installation Guide* (GC23-3898) Section 5, "Performing Software Maintenance" for a general idea of how to perform the installation.

1. Locate the diskette (either shipped with your adapter or obtained from the TOOLS disk.
2. Copy the adapter microcode to a temporary directory on the control workstation:
   a. Insert the diskette in the control workstation diskette drive
   b. Log on as *root*.
   c. Select a name in a temporary directory to store the microcode image such as "/tmp/microcode" or "/tmp/escon"
   d.

      `bffcreate -l -d /dev/fd0`

      This will list the contents of the diskette. Record the package name results (for example, escon.cuu). This will be useful if you decide to store other adapter microcode in the same directory.
   e.

      `bffcreate -t /tmp/microcode -d /dev/fd0 all`

      This will copy the data to the designated directory and update a table of contents file (.toc)
3. NFS Export that directory to the nodes:

   `exportfs -i /tmp/microcode`

4. Either use the **dsh** command to control one or more nodes directly from the control workstation, or telnet to each individual node. (Commands in following steps would be executes as in the example, but without the "dsh" prefix)

   Note: Refer to *IBM RS/6000 SP: Administration Guide* for help on using **dsh**.

5.

   `dsh -a "umount /mnt"`

6.

   `dsh -a "mount <control wks>:/tmp/microcode /mnt"`

7.

   `dsh -a "installp -qacXd /mnt all"`

   The "all" can be replaced by the individual microcode package as recorded earlier.
8.

```
dsh -a "umount /mnt"
```

9.

```
exportfs -u /tmp/microcode
```

To complete the microcode update, it is usually necessary to remove and then replace the device from the configuration. The most reliable method to do this is to reboot the node. Some adapters can actually require a power off cycle to complete the microcode update. Others can be updated simply by running **cfgmgr**.

Note: During microcode download for SSA adapters, there is a possibility that the download process could result in an error. When an unrecoverable error (loss of power) occurs during the download process the adapter can be left with no microcode. If this happens, repeat the microcode download. If unsuccessful, replace the adapter.

7133 Disks can also be updated, however the method varies, depending upon which disks are attached. If they are 4.5GB or 9.1GB "Scorpion" disks, and the AIX version is either 4.1.5 or 4.2.1, then run **dsh "ssadload -u"** to update the disks. Other disks will be updated by a **cfgmgr** or reboot cycle.

Preventive Maintenance

The air filter should be checked at least once every 6 months, depending on the condition of the area surrounding the frame. Filter should be cleaned when airflow is restricted or when excess dust has accumulated on the filter.

Removing and Cleaning the Air Filter

Perform the following procedures to remove and clean the air filter:

Note: Schedule periodic cleaning of the air filter screen with a soft brush to remove debris collected on the mesh. See "Preventive Maintenance."

1. Refer to "Removing the Acoustic Skirts" on page 3-148 to remove the front acoustic skirt.
2. Lift air filter from bottom and slide forward to remove completely.
3. Clean air filter screen with a soft brush to remove debris collected on the mesh.
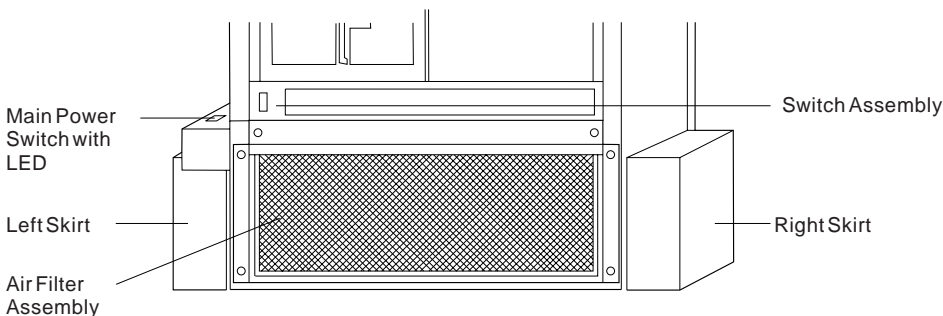
Figure 2-3. Air Filter Assembly

Replacing the Air Filter

Perform the following procedures to replace the air filter:

1. Replace the air filter by placing the air filter top first into the holding assembly. Push up on the bottom of the air filter and move the bottom back into holding bracket.
2. Refer to "Replacing the Acoustic Skirts" on page 3-148 to replace the front acoustic skirt.

604 and 604e High Node Service Procedures

Using the 604 or 604e High Node BUMP Menus

The following section shows a representation of menu selections that are seen when using options within the 604 or 604e high node Bring Up Micro Processor (BUMP).

1. From the node front panel, select "Service Mode."
2. Open an S1 Term session by issuing:

        slterm -Gw *Frame# Node#*

    (You might need to press **Enter** twice.)
3. At the BUMP prompt (>), issue:

        sbb

4. The following display appears:

        STAND-BY MENU : rev 17.03

        0 Display Configuration
        1 Set Flags
        2 Set Unit Number
        3 Set Configuration
        4 SSbus Maintenance
        5 I2C Maintenance

5. Choose the appropriate option:
    a. **0 Display Configuration** Option:

        The following display appears:

                        Display Configuration

        SID TM   7015R30 10004   SID Y2   00010004
        SID Y3 7fffff003935313132380000   UNIT PAAAAAAA 00
        CPU conf   CCAAAAAA   MM conf   CCAAAAAAAAAAAAAA
        FLASH_FW 0922 MM size   0040   OP_KEY   SRV   E_KEY   NRM
        OPP   E13134A   46H9308
        SP   D78605   19H0471   IOC   E38048   19H0481
        CPU0 D78611   19H0255   CPU1
        CPU2   CPU3
        MC0   D78605   19H0473   MC1
        MC2   MC3
        SIB10 D28460   11H8431   PS00 D28426A   11H8276
                                                 PS10

Notes:

1) A=Absent, C=Configured

2) SID TM here contains "7015R30 10004" where 7015 is the machine type, R30 is the model, and 10004 is the serial number.

Press **Enter** after the first menu. The DISPLAY CONFIGURATION — MAIN UNIT is displayed.

Select Option "7" for *I/O 0*, and Option "8" for *I/O 1*. Information similar to the following will be displayed:

```
Status:     Adapter #1 -> Valid & Enabled
            Adapter #2 -> Absent
            Adapter #3 -> Absent
            Adapter #4 -> Absent
            Adapter #5 -> Absent
            Adapter #6 -> Absent
            Adapter #7 -> Valid & Enabled
            Adapter #8 -> Valid & Enabled
BIST/POST:  Adapter #1 -> 0x0000   EC:            PN:
            Adapter #2 -> ------
            Adapter #3 -> ------
            Adapter #4 -> ------
            Adapter #5 -> ------
            Adapter #6 -> ------
            Adapter #7 -> 0xffff   EC:            PN:
            Adapter #8 -> 0x0000   EC:            PN:
```

Note: If the BIST and POST for en0 and SCSI are anything other than "0x0000", then they did not configure correctly.

b. **1 Set Flags** Option:

The following display appears:

```
Set Flags

0 Remote Authorization                     Disabled
1 Bump Console Present                      Enabled
2 Autoservice IPL                           Disabled
3 Extended Tests                            Enabled
4 PowerOn Tests in Trace Mode               Disabled
5 PowerOn Tests in Loop  Mode               Disabled
6 Fast IPL                                  Disabled
7 Set Electronic Mode Switch to Normal      NRM
```

Notes:

1) To change enable/disable status, select flag number and enter.

2) Remote Authorization—allows remote access to BUMP.

3) Bump Console Present—if disabled, cannot use BUMP.

4) Autoservice IPL—when enabled, bypasses maintenance menu.

5) PowerOn Tests—toggles loop and trace modes enabled and disabled.

6) Fast IPL—toggles PON test on and off.

7) Set Electronic Mode Switch to Normal—not important.

c. **2 Set Unit Number** Option:

The following display appears:

```
       Configured units number: 0
```

d. **3 Set Configuration** Option:

The following display appears:

```
Set Configuration

00 CPU0
01 CPU1
02 CPU2
03 CPU3
04 MC0
05 MC1
06 MC2
07 MC3
08 basic MCA
09 exp   MCA
```

If you specified "00 CPU0", you would see the following:

```
CPU0      Set       Status

00 CPU0  C         C
01 CPU0  D
02 CPU0  T
03 CPU1  C         C
04 CPU1  D
05 CPU1  T
```

Notes:

1) C=Configured, T=Temporarily disabled, D=Disabled

2) There are two CPs per CPU card.

Or if you specified "08 basic MCS", you would see the following:

```
UNIT0    Set     Status  | UNIT0   Set     Status

00 MCA1 C       A          12 MCA5 C       A
01 MCA1 D                  13 MCA5 D
02 MCA1 T                  14 MCA5 T
03 MCA2 C       A          15 MCA6 C       A
04 MCA2 D                  16 MCA6 D
05 MCA2 T                  17 MCA6 T
06 MCA3 C       A          18 MCA7 C       C
07 MCA3 D                  19 MCA7 D
08 MCA3 T                  20 MCA7 T
09 MCA4 C       A          21 MCA8 C       C
10 MCA4 D                  22 MCA8 D
11 MCA4 T                  23 MCA8 T
```

This allows you to configure/deconfigure cards on the MCA bus.

e. **4 SSbus Maintenance** Option:

This is used by support for PD. (SSbus = System Service Bus.)

f. **5 I2C Maintenance** Option:

The following display appears:

```
        I2C  Maintenance

00 rd OP status              05 wr LCD
01 rd UNIT status            06 rd i/o port SP
02 rd EEPROM                 07 fan speed
03 margins                   08 powering
04 on/off OP LEDs
```

6. Exit the Standby menu back to the > prompt. Issue:

   power

   (If you had tried to power on from the node front panel at this point, nothing would have happened.)

   BUMP starts PON tests (assuming that the Fast IPL flag had been set to DISABLE).

   If you had the mode set to the SERVICE position and the Autoservice IPL flag had been set to DISABLE, you will see the BUMP Maintenance Menu:

```
  MAINTENANCE MENU (Rev. 06.02)


  0> DISPLAY CONFIGURATION
  1> DISPLAY BUMP ERROR LOG
  2> ENABLE SERVICE CONSOLE
  3> DISABLE SERVICE CONSOLE
  4> RESET
  5> POWER OFF
  6> SYSTEM BOOT
  7> OFF-LINE TESTS
  8> SET PARAMETERS
  9> SET NATIONAL LANGUAGE
```

   This works in the same way as the Standby Menu, except that you have access to the PON test results and what the system really sees for resources.

604 or 604e High Node SystemGuard Maintenance Menu Access

Use Figure 2-4 on page 2-41 to access the SystemGuard maintenance menu.

```
                          ┌───────┐
                          │ Start │
                          └───┬───┘
                              ▼
                          ╱Physical╲
          Secure        ╱   Key     ╲        Service
        ◄──────────────╱             ╲──────────────►
        ▼               ╲           ╱                │
  ┌──────────┐           ╲         ╱                 │
  │ System   │               ▼                       │
  │ Secured  │           ╱ E-Key ╲                   ▼
  └──────────┘  Secure  ╱         ╲  Service      ╱ > ? ╲   sbb
       ▲      ◄────────╱           ╲────────────►╱       ╲─────►
       │               ╲          ╱              ╲       ╱
       └────────────────   │  Normal              ╲     ╱
                           ▼                     Power ▼
                     ┌──────────┐           ╱ Auto     ╲
                     │ Normal   │  Enable  ╱ Service IPL╲
                     │ AIX Load │ ◄───────╱    Flag     ╲
                     └──────────┘          ╲            ╱
                                            │ Disable
                                            ▼
                                      ╱ Bump     ╲
                                     ╱ Console    ╲
                                     ╲   Flag     ╱
```

AIX Diagnostic Menu

1 Service Aid
2 BUMP Service Aid
3 Display Diagnostic Flag
4 BUMP Console 0/1

Note: It is assumed that the Maintenance Flag in SysID EEprom is valid.

Maintenance Menu

0 Display Configuration
1 Display BUMP Error Log
2 Enable Service Console
3 Disable Service Console
4 Reset
5 Power Off
6 System Boot
7 Offline Tests
8 Set Parameters
9 Set National Language

Stand-By Menu

0 Display Configuration
1 Set Flags
2 Set Unit Number
3 Set Configuration
4 SSbus Maintenance
5 I2C Maintenance

Select (x:exit):

Power (Press the Power button, or enter the Power-on password)

Figure   2-4. SystemGuard Maintenance Menu Access

Notes:

1. In order to access the maintenance menu, the following conditions must be satisfied:

   - The system must be in Service Mode.
   - The AutoService IPL flag must be disabled.
   - The BUMP console must be enabled.

2. In order to access the AIX diagnostic menu, the following condition must be satisfied:

   - The BUMP console must be disabled.

Diagnosing an LED 292 Hang Condition

An LED 292 status indicates a Power-On Self Test (POST) failure on a DASD boot device (SCSI, SSA, or Serial DASD adapter). If the failing device is the device you want to boot from, or is another device in the boot chain (before your device), the system will not boot. To isolate the problem, minimum configuration of DASD bootable adapters can be required.

Boot Sequence: After completion of PON tests, and before the system attempts to boot AIX or diagnostic tests, the Micro Channel Bus is checked for adapters. If the adapter has built-in Power-On Self Tests, the POSTs are run on the adapter.

The BUMP console will show test progress such as the following example sequence:

```
Processor 0 on IPL Init
216
220
288
280
279
292
292
292
286
279
292
292
292
```

The screen then clears.

If in Service and AutoService IPL=0, Maintenance Menu is displayed. Otherwise, the following is shown:

```
Processor 0 on IPL Start          (usually)
223, 233, 243, 253               (if successful)
299                               (if unsuccessful)
269
```

Deciphering the Hang Condition: If the system hangs on one of the LEDs, you can identify the adapter causing the hang by using the LED information and comparing it to the system configuration.

In this example, assume the system configuration is for a 604 high processor node (functional equivalent to an RS/6000 Model R40):

Slot Number	Adapter Type	Slot Number	Adapter Type
01	ENET (2-1)	11	T/R (2-2)
02	FDDI (2-S)	12	FDDI (2-S)
03	FDDI (2-R)	13	FDDI (2-R)
04	128-P (3-7)	14	128-P (3-7)
05	128-P (3-7)	15	128-P (3-7)
06	SSA (4-G)	16	SSA (4-G)
07	SSA (4-G)	17	SSA (4-G)
08	SCSI (4-7)	18	SCSI (4-2)

Also assume the following LEDs are displayed on the BUMP console:

```
216
220
288
280
279
292
292
292
286
279
292  "HANG"
```

Using information from *Diagnostic Information for Micro Channel Bus Systems* and POST indicators, the following information is determined for the preceding list of LEDs:

Note: The Bus is tested beginning with slot 01 and continues through slot 18.

216   (IPL ROM code being uncompressed into memory)

220   (IPL control block is being initialized)

288   (Adapter card slots being queried

280   (3com Ethernet POST)

279   FDDI POST

292   SCSI POST running (or SSA, or SERDASDA)

292   SCSI POST running (or SSA, or SERDASDA)

292   SCSI POST running (or SSA, or SERDASDA)

286   Token-Ring adapter POST running

279   FDDI POST

292   SCSI POST running (or SSA, or SERDASDA)

With this "known" information from the LEDs, you can determine which adapters in the configuration passed POST.

Note: Not all adapters have built-in POSTs.

216
220
288
280
279
292
292
292
286
279
292 "HANG"

	Slot 11	Slot 12	Slot 13	Slot 14	Slot 15	Slot 16	Slot 17	Slot 18		Slot 01	Slot 02	Slot 03	Slot 04	Slot 05	Slot 06	Slot 07	Slot 08
Status	OK	OK	*	**	**					OK	OK	*	**	**	OK	OK	OK
Card	T/R	FDDI	FDDI	128P	128P	SSA	SSA	SCSI		ENT	FDDI	FDDI	128P	128P	SSA	SSA	SCSI
Slot #	11	12	13	14	15	16	17	18		01	02	03	04	05	06	07	08
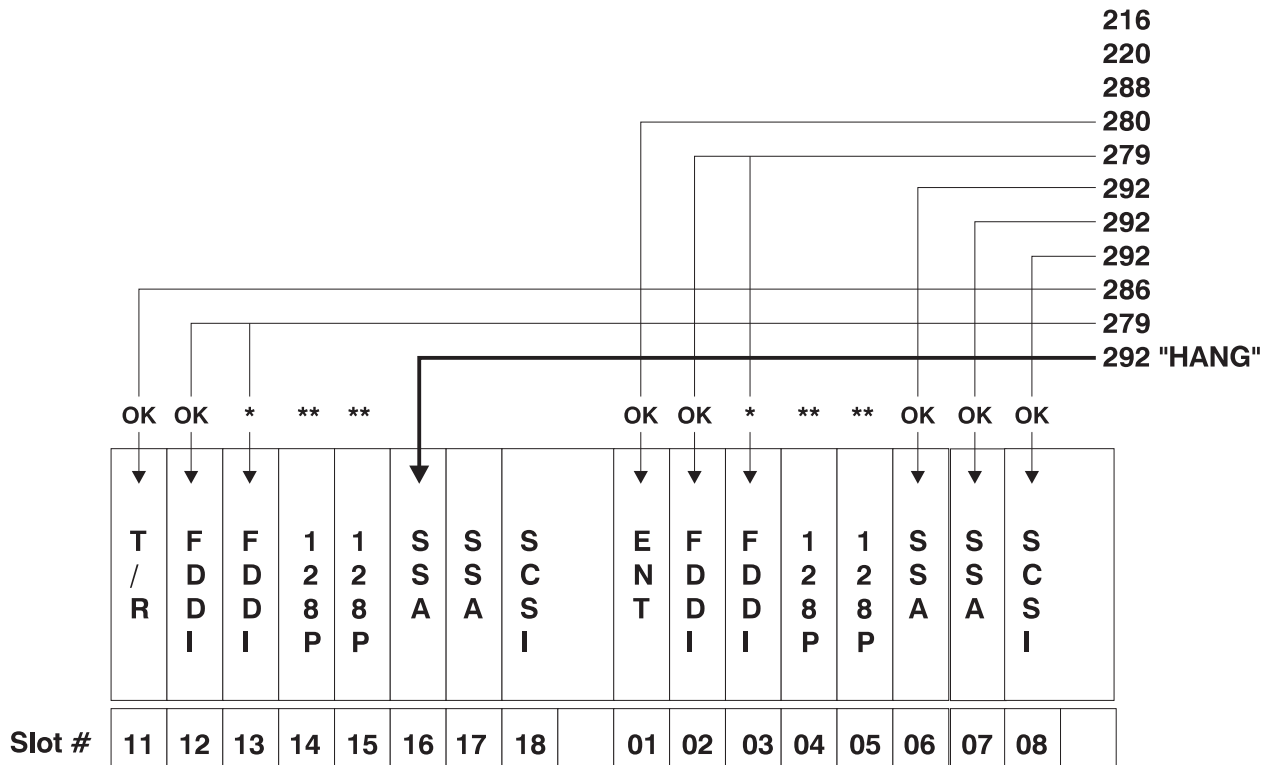
* Two port FDDI with one POST

** 128-port cards have no POST

332 MHz SMP and POWER3 SMP Thin and Wide Node Service Procedures

Memory Test Hang Problem

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

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

Memory card memory modules, on the other hand, must be installed in matched (size and speed) pairs. Refer to the "Removal and Replacement Procedures" in volume 2 of the RS/6000 SP Maintenance Information manual for instructions on module removal and installation; however, do not replace the covers as directed while troubleshooting this problem. A single memory module pair may be installed in module slots 1 and 2 (not slots 1 and 3). A second memory module pair could be installed in module slots 5 and 6 (slots 3 and 4 do not have to be populated first). Along these same lines, there is no requirement that memory module slots 1 and 2 be populated before another slot pair.

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

1. Power down the system.
2. Remove and re-install any installed memory card(s), power the system up. If the system no longer stops at an E3xx code, re-seating the memory card(s) has corrected the problem.
3. Attempt to isolate the problem to a specific memory card.
   a. If there is only one memory card installed, tag the card as suspect bad and skip to step 4 on page 2-45.
   b. Remove one of the two memory cards, tag the card as suspect bad and Power the system up. If the system no longer stops at an E3xx code, skip to step 3d.
   c. Power down the system, remove the installed memory card and install the memory card removed in step 3b. Move the suspect bad tag from the installed memory card to the one just removed, and power the system up. If the system stops at an E3xx code, remove the suspect bad tag and skip to step 7 on page 2-46, if the system does not stop at an E3xx code, skip to step 4.
   d. Power down the system, remove the installed memory card and install the memory card removed in step 3b (tagged as suspect bad). Power the system up. If the system stops at an E3xx code again, skip to step 4.
   e. Remove the suspect bad tag, re-install the second memory card and power the system up. If the system no longer stops at an E3xx code, re-seating the memory cards (again) has corrected the problem. If the system stops at an E3xx code again, skip to step 7 on page 2-46.
4. Attempt to isolate the problem to a specific memory module pair on the memory card tagged as suspect bad:
   a. Power the system down.
   b. Remove all installed memory modules from the suspect bad Memory card except one pair. Record the original positions of any memory modules removed so that when instructed to re-install them they can be installed in their original position.
   c. Power the system up.
   d. If the system no longer stops at an E3xx code, skip to step 4g.
   e. Replace the memory module pair left installed in step 4b, and tag the removed memory module pair as suspect bad.
   f. Power the system up. If the system stops at an E3xx code, skip to step 6 on page 2-46.
   g. Power down the system.
   h. If there are more memory module pairs to be re-installed on the suspect bad memory card, install another memory module pair in their original positions on the memory card, and continue with step 4i.

   If there are no more memory module pairs to be re-installed, you either have a suspect bad memory module pair or simply reseating the memory modules on the memory card has corrected the problem. If you have a suspect bad memory module pair, continue with step 5.
   i. Power the system up.
   j. If the system does not stop at an E3xx code, continue at step 4g.
   k. If the system has stopped at an E3xx code again, replace the memory module pair that was just re-installed and tag the removed memory module pair as suspect bad.
   l. Power the system up. If the system again stops at an E3xx code, continue with step 6 on page 2-46. If the system does not stop at an E3xx code, continue with step 4g.
5. Determine which of the suspect bad memory modules is defective (may be both).

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

6. Replace the memory card.
7. Replace the system planar.
8. Replace the processor card(s).

E1xx Code Boot Problems

Depending on the boot device, a checkpoint may be displayed on the LCD display for an extended period of time while the boot image is retrieved from the device. This is particularly true for Tape and Network boot attempts. If the checkpoint/code is displayed for an extended time there may be a problem loading the boot image from the device.

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

1. Restart the system and get to the Firmware SMS menu. In the multi-boot menu check:
   - Is the intended boot device correctly specified in the boot sequence?
   - For network boot attempts:
     – Are the IP parameters correct?
     – Attempt to "Ping" the target server using the SMS "Ping" utility.
2. If the checkpoint E105 or E15B is displayed for an extended time, there may be a problem with the integrity of the boot image.
   - Try to boot and run standalone diagnostics against the system, particularly against the intended boot device. If the diagnostics are successful, it may be necessary to perform an operating system specific recovery process, or reinstall the operating system.
3. If attempting to boot from a Hard disk:
   a. Verify proper SCSI bus termination.
   b. Replace SCSI cable.
   c. It is possible that another attached SCSI device is causing the problem.

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

      Remove all installed adapters except the one the boot device is attached to, try to boot the stand-alone diagnostics from an Ethernet adapter, using network boot, and run the diagnostics against the system.

      If this is successful, re-install adapters (and attached devices as applicable) that were removed, one at a time, and run the standalone diagnostics against the system.
   h. Replace I/O planar. (See notes on B-2.)
4. If attempting to boot from a Network controller:
   a. Power Off then On and retry the boot operation.
   b. Verify the network connection (network could be down).
   c. Verify that IP parameters are correct.
   d. Try to "Ping" the target server.
   e. Have network administrator verify the server configuration for this client.
   f. Replace network cable.
   g. Replace network adapter (unless trying to boot using the Ethernet controller on the I/O planar).
   h. It is possible that another installed adapter is causing the problem.

Remove all installed adapters except the one you are trying to boot, and try to boot the online diagnostics from the hard disk drive. If this is successful, run the diagnostics against the system, particularly against the target network boot controller/adapter.

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

   i. Replace I/O planar (if not replaced in previous step). (See notes on B-2.)
5. If you replaced the indicated FRUs and the problem is still not corrected, or the above descriptions did not address your particular situation, go to the "332 MHz SMP Node Minimum Configuration" or POWER3 SMP Thin and Wide Node Minimum Configuration MAP in volume 2 of the RS/6000 SP Maintenance Information manual.

Firmware Utilities

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

Text-Based System Management Services: The text-based Open Firmware command line allows you to configure some adapters, and the System Management Services makes it possible for you to view information about your processor node and to perform such tasks as setting passwords and changing device configurations.

To start the text-based System Management Services, press **1** on the console when the words "memory" and "keyboard" appear during startup.

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

```
 System Management Services


  1.  Display Configuration
  2.  Multiboot
  3.  Utilities
  4.  Select Language

                                         .------.
                                         ³X=Exit³
                                         '------'

  ====>
```

See the following for option descriptions:

- "Display Configuration"
- "MultiBoot Menu" on page 2-48
- "Utilities" on page 2-50
- "Select Language" on page 2-55

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

Display Configuration: This option (option 1 on the System Management Services menu) provides information about the setup of your computer. A screen similar to the following is displayed.

```
   Device

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

   PCI Adapters


   .-----------. .-----------.                           .------.
   ³P=prev-page³ ³N=next-page³                           ³x=Exit³
   '-----------' '-----------'                           '------'

```

MultiBoot Menu: The MultiBoot Menu is option 2 on the System Management Services menu. A screen similar to the following is displayed.

```
   Multiboot Menu

     1. Select Software
     2. Software Default
     3. Install From
     4. Select Boot Devices
     5. OK Prompt
     6. Mulitboot Startup <OFF> (or <ON>)




                                           .------.
                                           ³X=Exit³
                                           '------'
     ===>
```

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

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

`No Operating System Installed`

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

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

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

Select Boot Devices: This selection enables you to view and change the custom boot list, which is the sequence of devices read at startup time. A screen similar to the following is displayed.

```
  Select Boot Devices

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



                                          .------.
                                          ³X=Exit³
                                          '------'
     ====>
```

Selecting the Display Current Settings option lists the current order of devices in the boot list. The following screen shows an example of this display. For Ethernet boot, go to the Install From icon and then select Ethernet as a boot device.

```
  Current Boot Sequence

    1. Diskette
    2. Ethernet (Integrated)
    3. SCSI CD-ROM            id=3   (slot=1)
    4. SCSI 500MB Hard Disk   id=6   (slot=1)
    5. SCSI 500MB Hard Disk   id=5   (slot=5)



                                          .------.
                                          ³X=Exit³
                                          '------'
     ===>
```

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

```
     Configure Nth Boot Device

     Device Number        Current Position        Device Name

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




     .-----------. .-----------.                  .------.
     ³P=prev-page³ ³N=next-page³                  ³X=Exit³
     '-----------' '-----------'                  '------'
  ===>
```

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

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

Utilities: The Utilities screen (option 3 on the System Management Services menu) enables you to select from the following system management tools. A screen similar to the following is displayed.

```
  Utilities

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



                                     .------.
                                     ³X=Exit³
                                     '------'
  ===>
```

See the following for option descriptions:

- "Set Password and Unattended Start Mode"
- "Utilities Option 2" on page 2-51
- "Display Error Log" on page 2-51
- "Remote Initial Program Load Setup" on page 2-52
- "Change SCSI ID" on page 2-54
- "Update System Firmware" on page 2-55
- "Update Service Processor" on page 2-55
- "Select Console" on page 2-55

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

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│  Password Utilities                                               │
│                                                                   │
│    1. Set Power On Password                                       │
│    2. Remove Power On Password                                    │
│    3. Unattended Start Mode <OFF>                                 │
│    4. Set Privileged-Access Password                              │
│    5. Remove Privileged-Access Password                           │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│                                         .------.                  │
│                                         ³X=Exit³                  │
│                                         '------'                  │
│                                                                   │
│   ===>                                                            │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

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

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

Note: If you *forget* the power-on password, contact your service representative.

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

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

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

Note: If you *forget* the power-on password, contact your service representative.

Utilities Option 2: This option varies, depending on the node type

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

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│     .----------------------------------------------------------.  │
│     ³                      Error Log                          ³  │
│     ³                                                         ³  │
│     ³         Date       Time       ErrorCode      Location ³  │
│     ³  Entry 1. 96/04/01  12:13:22   25A80011        00-00    ³  │
│     ³  Entry 2. no error logged                                ³  │
│     '----------------------------------------------------------'  │
│                                                                   │
│                                                                   │
│                                                                   │
│      .-----------------.                        .------.          │
│      ³C=Clear Error Log³                        ³X=Exit³          │
│      '-----------------'                        '------'          │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

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

```
┌──────────────────────────────────────────────────────────────┐
│                                                              │
│  Network Parameters                                          │
│                                                              │
│   1. IP Parameters                                           │
│   2. Adapter Parameters                                      │
│   3. Ping                                                    │
│                                                              │
│                                                              │
│                                                              │
│                                      .------.                │
│                                      ³X=Exit³                │
│                                      '------'                │
│                                                              │
│  ===>                                                        │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```

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

Selecting the IP Parameters option displays the following screen.

```
┌──────────────────────────────────────────────────────────────┐
│                                                              │
│   IP Parameters                                             │
│                                                              │
│   1. Client IP Address     000.000.000.000                  │
│   2. Server IP Address     000.000.000.000                  │
│   3. Gateway IP Address    000.000.000.000                  │
│   4. Subnet Mask           000.000.000.000                  │
│                                                              │
│                                                              │
│                                                              │
│                                                              │
│                                      .------.                │
│                                      ³X=Exit³                │
│                                      '------'                │
│                                                              │
│   ===>                                                       │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```

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

```
Adapter Parameters


   Device             HW Address

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




                              .------.
                              ³X=Exit³
                              '------'
```

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

```
3Com Etherlink Fast XL


1. Media Type          [Auto]
2. Full Duplex         [Auto]




                              .------.
                              ³X=Exit³
                              '------'
```

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

```
              .----------------.
              ³ MEDIA TYPE     ³
              ³ 1. 10 BaseT    ³
              ³ 2. 100 Base TX ³
              ³ 3. Auto        ³
              '----------------'
```

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

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

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

```
 Interface

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




 ===>
```

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

```
 Ping

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






      .----------.                              .------.
      ³E=Execute³                               ³X=Exit³
      '----------'                              '------'

 ===>
```

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

Update System Firmware: This option allows you to update your system firmware. The firmware update image must already be present on the hard drive in order to perform this procedure.

```
┌─── Firmware Recovery ─────────────────────────────────────────────────────────────┐
│                                                                                    │
│  If a troubleshooting procedure has indicated that the firmware information in your processor node has │
│  been corrupted, then you must perform a firmware recovery.                         │
│                                                                                    │
│  To perform a firmware recovery, do the following:                                 │
│   1. Make sure the firmware image (*.img) is present on the hard drive in a known directory. │
│   2. Make sure the processor node power is turned off.                             │
│   3. Turn the processor node power on.                                             │
│   4. When the keyboard indicator appears, press the 1 key on the system console ASCII terminal. │
│   5. When the System Management Services appear, choose Utilities and perform a System Firmware │
│      Update.                                                                        │
│   6. Follow the on-screen instructions, specifying the directory and filename of the firmware image file. │
│                                                                                    │
└────────────────────────────────────────────────────────────────────────────────────┘
```

Update Service Processor: This menu option will not operate on this node because no diskette is available. If you need to update the SP Flash EPROM, use the procedure in "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72.

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

If no console is selected within two minutes, the console defaults to Serial Port 2.

Select Language: This option (option 4 on the System Management Services menu) allows you to change the language used by the text-based System Management Services screens. A screen similar to the following is displayed.

```
┌──────────────────────────────────────────────────────────────────────┐
│  SELECT LANGUAGE                                                       │
│                                                                        │
│   1.  English                                                          │
│   2.  Francais                                                         │
│   3.  Deutsch                                                          │
│   4.  Italiano                                                         │
│   5.  Espanol                                                          │
│   6.  Svenska                                                          │
│                                                                        │
│                                                                        │
│  ====>                                              .------.           │
│                                                     ³x=Exit³           │
│                                                     '------'           │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

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

Open Firmware Command Prompt: To enter the Open Firmware command line, you must press the **F8** key or number **8** key *after the keyboard icon appears* during startup.

If you have pressed the **F8** key or number 8 key, the Open Firmware command line (an "OK" prompt) appears after the initialization and power-on self test (POST) are complete.

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

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

To exit from the Open Firmware command enter `reset-all` or power the system down and reboot.

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

Service Processor Menus

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

Service processor menus are available using an ASCII terminal when the server is powered off and the service processor is operating with standby power. Service processor menus are also available when server power is on and the service processor has detected a server problem (such as loss of surveillance).

During the first power up (i.e. node circuit breaker is powered on), service processor menus are not available for 45 seconds while the service processor is running self-tests and initializing the server. If the server powers down, service processor menus become available after 15 seconds.

For a summary of the service processor functions and the methods for invoking them, see Table 2-6.

Table 2-6 (Page 1 of 2). Service Processor Functions			
Service Processor Functions	**Service Processor Menus (ASCII terminals)**	**Service Processor Service Aids (ASCII or graphics terminals)**	**SMS (ASCII or graphics terminals)**
Read VPD	Y3		Y3
View System Environmental Conditions	Y3		
Read System POST Errors	Y3		
Read SP Error Logs	Y3		
View Progress Indicators from last Boot	Y3		
Power-on System	Y3		
Power-off System	Y2		
Read NVRAM	Y2		
Reset SP	Y2		

Service Processor Functions	Service Processor Menus (ASCII terminals)	Service Processor Service Aids (ASCII or graphics terminals)	SMS (ASCII or graphics terminals)
Setup Reboot/Restart Policy	Y2		
Start Talk Mode	Y2		
Enable/Disable Console Mirroring	Y2	Y1	
Select Modem Line Speed	Y2	Y1	
Enable/Disable Modem	Y2	Y1	
Setup Modem Configuration	Y2	Y1	
Setup Ring Indicate Power-On	Y2	Y1	
Setup Dial-out Phone Numbers	Y2	Y1	
Setup Surveillance	Y2	Y1	
Update SP Flash EPROM	Y2	Y1	Y2
Change General Access Password	Y2		Y2
Change Privileged Access Password	Y2		Y2
Select Language	Y2		Y2
Enable/Disable Unattended Start Mode	Y2		Y2

Table 2-6 (Page 2 of 2). Service Processor Functions

Note:

   1 Operating system root password
   2 Privileged access password
   3 General access (power-on) password

Service Processor Menus: The service processor menus are divided into two groups:

- General user menus - the user must know the general access password.

- Privileged user menus - the user must know the privileged access password.

The following section describes these two groups of menus, how to access them, and the functions associated with each option.

When the server is powered down, the service processor menus may be accessed locally or remotely. menus for maintenance functions, you must use

Menu Inactivity: To prevent loss of control in unstable power environments, the service processor leaves the menu mode after 5 minutes of inactivity. Menus may be resumed by pressing any key on the terminal, local or remote.

How to access service processor menus locally: Service processor menus may be accessed locally by connecting an ASCII terminal to either serial port. Because the presence of the ASCII terminal cannot be confirmed by the service processor, you must press a key on the ASCII terminal to confirm its presence. Next the service processor prompts you for a password (if set), and when verified, displays the service processor menus.

How to access service processor menus remotely: **This function is not supported on this node.**

Service processor menus may be accessed remotely by connecting a modem to serial port 1 or serial port 2.

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

General User Menus: The menu options presented to the General user are a subset of the options available to the Privileged user. The user must know the General Access Password in order to access these menus.

```
        GENERAL USER MENU

   1. Power-On System

   2. Read VPD

   3. Read Progress Indicators from Last System Boot

   4. Read Service Processor Error Logs

   5. Read System POST Errors

   6. View System Environmental Conditions

  99. Exit from Menus
```

Power-On System: Allows the user to power-on the system.

Read VPD: Displays manufacturer vital product data, such as serial numbers, part numbers, etc.

Read Progress Indicators from Last System Boot: Displays the boot progress indicators (check points), up to a maximum of 80,from the last system boot. This historical information may be useful to help diagnose system faults.

Read Service Processor Error Logs: Displays the service processor error logs.

```
                      Error Log

 19970626223337   0. Loss of Redundant Fan #5
                     40210091
                                                              0000000



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

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

Read System POST Errors: Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults.

View System Environmental Conditions: On selection of this menu, the service processor reads all environmental sensors and reports the results to the user. This option maybe useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

Privileged User Menus: The following menus are available to privileged users only. The user must know the Privileged Access Password in order to access these menus.

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

- Your Service Processor's current firmware version
- The firmware copyright notice
- The System Name given to your server during setup

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

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

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

```
            Service Processor Firmware
            EPROM:  963551107
            FLASH:  963551108
            Copyright 1997, IBM Corporation
                SYSTEM NAME


        MAIN MENU

    1. Service Processor Setup Menu

    2. System Power Control Menu

    3. System Information Menu

    4. Language Selection Menu

    5. Call-In/Call-Out Setup Menu

    6. Set System Name

   99. Exit from Menus
```

See the following for option descriptions:

- "Service Processor Setup Menu"
- "System Power Control Menu" on page 2-62
- System Information Menu
  - "System Information Menu (332 MHz SMP Thin and Wide Nodes)" on page 2-64
  - "System Information Menu (POWER3 SMP Thin and Wide Nodes)" on page 2-65
- "Language Selection Menu" on page 2-66
- "Call-In/Call-Out Setup Menu" on page 2-67
- "Set System Name" on page 2-67

Service Processor Setup Menu

```
         SERVICE PROCESSOR SETUP MENU

  1. Change Privileged Access Password

  2. Change General Access Password

  3. Enable/Disable Console Mirroring
        Currently Disabled

  4. Start Talk Mode

  5. OS Surveillance Setup Menu

  6. Reset Service Processor

  7. Reprogram Service Processor Flash EPROM

 98. Return to Previous Menu

 99. Exit from Menus
```

Note

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

Passwords: Passwords can be any combination of up to 8 alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first 8 characters. Passwords can be set from the service processor menu or from the SMS menus.

The following illustrates what you can access with the Privileged Access Password and the General Access Password.

Privileged Access Password	General Access Password	Resulting Menu
None	None	MAIN MENU displayed
None	Set	MAIN MENU displayed

Privileged Access Password	General Access Password	Resulting Menu
Set	None	User's with password see the MAIN MENU Others users see the GENERAL USER MENU
Set	Set	Users see menus associated with the entered password

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

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

Enable/Disable Console Mirroring: This option is not supported on this node.

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

Surveillance Setup Menu: This option may be used to setup operating system surveillance.

```
        OS Surveillance Setup Menu

 1. Surveillance:
      Currently Disabled

 2. Surveillance Time Interval:
      Not Applicable

 3. Surveillance Delay:
      Not Applicable


98. Return to Previous Menu
```

- **Surveillance**

  May be set to Enable or Disable.

- **Surveillance Time Interval**

  May be set to any number from 2 to 255.

- **Surveillance Delay**

  May be set to any number from 0 to 255.

Refer to "Service Processor System Monitoring - Surveillance" on page 2-71 for more information about surveillance.

Reset Service Processor: Allows the user to reinitialize the service processor.

Reprogram Service Processor Flash EPROM: An update diskette can be acquired from the Support page on the Internet or from your service team. The Internet address is:

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

This menu option will not operate on this node because no diskette drive is available. If you need to update system firmware, use the procedure in "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72.

System Power Control Menu

```
        SYSTEM POWER CONTROL MENU

   1. Enable/Disable Unattended Start Mode
        Currently Disabled

   2. Ring Indicate Power-On Menu

   3. Reboot/Restart Policy Setup Menu

   4. Power-On System

   5. Power-Off System

   6. Enable/Disable Fast System Boot:
        Currently Enabled

  98. Return to Previous Menu

  99. Exit from Menus
```

Enable/Disable Unattended Start Mode: This option may be used to instruct the service processor to immediately power-on the server after a power failure, bypassing power-on password verification. Unattended Start Mode can also be set via SMS Menus. It is intended to be used on servers that require automatic power-on after a power failure.

Ring Indicator Power-On Menu: Ring Indicate Power-On is an alternate method of dialing in, without establishing a service processor session. If the system is powered off, Ring Indicate Power-On is enabled, the server is powered on at the predetermined number of rings, If the server is already on, no action is taken. In either case, the telephone call is not answered. The caller receives no feedback that the server powered-on. The **Ring Indicator Power-On Menu** and defaults are shown below:

```
        Ring Indicator Power-On Menu

   1. Ring Indicate Power-On :
        Currently Disabled
   2. Number of Rings :
        Currently 6

  98. Return to Previous Menu
```

- Ring Indicate Power-On may be set to 'Enabled' or 'Disabled'.

- Number of Rings may be set to any number from 1 to 255.

Reboot/Restart Policy Setup Menu

```
         Reboot/Restart Policy Setup Menu

   1. Number of reboot attempts:
        Currently 3

   2. Use OS-Defined restart policy?
        Currently Yes

   3. Enable supplemental restart policy?
        Currently No

   4. Call-Out before restart:
        Currently Disabled

  98. Return to Previous Menu
```

Number of reboot attempts: If the server fails to successfully complete the boot process, it attempts to reboot the number of times specified. Entry values equal to or greater than 0 are valid. Only successive failed reboots attempts count, not reboots that occur after a restart attempt. At restart, the counter is set to 0.

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

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

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

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

   Refer to "Service Processor Reboot/Restart Recovery" on page 2-69.

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

Power-on System:

Note: This option is not supported on the 332 MHz SMP thin and wide nodes.

Lets you power-on the system immediately. For other power-on methods see "Node Power-On Methods" on page 2-68.

Power-off System:

Note: This option is not supported on the 332 MHz SMP thin and wide nodes.

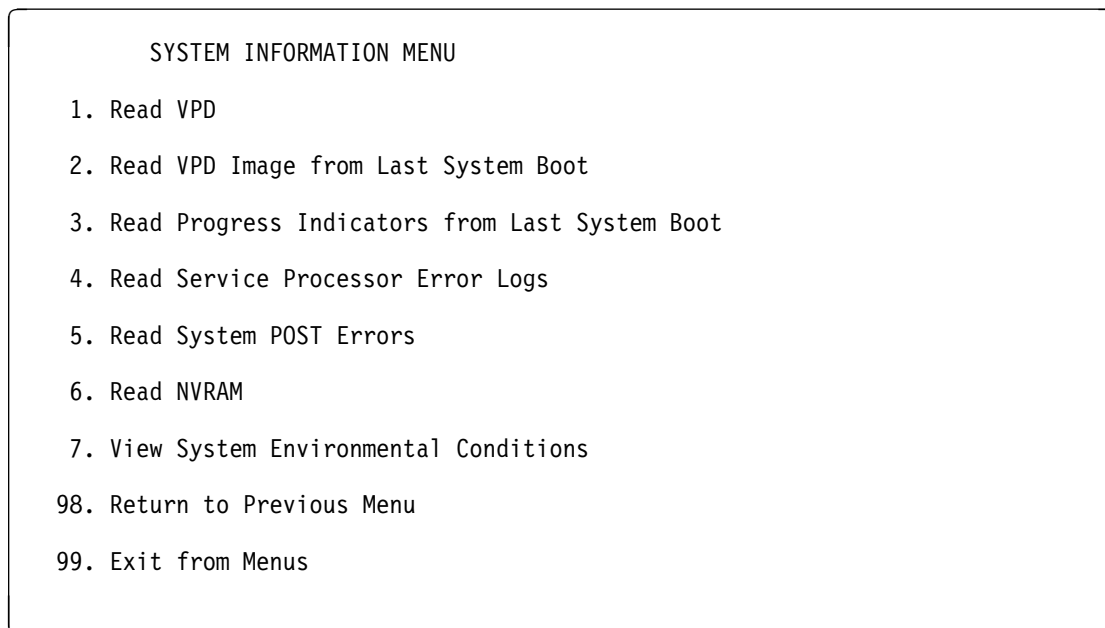Allows the user to power-off the server following a surveillance failure.

Enable/Disable Fast System Boot

Note: This option is available for POWER3 SMP thin and wide nodes, but not for 332 MHz SMP nodes.

In fast boot mode, there are two actions that will explicitly change the mode back to slow boot: 1) All checkstop conditions and 2) The user manually changing mode using the menu.

Clearing NVRAM also returns the mode to slow boot mode, slow boot remains in effect until the system boots AIX successfully one time, then automatically changes to fast boot.

System Information Menu (332 MHz SMP Thin and Wide Nodes)

```
        SYSTEM INFORMATION MENU

 1. Read VPD

 2. Read VPD Image from Last System Boot

 3. Read Progress Indicators from Last System Boot

 4. Read Service Processor Error Logs

 5. Read System POST Errors

 6. Read NVRAM

 7. View System Environmental Conditions

98. Return to Previous Menu

99. Exit from Menus
```

Read VPD: Displays manufacturer's vital product data, such as serial numbers, part numbers, etc.

Read VPD Image from Last System Boot: Displays the VPD information that was in effect after the last system boot. This information will usually be identical with the results from the menu selection "Read VPD," but in the case of configuration updates or certain faults, this historical comparison can be useful to System Administrators and service personnel.

Read Progress Indicator from Last System Boot: Displays the boot progress indicators (check points), up to a maximum of 80, from the last system boot. This historical information may be useful to help diagnose system faults.

Read Service Processor Error Logs: Displays error conditions detected by the Service Processor.

```
                        Error Log

19970626223337  0. Loss of Redundant Fan #5
                    40210091



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

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

Read System POST Errors: Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults.

Read NVRAM: Displays Non-Volatile Random Access Memory (NVRAM) content.

View System Environmental Conditions: The service processor reads all environmental sensors and reports the results to the user. This option is most useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

The content of the System Environmental Conditions menu varies depending on the node examined and the level of service processor firmware installed.

System Information Menu (POWER3 SMP Thin and Wide Nodes)

```
        SYSTEM INFORMATION MENU

   1. Read VPD Image from Last System Boot

   2. Read Progress Indicators from Last System Boot

   3. Read Service Processor Error Logs

   4. Read System POST Errors

   5. Read NVRAM

   6. Read Service Processor Configuration

   7. View System Environmental Conditions

   8. Processor configuration/deconfiguration Menu

   9. Memory configuration/deconfiguration Menu

  98. Return to Previous Menu

  99. Exit from Menus
```

Read VPD Image from Last System Boot: Displays the VPD information that was in effect after the last system boot. This information will usually be identical with the results from the menu selection "Read VPD," but in the case of configuration updates or certain faults, this historical comparison can be useful to System Administrators and service personnel.

Read Progress Indicator from Last System Boot: Displays the boot progress indicators (check points), up to a maximum of 80, from the last system boot. This historical information may be useful to help diagnose system faults.

Read Service Processor Error Logs: Displays error conditions detected by the Service Processor.

```
                         Error Log

 19970626223337   0. Loss of Redundant Fan #5
                     40210091



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

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

Read System POST Errors: Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults.

Read NVRAM: Displays Non-Volatile Random Access Memory (NVRAM) content.

Read Service Processor Configurations: Displays the processor configurations.

View System Environmental Conditions: The service processor reads all environmental sensors and reports the results to the user. This option is most useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

The content of the System Environmental Conditions menu varies depending on the node examined and the level of service processor firmware installed.

Processor Configuration/Deconfiguration Menu: Use this option only in conjunction with support center instruction.

Memory Configuration/Deconfiguration Menu: Use this option only in conjunction with support center instruction.

Language Selection Menu

```
         LANGUAGE SELECTION MENU

   1. English

   2. Francais

   3. Deutsch

   4. Italiano

   5. Espanol

   6. Svenska

  98. Return to Previous Menu

  99. Exit from Menus
```

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

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

Call-In/Call-Out Setup Menu: **All functions specific to this menu are not supported on this node.**

Set System Name

Service Processor Functions: The 332 MHz SMP and POWER3 SMP nodes service processor supports the following functions:

Built-in Functions	Initialization and Test	Service processor Basic Instructions Test (BIST)
		JTAG System Chip Initialization
	Error Data Collection	BIST/POST errors and status
		Checkstop FIR data logout
		Machine check logout
	Configuration	CPU Complex validation
		VPD Collection
	System Management	Reset and Reboot on System Firmware fail
		Reboot on system failure

Local User Function	User Interface	Local async console
		Text based menus with NLS
		Operator Panel messages
	Power and Miscellaneous	Power On/Off
		Configurable Reboot Policy
	Status and Data Access	VPD
		Error data (service processor)
		Error data (system)
		Environmental data
	service processor Setup Utilities	Passwords
		Phone numbers
		Language (NLS) selection
		Call In/Call Out enable/disable
		Flash (Gold/Recovery block) Update
		Flash (Composite block) Update
		System Name
		Modem Configuration
Remote User Functions	Call Out (Call Home) Reporting	Boot failure
		OS Termination
		Surveillance failure
		Critical EPOW reporting
		Checkstop
		Machine check
	Indentify system by name	Call In
		Power-on via ring-indicate
		Password/security check
		Console mirroring/Quick disconnect
Application Interface Functions	Monitor/Sense	Thermal/Voltage/fan speed
		service processor Flash Update(Recovery and Composite)

Node Power-On Methods

• Power-on from control workstation (CWS), refer to the *IBM Parallel System Support Programs for AIX: Administration Guide*, (GC23-3897).

• Service Processor Menu power-on request

  You can request a power-on via the service processor menus from a console.

• Unattended start mode - refer to **Enable/Disable Unattended Start Mode** on page "Enable/Disable Unattended Start Mode" on page 2-62.

  The Service Processor can be enabled to recover from the loss of power (see Enable/Disable Unattended Power-On Mode in the SYSTEM POWER CONTROL MENU). When power is restored, the

system returns to the then current power state at the time power loss occurred. For example, if the system was powered-on when power loss occurred, it reboots/restarts when power is restored. If the system was powered-off when power loss occurred, it remains off when power is restored.

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

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

  Because of the potential for power loss, the Timed Power-On function of AIX can only be assured when Unattended Power-On Mode is enabled. If a Timed Power-On event occurs during a power loss, and if Unattended Power-On Mode is enabled, the system starts when power is restored.

  If Unattended Start Mode is disabled (the default), the system power state remains off when power is restored, regardless of the power state of the system when power loss occurred.

- Ring Indicate Power-On

  Enabling ring indicate power-on disables remote call-in. If ring indicate power-on is enabled, the server will power on at a predetermined number of rings. If the server is already on, no action is taken. In either case, the telephone call is not answered. The caller receives no feedback that the server powered on.

- Follow-up to a Failed Boot Attempt

  The service processor will initiate a power-on sequence upon detection of a failed boot attempt.

Service Processor Reboot/Restart Recovery: **Reboot** describes bringing the system hardware back up from scratch, for example, from a system reset or power on. The boot process ends when control passes to the operating system process.

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

Failure During Boot Process: During the boot process, either initially after system power-on or upon reboot after a system failure, the Service Processor monitors the boot progress (via surveillance). If progress stops, the service processor can reinitiate the boot process (reboot) if enabled to do so. service processor can re-attempt this process according to an entry on the Reboot/Restart Policy Setup Menu.

Failure During Normal System Operation: When the boot process completes and control transferers to the operating system (OS), the service processor can monitor operating system activity (see the SERVICE PROCESSOR SETUP MENU item Set Surveillance Parameters). If OS activity stops, the service processor can initiate a reboot/restart process based on the settings in the Service Processor Reboot/Restart Policy Setup Menu and the OS automatic restart settings (see OS documentation).

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

Service Processor Reboot/Restart Policy Controls: The operating system's automatic restart policy (see operating system documentation) indicates the OS response to a system crash. The service processor can be instructed to refer to that policy, or not, by the Use OS-Defined Restart Policy menu item.

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

Use OS-Defined restart policy?: The **Use OS-Defined restart policy** default setting is YES. This causes the service processor to refer to the OS Automatic Restart Policy setting and take action, the same action the OS would take if it could have responded to the problem causing the restart.

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

Enable Supplemental Restart Policy?: The default setting is NO. If set to YES, the service processor restarts the system when the system loses control as detected by service processor surveillance, and either:

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

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

   Refer to "Service Processor Reboot/Restart Recovery" on page 2-69.

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

OS automatic reboot/restart after crash setting	Service processor to use OS-defined restart policy?	Service processor enable supplemental restart policy?	System response
None	No	No[1]	
None	No	Yes	Restarts
None	Yes[1]	No[1]	
None	Yes[1]	Yes	Restarts
False[2]	No	No[1]	
False[2]	No	Yes	Restarts
False[2]	Yes[1]	No[1]	
False[2]	Yes[1]	Yes	
True	No	No[1]	
True	No	Yes	Restarts
True	Yes[1]	No[1]	Restarts
True	Yes[1]	Yes	Restarts

Note:

[1] Service processor default
[2] AIX default

Service Processor System Monitoring - Surveillance: Surveillance is a function in which the service processor monitors the system, and the system monitors the service processor. This monitoring is accomplished by periodic samplings called heartbeats.

Surveillance is available during two phases:

1. System firmware bringup (automatic) and

2. Operating system runtime (optional).

System Firmware Surveillance: Provides the service processor with a means to detect boot failures while the system firmware is running.

System firmware surveillance is automatically enabled during system power-on. It cannot be disabled via a user selectable option.

If the service processor detects no heartbeats during system IPL (for 7 minutes), it cycles the system power to attempt a reboot. The maximum number of retries is set from the service processor menus. If the fail condition repeats, the service processor leaves the machine powered on, logs an error and offers menus to the user. If Call-out is enabled, the service processor calls to report the failure and displays the operating system surveillance failure code on the operator panel.

Operating System Surveillance: Provides the service processor with a means to detect hang conditions, hardware or software failures while the operating system is running. It also provides the operating system with a means to detect a service processor failure by the lack of a return heartbeat.

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

Operating system surveillance can be enabled and disabled via:

- Service Processor Menus
- Service Processor Service Aids

Three parameters must be set for operating system surveillance:

1. Surveillance enable/disable

2. Surveillance interval

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

3. Surveillance delay

   This is the length of time to wait from when the operating system is started to when the first heartbeat is expected.

Surveillance will not take effect until the next time the operating system is started after setting the parameters.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and the service processor does not detect any heartbeats from the operating system, the service processor assumes the system is hung. The machine is left powered on and Service Processor enters standby phase, displaying the operating system surveillance failure code on the operator panel. If Call-out is enabled, the service processor calls to report the failure.

Service Processor Flash EPROM Updates (and System Firmware): The service processor EPROM may need to be updated for two different reasons:

1. The UPDATE (composite) portion of the EPROM has become corrupted.

2. Service processor firmware upgrades, without any corruption present.

The use of a Flash EPROM allows updates to occur without physically replacing the memory.

Firmware Updates: The firmware in your server can be updated using one of two available initiation processes:

1. SMS Utilities initiation

2. Diagnostic Service Aids initiation

Each initiation method is described below. In each case, the process prompts you for your authority and shows the contents of the update media. Verify the file with which to perform the update, and follow any other instructions that may appear. After initiation, the processes are identical and automatic.

There are two areas in each firmware module that may need updating:

1. The gold code or base code or EPROM area

2. The custom or main program or FLASH area

Each update file contains matching gold and custom firmware, so it is not possible to update to a conflicting set.

Before the update process begins, the versions of each of the two areas of the target firmware module are compared to the versions on the update file. Only the area(s) that need updating are updated. In most cases, only the custom area is updated.

An update file can be acquired from the Support page on the Internet or from your service team. The Internet address is:

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

The update files will need to be loaded onto the control workstation prior to distribution to the nodes. This can be done by putting the files on a diskette in TAR or DOS format, and then using the appropriate **tar** or **dosread** command at the control workstation. Alternatively, you might be able to FTP the files directly onto the control workstation.

Checking Current Firmware Levels: If the node is running AIX or in Service Mode, you may check the current firmware level by performing the first step of the procedure in "Updating Firmware from Diagnostic Service Aids" on page 2-73. Otherwise, refer to the downloaded update instructions, or to the System Management Services "Display Configuration" on page 2-47, or Service Processor menus on page 2-59, to determine the level of the processor node or service processor flash.

Distributing Firmware Files to Nodes Before Update

Note: This step must be done to propagate the firmware files on the hard drive of the node prior to initiating the firmware update.

1. Locate the required firmware file(s), which may be one or more of the following.

    `WILyyjjj.IMG` - image file used for system firmware
    `wcyymmdd.bin` - binary file used to burn the service processor EEPROM
    `wcyymmdd.img` - image file used for service processor Flash update
    (where: yy=year, jjj=julian date, mm=month, dd=day)

2. Transfer the firmware file(s) to the control workstation. The file can be put into any directory. Creating a firmware directory or using **/tmp** is suggested.

3. Make sure each node that will be updated is IPLed.

4. From the control workstation or each node, use the **ftp** command to transfer the files to each node. Make sure to use "image" or "binary" mode to ensure that the files are exact duplicates. The file(s) may be put in any directory although a directory with the name **/tmp** is suggested.

5. You may recheck that the distributed files are exact duplicates by running the following command against the original and distributed files:

   `chksum` *filename*

Updating Firmware from the SMS Utilities

Notes:

1. From the SMS menus, select "Utilities," then select option to "Update System Firmware" or "Update Service Processor."

2. Select update from filesystem. (Diskette is not supported)

3. Enter the directory and filename of the firmware file.

4. When firmware is completed, the system may reboot.

5. You should recheck the firmware level.

Note: The node must be powered-on to bring up the SMS Menus.

Updating Firmware from Diagnostic Service Aids

Note: This procedure can be run from Service Mode or from AIX.

1. Check current level of firmware:

   a. From Service Mode, select "Task Selection (Service Aids)," then select "Display Hardware Vital Product Data," select "All Resources," then press the commit key. Continue at 1c below..

   b. From AIX, use **lscfg -pv | pg** to list VPD information. Continue at 1c below..

   c. Scan the output for the following (towards the bottom):

   ```
   - System Firmware:
       ROM Level (alterable).......Lyyjjj

   - SP_CARD_
       ...
       ROM Level (non-alterable)...yyyymmdd
       ROM Level (alterable).......yyyymmdd
   ```

2. If running from AIX, enter the **diag** command, then select "Task Selection (Service Aids)."

3. From the "TASK SELECTION LIST," select "Update System or Service Processor Flash" (near the bottom of the list).

4. Select "FILESYSTEM" (diskette not supported).

5. Enter the directory and filename of the firmware file.

6. When firmware is completed, the system may reboot.

7. You should recheck the firmware level.

Service Processor Error Logs: The service processor error logs contain error conditions detected by the service processor.

```
                              Error Log

 19970626223337   0. Loss of Redundant Fan #5
                      40210091



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

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

System POST Errors: If POST (Power-On Self Test) errors occur during start-up, this error log help isolate faults when used with the diagnostics.

```
                          Read System POST Errors


 Version : 0
 Severity : 0
 Disposition : 0
 Initiator : 0
 Event being reported : 0
 Extended Error Log Data:
 000000C2 00000000 00000084 00000009 00000000 00000000 00000000 00000000
 00000020 00000000 00000000 00000000 00000000 00000000 00000072 00000074
 00000063 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000028 00000003 00000000 00000005 00000000 00000001
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000049 00000042 0000004D 00000000 00000055 00000030 0000002E 00000031
 0000002D 00000050 00000031 0000002D 00000058 00000031 00000000

                     (Press Return to Continue)
```

Service Processor Operational Phases

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

```
        Service Processor Power Applied
                      │
                      ▼
              Pre-Standby Phase
                      │
   ┌─────────┐        │
   │         ▼        ▼
   │   Standby Phase    Service Processor Menus Available
   │                    │
   │                    ▼
   │   Bring-Up Phase   SMS Menus Available
   │                    │
   │                    ▼
   │   Runtime Phase    Diagnostic Service Aids Available
   │         │
   └─────────┘
```
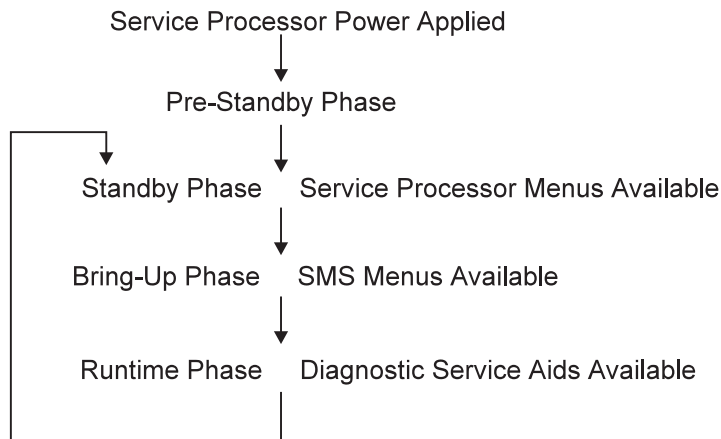
Pre-Standby Phase: This phase is entered when the server is connected to a power source. The server may or may not be fully powered on. This phase is exited when the Power-On Self Tests (POSTS) and configurations tasks are completed.

The Pre-Standby phase components are:

- Service Processor Initialization

  The service processor performs any necessary hardware and software initializations.

- Service Processor POST

  The service processor conducts Power-On Self Tests on its various work and code areas.

- Service processor Unattended Start Mode Checks

  To assist fault recovery. If unattended start mode is set, the service processor automatically reboots the server. The service processor does not wait for a user-input or power-on command, but will move straight through the phase and into the Bringup Phase. The unattended start mode can be reset by accessing SMS menus, or service processor menus.

Standby Phase: The standby phase can be reached in two ways:

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

2. With the server ON after an operating system fault, recognized by `STBY` or an 8-digit code in the LCD display.

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

The Standby phase components are:

- Modem Configuration

  The service processor will configure the modem (if installed) so that incoming calls may be received, or outgoing calls may be placed.

- Dial In

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

- Menus

  The service processor menus are password protected. Before you can access them you need to know either General User (Power-On Password or POP) or Privileged User (Privileged Access Password or PAP).

Bring-Up Phase: This phase is entered upon power-on, and exited upon loading of the operating system.

The Bring-up phase components are:

- Retry Request Check

  The service processor checks to see if the previous IPL attempt failed. If two consecutive fails are detected, the service processor displays an error code and places an outgoing call to notify an external party if the user has enabled this option.

- Dial Out

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

- Update Operator Panel

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

- Environmental Monitoring

  Environmental Monitoring is now controlled by the service processor instead of the base system, with expanded error recording and reporting.

- System Firmware Surveillance (Heartbeat Monitoring)

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

- Responding to System Processor Commands

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

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

- Environmental Monitoring

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

- Responding to System Processor Commands

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

- Run-Time Surveillance (Heartbeat Monitoring)

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

SP-Attached Server Service Procedures

Decoupling and Coupling Code for SP-Attached Servers

1. Go to *IBM Parallel System Support Programs for AIX: Diagnosis Guide* and perform the problem determination procedure described in the chapter "Diagnosing SP-Attached Server Problems".

2. Before servicing the SP-attached server (RS/6000 7017 Models S70 and S7A), perform the following procedures.

Decoupling the SP-Attached Server: Before removing the connection cables and powering off the SP-attached server, enter the following commands on the SP-attached server:

1. Stop hardmon:

   `stopsrc -s hardmon`

2. Physically disconnect SAMI cable from RS/6000 7017 Models S70 or S7A operator panel.

3. Restart hardmon:

   `startsrc -s hardmon`

When the SAMI daemon is stopped, you can unplug the SAMI cable from the RS/6000 7017 Models S70 and S7A operator panel and the serial cable from the S1 connector at the rear of the main I/O drawer. A keyboard and display must be attached to perform any action other than reading the operator panel codes.

RS/6000 7017 Models S70 and S7A Service: Refer to the *RS/6000 Enterprise Servers S70 and S7A Installation and Service Guide* to perform the required service action. One or both of the SP-attached server connection cables may need to be replaced to regain supervisor connectivity between the control workstation and the server.

Coupling the SP-Attached Server: Physically connect SAMI cable at the RS/6000 7017 Models S70 or S7A operator panel. Hardmon will detect the cable connection in approximately 5 seconds.

Chapter 3. FRU Removals and Replacements

Attention: Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers. (See "Personal ESD Requirements" on page xviii for more details.) Do not touch the pins or circuitry on these components.

This chapter describes the removal and replacement of RS/6000 SP product-specific Field Replaceable Unit (FRU) components.

For common RS/6000 components, refer to the *7012 POWERstation and POWERserver: Installation and Service Guide* (SA23-2624) for the thin processor node component, the *7013 POWERstation and POWERserver: Installation and Service Guide* (SA23-2622) for the wide processor node component, or the *7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide* (SA23-2743) for the 604 or 604e high processor node.

Handling Static-Sensitive Devices

Attention: Adapters, planars, disk drives, supervisor cards and memory cards are sensitive to static elec-tricity discharge. These devices are wrapped in antistatic bags or containers to prevent this damage.

Perform the following procedures to prevent damage to these devices:

1. Do not remove the device from the antistatic bag or container until you are ready to install the device in the system unit.
2. You must wear an ESD wristband while installing or removing any static-sensitive devices.
3. With the device still in its antistatic bag, touch it to a metal frame of the system.
4. Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints and pins.
5. Handle the devices carefully in order to prevent permanent damage.
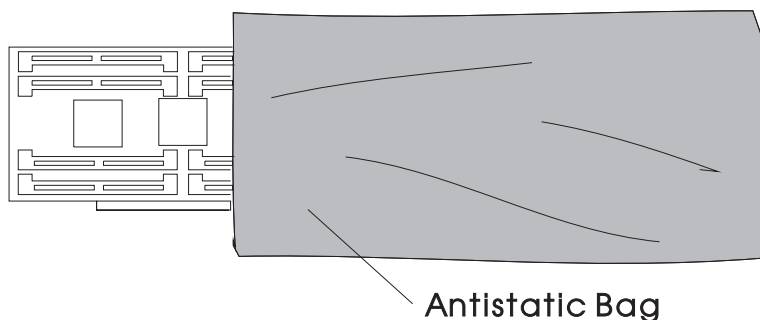
Figure 3-1. Handling an Anti-static Device

Procedures for Thin Processor Nodes

Attention: Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers. (See "Personal ESD Requirements" on page xviii for more details.) Do not touch the pins or circuitry on these components.

Removing a Thin Processor Node

CAUTION:
Due to the weight of each thin node (under 18 Kg Á40 lbs‖), use care when removing and replacing thin nodes above shoulder height.

Perform the following procedures to remove the thin processor node from the frame:

1. Ensure that the processor node is offline (shutdown) from the control workstation and powered off from the control workstation.
2. Observe processor node for blinking green light. Turn the processor node front panel power switch to Off ('0').
3. Remove all attached cables in the rear of the processor node.
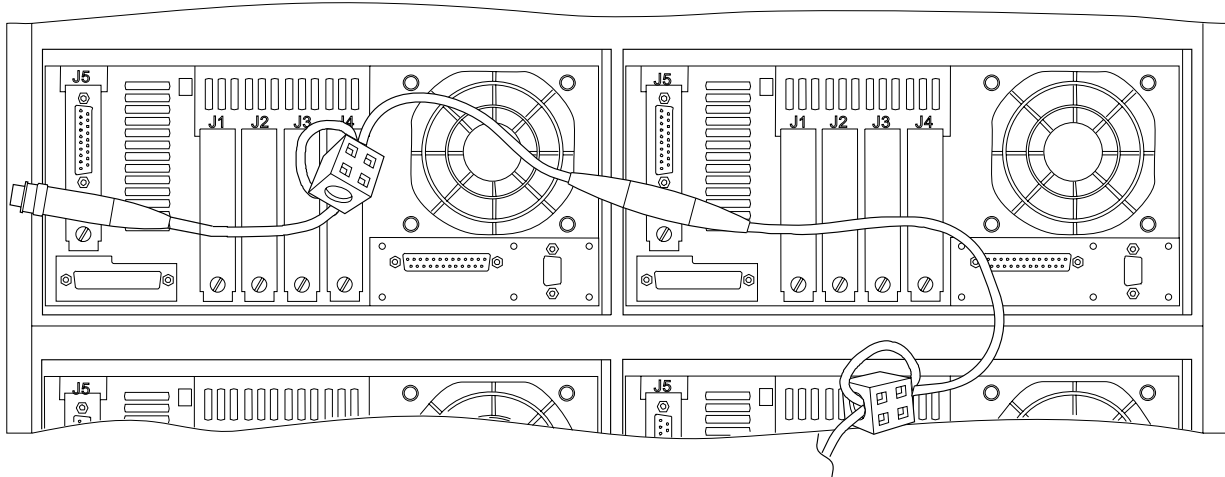
Figure   3-2. Removing a Thin Processor Node From Frame

4. When removing the 48-volt cable connector at J8, place protective cover p/n 48G3055 (from ship group) over the plug end.
5. Remove the two hold-down screws located at the rear of the processor node.
6. Remove all mounting screws that hold the front cover in place.

   Note: Outer mounting screws are larger than the inner (processor node) mounting screws.

7. Remove the processor node from the front of the frame.
8. Return to the procedure that directed you here.
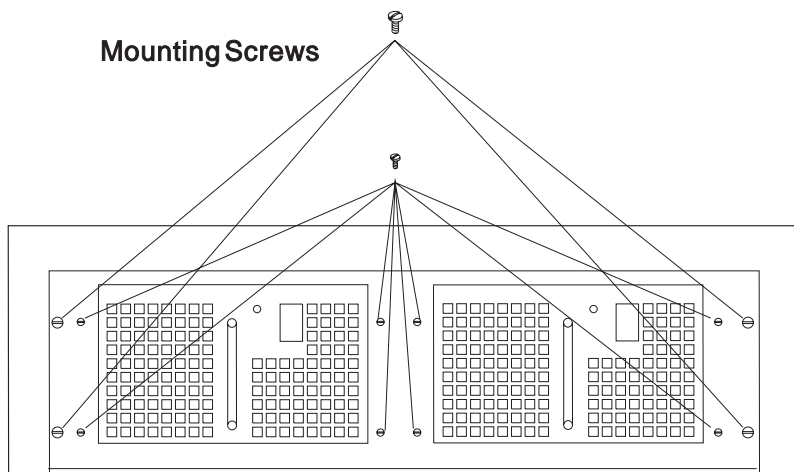
Figure   3-3. Thin Processor Node From Front of Frame

Replacing a Thin Processor Node

Perform the following procedures to replace a thin processor node in the frame:

Note: Verify that the processor node top cover is installed properly on the processor node.

1. Reinstall the processor node in the front of the frame.
2. Reinstall the front cover.
3. Reinstall all mounting screws that hold front cover in place.

   Note: Outer mounting screws are larger than the inner (processor node) mounting screws.

4. Reinstall the two hold-down screws located at the rear of the processor node.
5. Reattach all cables in the rear of the processor node.
6. Remove protective cover p/n 48G3055 from the cable end and install the 48-volt power cable in J8. (Ensure that the alignment arrow is pointing at the top of the connector.) Store protective cover with the ship group tools.
7. Put the circuit breaker on the front of the processor node in the On ('1') position.
8. Return to the procedure that directed you here.

Removing the Supervisor Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a node supervisor card:

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node.
2. Remove the processor top node cover by loosening the six captive screws on top of the processor node.
3. If necessary, remove the daughter power card attached to the supervisor card. Refer to "Removing the Daughter Power Card" on page 3-11.
4. Disconnect the following cables at the supervisor card:
   J101, J102, J104, J106, J107, J110, J111
5. Remove the connector from the front LEDs.
6. Loosen power switch and move forward.
7. Remove four nuts holding Fan 3 bracket and remove the bracket.
8. Remove five screws from node supervisor card.
9. Remove node supervisor card from chassis.

   Note: Use dc converter hold-down bars from old supervisor card to reinstall new supervisor card.

Node Supervisor Card
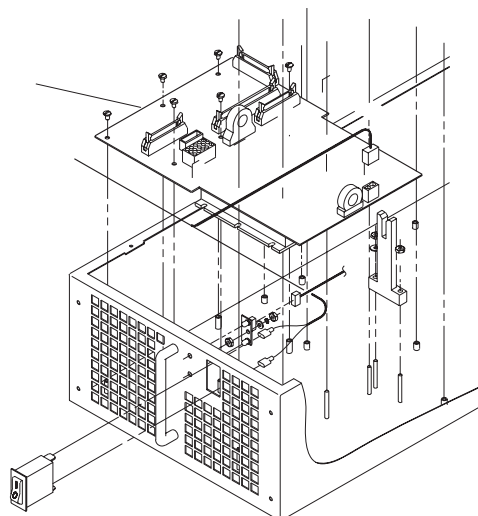
Figure 3-4. Removing the Thin Processor Node Supervisor Card

Replacing the Supervisor Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to replace a node supervisor card:

1. Insert node supervisor card into chassis.

   Note: Check that wires are not pinched under the node supervisor card.

2. Reinstall five screws on the node supervisor card.
3. Replace Fan 3 bracket and secure by replacing four nuts.
4. Reattach all cables to the supervisor card:
       J101, J102, J104, J106, J107, J110, J111
5. Reinstall connector to the front LEDs.
6. Reinstall the power switch.
7. If necessary, replace the daughter power card attached to the supervisor card. Refer to "Replacing the Daughter Power Card" on page 3-11.
8. Reinstall the processor node top cover and tighten the six captive screws.
9. Refer to "Replacing a Thin Processor Node" on page 3-8 to replace the RS/6000 SP thin processor node.

Removing the CPU or Memory Cards (and SIMMs)

Attention: The CPU card ID will change when replacing a CPU card. Inform the Customer, **before** removing and replacing the CPU card, that some software applications that use the machine ID number for licensing purposes may be impacted by this change.

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the thin processor node CPU or memory cards (and SIMMs):

Note: Replacing a cache SIMM on a thin node 2 may be done without removing the CPU card.

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node. Remove the processor node cover by removing the screws on top of the processor node.
2. Remove the memory card(s).
3. If this is a thin node 2, remove the air baffle which fits snugly between the side of the chassis and the CPU card MCM. Make sure to remove this baffle carefully.
4. Remove the CPU card by pulling on the top edge of the card.

5. If this is a thin node 2 CPU card, disconnect the CPU power cable at the CPU card.

   Note: The CPU card may contain memory and/or cache SIMMs. When replacing the CPU card, all SIMMs should be removed from the old CPU card and installed on the new CPU card.

6. For more information on exchanging memory SIMMs, refer to "Exchanging Memory SIMMs for Memory Upgrade" or "Installing the L2 Processor Cache" in *RS/6000 SP: Maintenance Information Volume 1*.
   - The processor node type 2002 (66 MHz) CPU card has one cache SIMM socket: J1.
   - The processor node type 2004 (thin node 2) CPU card has two cache SIMM sockets: L1 and L2.

Attention: The latches on the SIMM connectors break easily, so use caution when handling.

J1-J8 Memory SIMMs
L1-L2 Cache Memory SIMMs
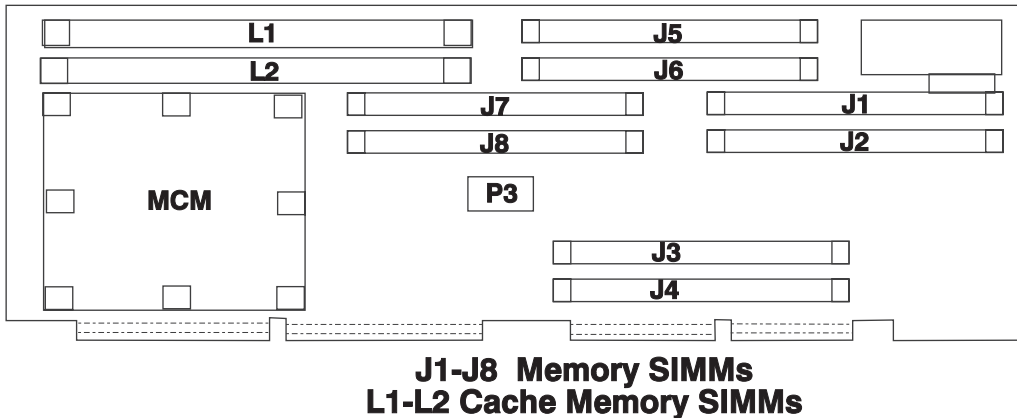
Figure 3-5. Thin Processor Node 2 CPU Card Locations

L2 Cache Memory SIMM
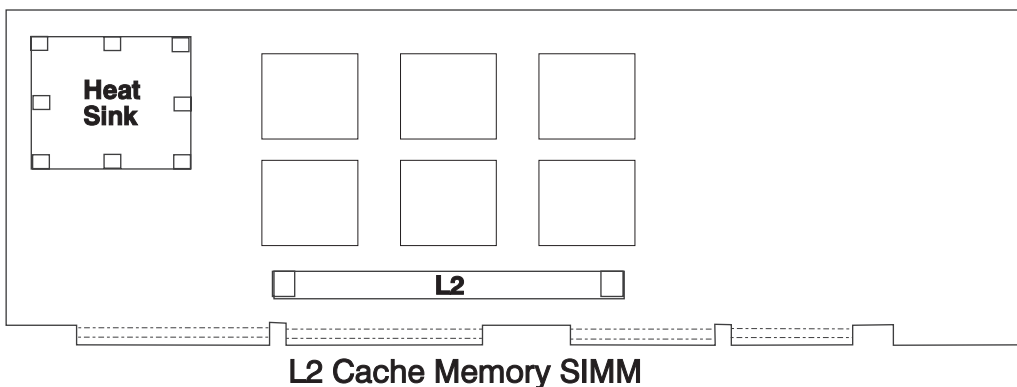
Figure 3-6. 66 MHz Thin Processor Node (With L2 Cache) CPU Card Locations

Replacing the CPU or Memory Cards (and SIMMs)

Attention: The CPU card ID will change when replacing a CPU card. Inform the Customer, **before** removing and replacing the CPU card, that some software applications that use the machine ID number for licensing purposes may be impacted by this change.

1. Make sure that all SIMMs have been reinstalled on the CPU card.
2. If this is a thin node 2 CPU card, connect the CPU power cable at the CPU card.
3. Align the CPU card with front and rear guides and connector. Press the card down into connectors.
4. If this is a thin node 2, reinstall air baffle, making sure that it fits snugly between the MCM and the side of the chassis. Also, reinstall memory card.
5. Install the memory card(s).

6. Install the top cover of the processor node. Refer to "Replacing a Thin Processor Node" on page 3-8 to reinstall the processor node.

Removing the Daughter Power Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the thin processor node daughter power card:

1. Disconnect cable from card at N00-DP-J204.
2. Remove screws, then carefully lift card from supervisor.
3. Make sure jumper card (underneath daughter power card) is detached from the daughter power card.
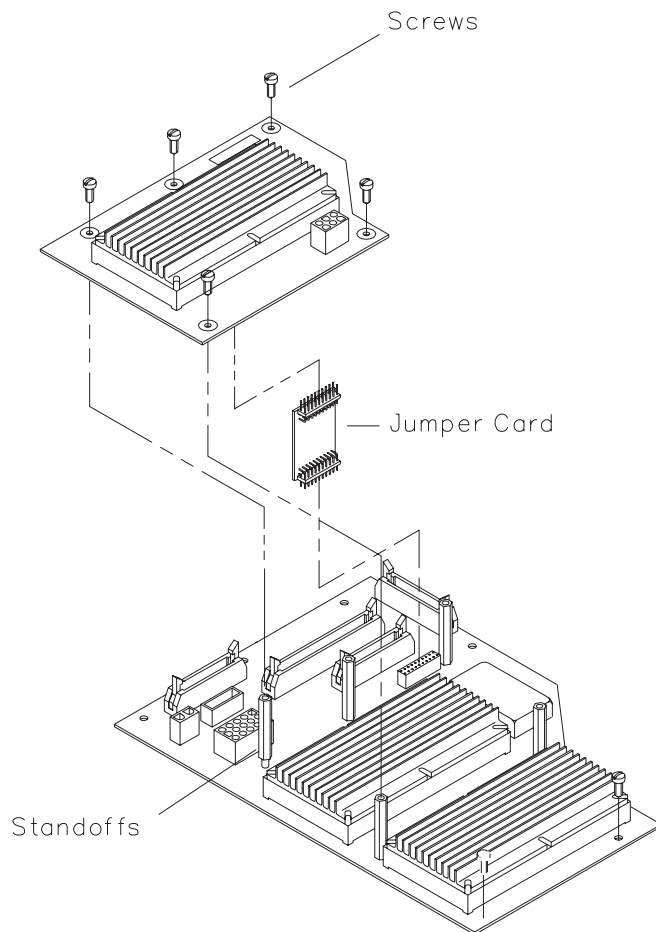
Figure 3-7. Removing the Thin Processor Node Daughter Power Card

Replacing the Daughter Power Card

1. Make sure jumper card (underneath daughter power card) is attached at node supervisor.
2. Align daughter power card connector with jumper card and push down.
3. Install screws to retain card.
4. Reconnect cable to card at N00-DP-J204.

Removing the I/O Planar Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the I/O planar card:

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node.
2. Remove the processor top node cover by loosening the six screws on top of the processor node.
3. Remove the disk drive (SCSI-attached), but leave the disk drives in the disk drive frame.
4. Make a note of their positions, then remove all cards (CPU Card, Memory Card(s), Adapter Cards, Ethernet Adapter) and I/O slot brackets.

Attention: All adapters and memory cards must be returned to their original slots.

5. Remove front card guide by taking out three retaining screws.
6. Unplug Fan 2.

   Note: Leave the front fan in the card guide frame (note that the longest screw goes through the option card down stop).

7. Remove remaining plugs from planar (J02, J16, J21, J22, J23, J25).
8. Remove the SCSI terminator from the SCSI port, if present.
9. Remove ground wire lug by removing screw and washer.
10. Make a note of the positions of the remaining planar mounting screws, then remove them from the planar.
11. Remove the planar from the base.

    CAUTION:
    The ground strip may have sharp edges.
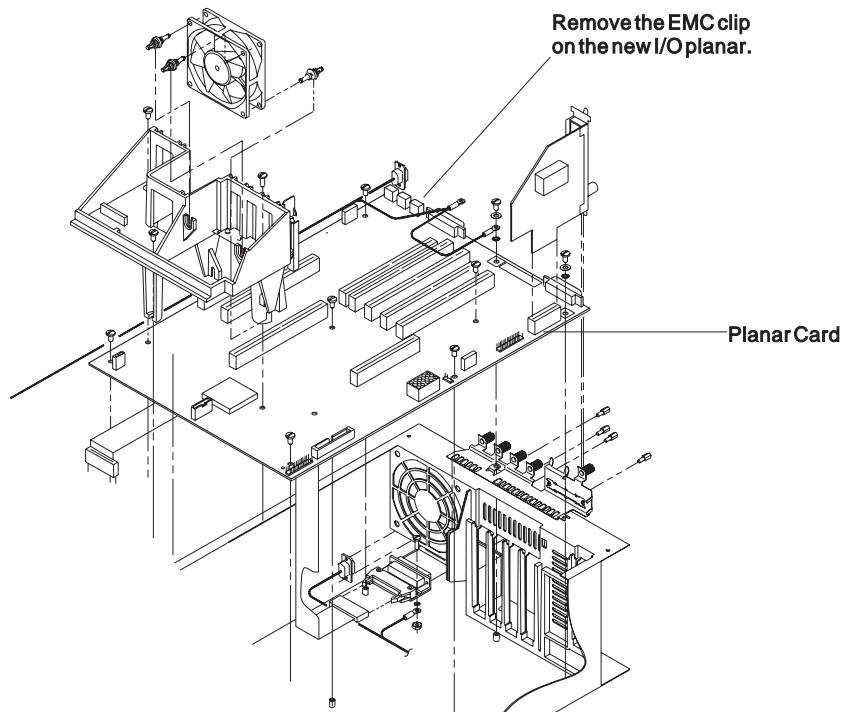
Figure 3-8. I/O Planar Card components

Replacing the I/O Planar Card

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

Perform these procedures to replace the I/O planar card:

1. Prior to installation, remove the EMC clip on J6 (TAB) at the rear of the I/O planar card.
2. Insert the I/O planar.
3. Reinstall *seven* of the *10* planar screws, leaving out the three planar screws for the card guide frame.
4. Reinstall ground wire.
5. Reinstall cables into I/O planar (J02, J16, J21, J22, J23, J25).
6. Reinstall card guide and three planar screws.
7. Reinstall Fan 2 plug.
8. Reinstall SCSI terminator in the SCSI port, if present.
9. Replace all cards and I/O planar slot brackets back in their previous positions.

   Note: Remember to put the CPU shield over the CPU card (if present).

10. Refer to *7012 POWERstation and POWERserver: Installation and Service Guide* (SA23-2624), for the replacement procedure described for the Disk Drive (SCSI-attached).
11. Reinstall the power switch.
12. Reinstall the processor node top cover and tighten the six screws.
13. Refer to "Replacing a Thin Processor Node" on page 3-8 to replace the RS/6000 SP thin processor node.

Removing the 120/160 MHz Thin Processor Node Planar Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the planar card from the 120 and 160 MHz thin processor nodes:

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node.
2. Remove the processor top node cover by loosening the six screws on top of the processor node.
3. Make a note of their positions, then remove all cards (Memory Card(s), Adapter Cards, Ethernet Adapter) and I/O slot brackets.
4. Remove the fan 1 assembly. Refer to "Removing Fan 1" on page 3-23.
5. Remove the card guide assembly. Refer to "Removing the 120 or 160 MHz Thin Processor Node Card Guide Bracket" on page 3-15.
6. Remove the DASD (SCSI-attached), but leave the DASDs in the DASD bracket. Refer to "Removing the 120 or 160 MHz Thin Processor Node DASD" on page 3-21
7. Remove remaining plugs from planar (J02, J03, J3P, J7A, J16, J21, J22, J23, J24, J25, J27).
8. Remove the SCSI terminator from the SCSI port, if present.
9. Remove ground wire lug by removing screw and washer.
10. Make a note of the positions of the remaining planar mounting screws, then remove them from the planar.
11. Remove the planar from the base.

    CAUTION:
    The ground strip may have sharp edges.
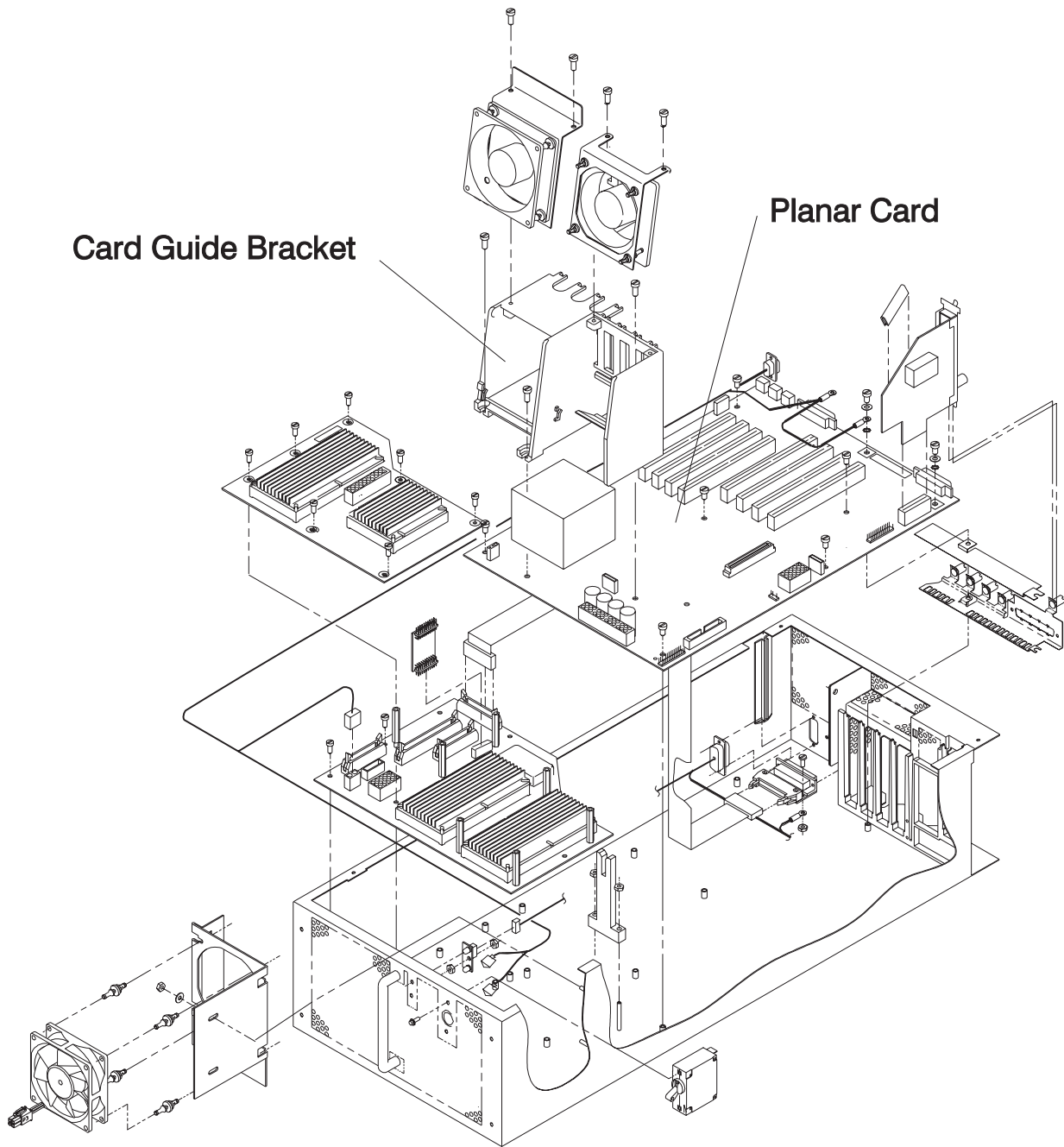
Figure   3-9. Removing the 120/160 MHz Thin Node Planar Card

Replacing the 120/160 MHz Thin Processor Node Planar Card

Note: Inform the customer that the boot address will need to be updated. Refer the customer to *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

Perform these procedures to replace the planar card:

1. Insert the planar.
2. Reinstall ground wire with the screw and washer.
3. Reinstall the remaining planar screws, leaving out the three planar screws for the card guide frame.
4. Reinstall SCSI terminator in the SCSI port, if present.
5. Reinstall cables into planar (J02, J03, J3P, J7A, J16, J21, J22, J23, J24, J25, J27).

6. Reinstall DASD bracket. Refer to "Replacing the 120 or 160 MHz Thin Processor Node DASD" on page 3-22
7. Reinstall the fan 1 assembly. Refer to "Replacing Fan 1" on page 3-24
8. Reinstall card guide assembly. Refer to "Replacing the 120 or 160 MHz Thin Processor Node Card Guide Bracket" on page 3-16.
9. Replace all cards and planar slot brackets back in their previous positions.
10. Reinstall the processor node top cover and tighten the six screws.
11. Refer to "Replacing a Thin Processor Node" on page 3-8 to replace the RS/6000 SP thin processor node.

Removing the 120 or 160 MHz Thin Processor Node Card Guide Bracket

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the card guide bracket from the 120 or 160 MHz thin processor node:

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node.
2. Refer to "Removing the 120 or 160 MHz Thin Processor Node Fan 4" on page 3-27 to remove fan 4.
3. Remove the three screws holding the bracket to the planar.
4. Remove the card guide bracket.
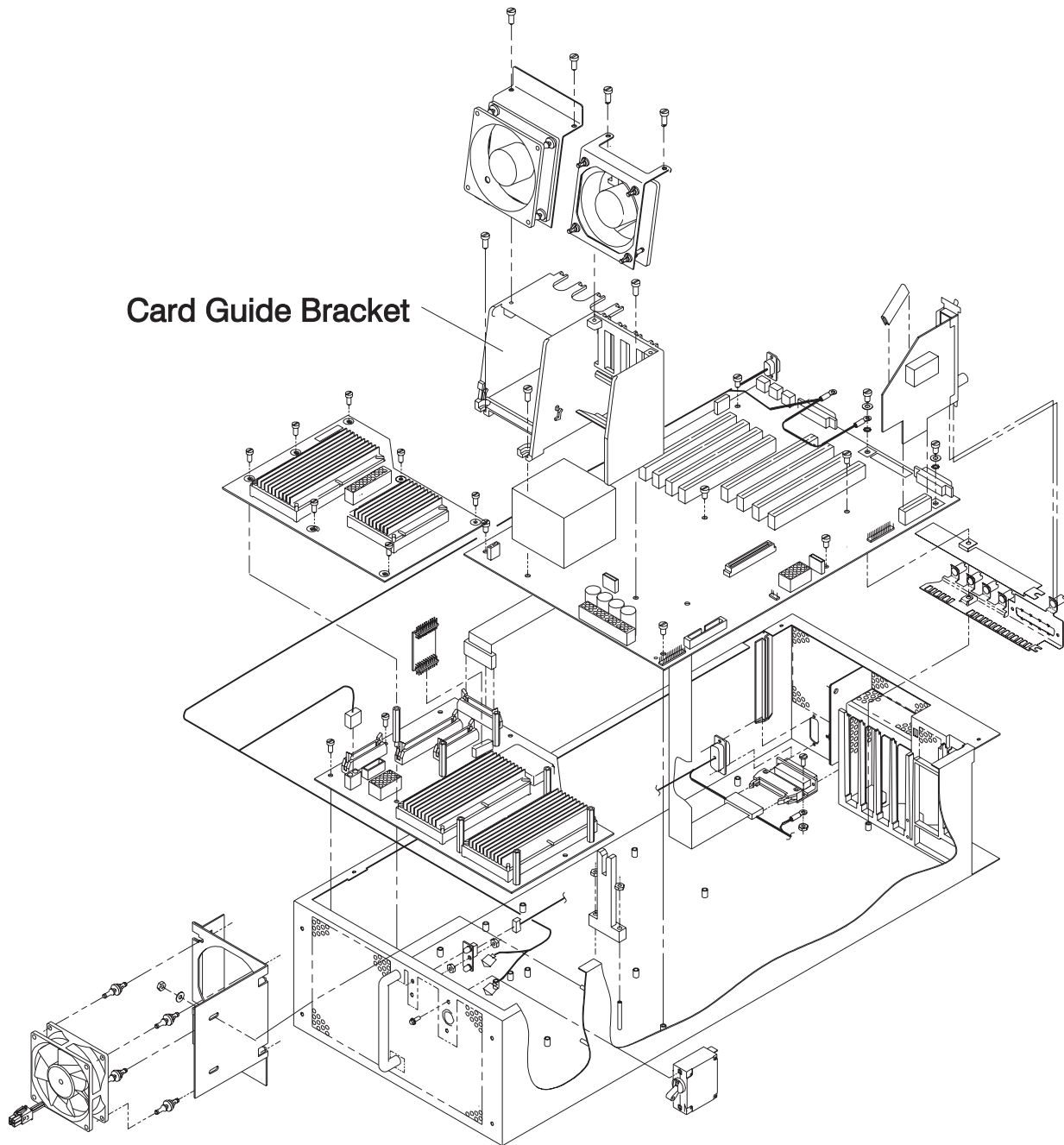
Card Guide Bracket

Figure 3-10. Removing the 120 or 160 MHz Thin Node Card Guide Bracket

Replacing the 120 or 160 MHz Thin Processor Node Card Guide Bracket

Perform these procedures to replace the card guide bracket:

1. Install the card guide bracket.
2. Install and tighten the three screws holding the bracket to the planar.
3. Refer to "Replacing the 120 or 160 MHz Thin Processor Node Fan 4" on page 3-27 to replace fan 4.
4. Refer to "Replacing a Thin Processor Node" on page 3-8 to replace the RS/6000 SP thin processor node.

Removing the Micro Channel Adapters or Ethernet Riser Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a Micro Channel adapter or Ethernet riser card:

Attention: Make sure to note which adapters are in which slots, so that all adapters are returned to their original slots.

1. Refer to "Removing a Thin Processor Node" on page 3-6, to remove the RS/6000 SP thin processor node. Remove the processor node cover by removing the screws on top of the processor node.
2. Loosen the knurled knob for this adapter at the rear of the processor node.
3. Check for internal connections to other adapter cards or cables. Be sure to note these connections before removing any.
4. If the adapter has a card extender that holds the front end of the adapter, release the extender by pressing the locking tab to the side.
5. Grasp the adapter by the pull tabs and pull out of the slot.
6. If this is an Ethernet riser card with a black grommet strip on the angled part of the card, remove the grommet strip for reinstallation on the new card.

Replacing the Micro Channel Adapters or Ethernet Riser Card

1. Check for any jumpers or switches to be set on this card, and set as appropriate.
2. If this is an Ethernet riser card and the old card had a black grommet strip, install the grommet strip on the angled part of the new riser card. Ensure that it is fully seated on the new card.
3. Align adapter in slot, then push card into slot.
4. If this card has any internal connections to other adapter cards or cables, be sure to reconnect them, as appropriate.
5. Tighten the knurled knob for this adapter at the rear of the processor node.
6. Install top cover of the processor node.
7. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor node.

Removing the DASD

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a DASD:

> **Attention**
>
> Before removing any DASDs, make sure the following steps have been performed to preserve customer data and configuration:
>
> 1. Log into the processor node as "root".
> 2. Enter **lspv** to list currently installed DASD. You should get a result like the following:
>
>     ```
>     hdisk0          0000100361ea28cf    rootvg
>     hdisk1          0000237467384004    rootvg
>     ```
>
> 3. Make sure the customer has backed up any required data from the volume group on the disk(s) to be removed. If the volume group is "rootvg", then AIX will need to be reinstalled on the processor node following DASD upgrade.
> 4. Have the customer remove the disk(s) from volume group(s) using SMIT.
> 5. Have the customer remove the disk device(s) from the system using SMIT.
> 6. Enter **lspv** to list currently installed DASD. The disk(s) removed should no longer appear.
>
>     ```
>     hdisk0          0000100361ea28cf    rootvg
>     ```
>
> 7. Enter **shutdown -F** to shutdown the processor node.

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node. Remove the processor node cover by removing the screws on top of the processor node.
2. Disconnect the power supply connector(s) from the DASDs.
3. Disconnect the SCSI cable from the DASD (if this is a 66 MHz processor).
4. Pull up the DASD frame latch.
5. Lift the DASD frame assembly out.
6. Disconnect the SCSI cable and SCSI riser card from the disk assembly (if this is a 62 MHz processor).
7. Remove the four screws from back of the DASD frame assembly, and remove the DASD.
8. If this is a Starfire DASD, there should be four standoffs and washers installed under the DASD. If so, remove them for installation on the new DASD.
9. Note position of any address jumpers near connector end of DASD, since the address jumpers must be transferred to the new DASD.

Figure 3-11. Removing the Thin Processor Node DASD

Replacing the DASD

Perform these steps to replace the thin processor node DASD:

1. Install any address jumper(s) at the appropriate positions.

   Note: If the replacement DASD is the same part number as the original, install jumpers in the original positions; otherwise, use Figure 3-12 on page 3-20.

2. Ensure all required DASD jumpers are installed. Refer to "1.1GB, 2.2GB, 4.5GB, 9.1GB (50-pin and 60-pin) Single Ended Disk Drives", in the *Adapters, Devices, and Cable Information for Micro-Channel Bus Systems*, SA38-0533, for the required jumper information.
3. If this is a Starfire DASD, install washers (1 thick or 3 thin) then standoffs into the holes in the under-side of the DASD. For a 4GB Starfire DASD, make sure a black grommet strip is installed on the angled part of the Ethernet riser card.
4. Install the DASD into the DASD frame using the four screws that were previously removed (if you are replacing a DASD).
5. Install the DASD frame into the processor node. If a SCSI cable is plugged directly into the I/O planar, pull the cable through as the DASD frame is installed to avoid cable crimping.
6. Install the power supply connector(s) into the DASD(s).
7. Install the SCSI cable to the DASD (if this is a 66 MHz processor) or SCSI riser card (if this is a 62 MHz processor).
8. Ensure that the DASD frame latch is in the locked position.
9. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor node.

1 GB, SE, Fast Only (F/C 2555)
2 GB, SE, Fast Only (F/C 2580)

(Address)
DASD 1   (0)
DASD 2   (1)
DASD 3   (2)
DASD 4   (3)
Jumper (PN 45G9800 or 93X2452)
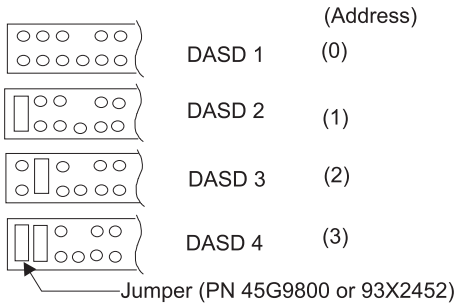
2.2 GB, SE, 50-Pin, Fast Only (F/C3031)
1 GB, SE, Fast Only (F/C2555)
1 GB, SE, Fast Only (F/C2555)
2 GB, SE, Fast Only (F/C2580)

(Address)
DASD 1   (0)
DASD 2   (1)
DASD 3   (2)
DASD 4   (3)
Jumper (PN 45G9800 or 93X2452)

1.1 GB, SE, Fast/Wide (F/C 3032)
2.2 GB, SE, Fast/Wide (F/C 3033)
4.5 GB, SE, Fast/Wide (F/C 3034)

(Address)
DASD 1   (0)
DASD 2   (1)
DASD 3   (2)
DASD 4   (3)
Jumper (PN 45G9800 or 93X2452)
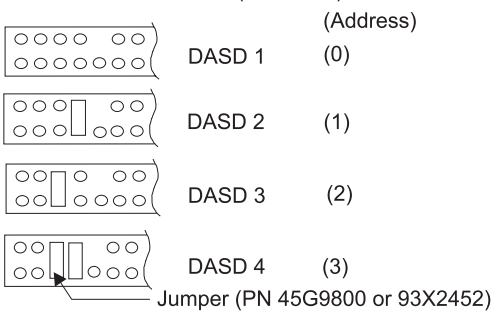
4.5 GB, Fast/Wide (F/C 3000)
9.1 GB, Fast/Wide (F/C 3010)

(Address)
DASD 1   (0)
DASD 2   (1)
DASD 3   (2)
DASD 4   (3)
Jumper (PN 45G9800 or 93X2452)
(Pins 23-24 and 31-32 must have jumpers)
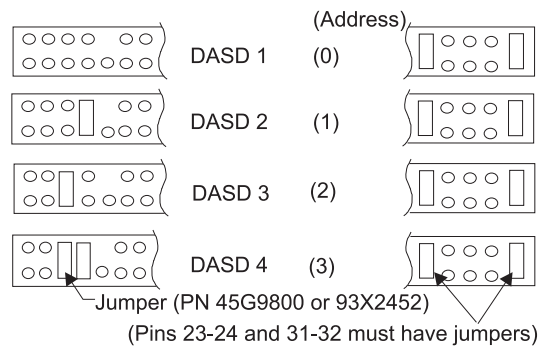
9.1 GB, SE, Ultra (F/C 2908/2909)
18.2 GB, SE, Ultra (F/C 9146/2918)

(Address)
DASD 1   (0)
DASD 2   (1)
DASD 3   (2)
DASD 4   (3)
Jumper (PN 45G9800 or 93X2452)

4.5 GB, Ultra (F/C 2900/2904)

(Address)
DASD 1   (0)
DASD 2   (1)
DASD 3   (2)
DASD 4   (3)
Jumper (PN 45G9800 or 93X2452)
(Position 8 must have jumpers)
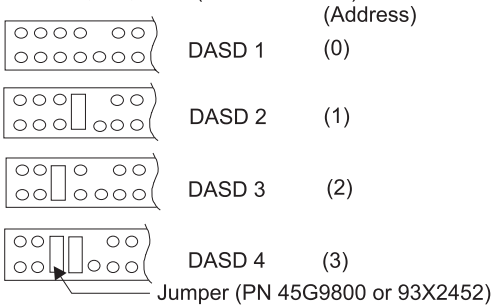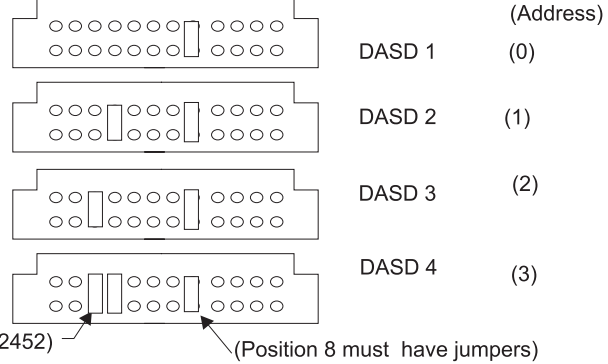
Figure   3-12. Setting the DASD Address (Note: F/C 2904, 2909, and 2918 are Mirror DASD)

Copper strip

SCSI ID Jumper
Pins 23-24 and 31-32 must have jumpers
3 2 1 0 Blank
Pin 2
Pin 1
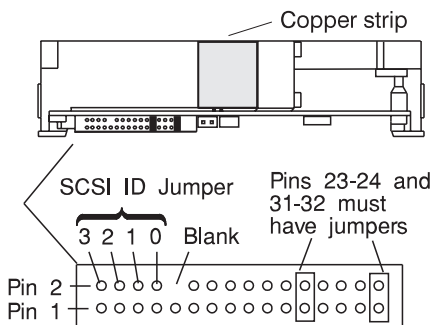
Figure   3-13. 4.5 GB DASD (F/C 3000) Jumper Locations
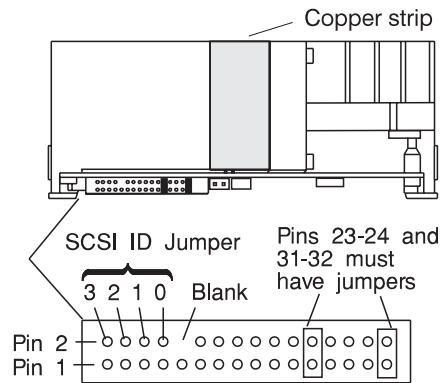
Figure 3-14. 9.1 GB DASD (F/C 3010) Jumper Locations

Removing the 120 or 160 MHz Thin Processor Node DASD

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a DASD from a 120 or 160 MHz thin processor node:

Attention

Before removing any DASDs, make sure the following steps have been performed to preserve customer data and configuration:

1. Log into the processor node as "root".
2. Enter **lspv** to list currently installed DASD. You should get a result like the following:

```
hdisk0          0000100361ea28cf    rootvg
hdisk1          0000237467384004    rootvg
```

3. Make sure the customer has backed up any required data from the volume group on the disk(s) to be removed. If the volume group is "rootvg", then AIX will need to be reinstalled on the processor node following DASD upgrade.
4. Have the customer remove the disk(s) from volume group(s) using SMIT.
5. Have the customer remove the disk device(s) from the system using SMIT.
6. Enter **lspv** to list currently installed DASD. The disk(s) removed should no longer appear.

```
hdisk0          0000100361ea28cf    rootvg
```

7. Enter **shutdown -F** to shutdown the processor node.

---

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove the RS/6000 SP thin processor node. Remove the processor node cover by removing the screws on top of the processor node.
2. Remove the two screws connecting the DASD bracket to the card guide bracket and rear I/O bracket.
3. Lift the DASD assembly out of the processor node.
4. Disconnect the power supply connector(s) from the DASDs.
5. Disconnect the SCSI cable from the DASD.
6. Remove the two screws from each side of the DASD bracket, and remove the DASD.
7. Note position of any address jumpers near connector end of DASD, since the address jumpers must be transferred to the new DASD.
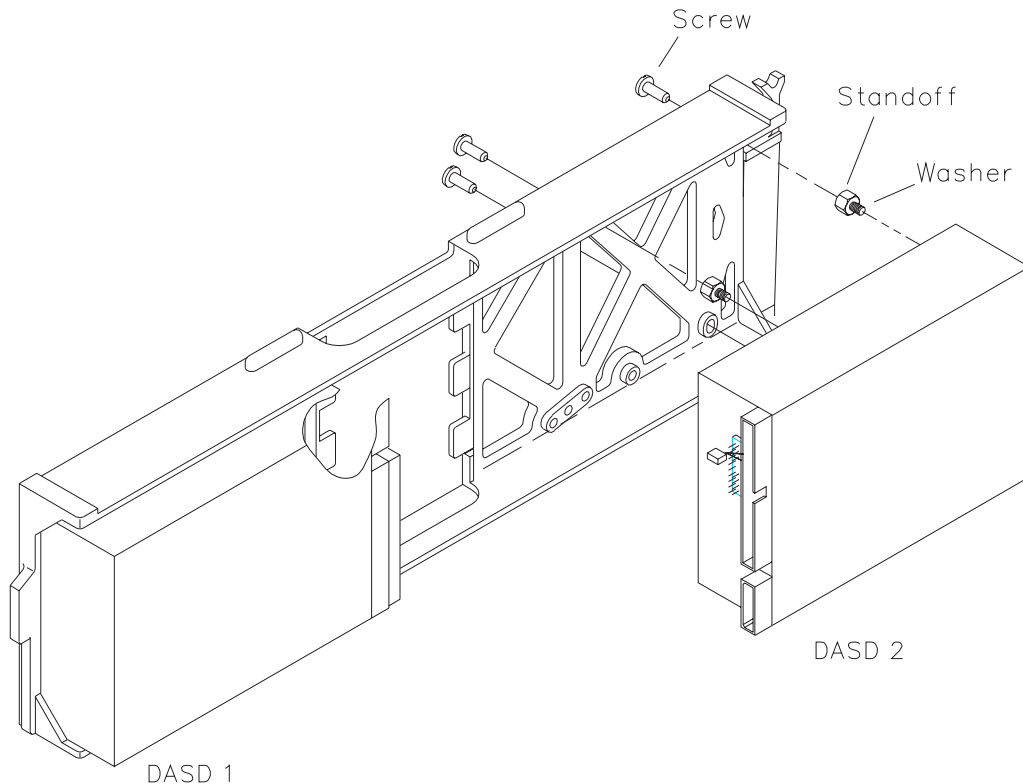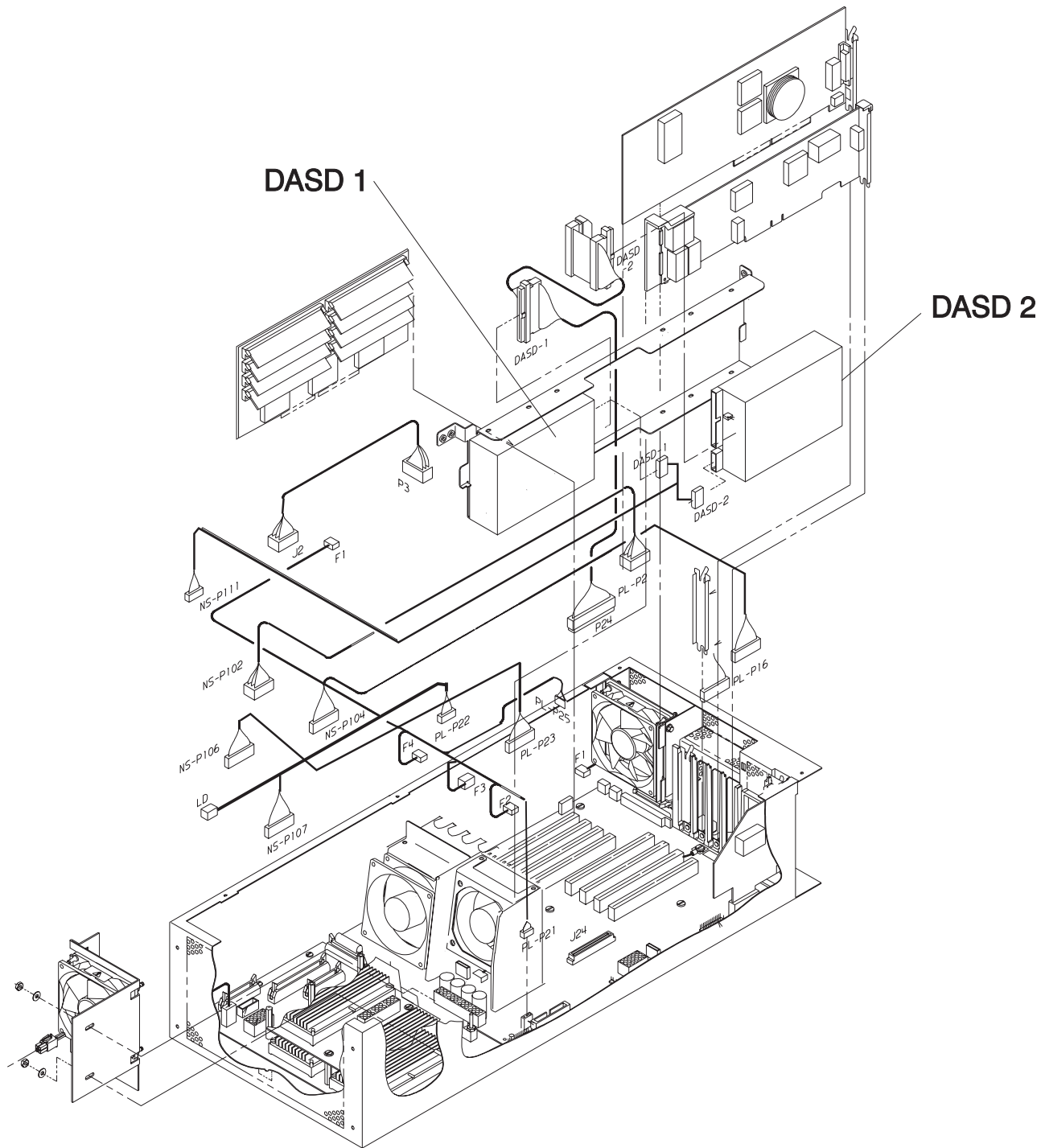
Figure 3-15. Removing the 120 or 160 MHz Thin Processor Node DASD

## Replacing the 120 or 160 MHz Thin Processor Node DASD

Perform these steps to replace the 120 or 160 MHz thin processor node DASD:

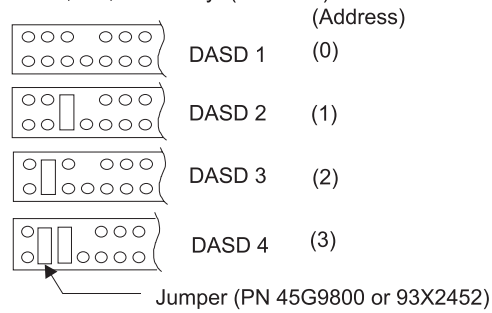1. Install any address jumper(s) at the appropriate positions.

    Note: If the replacement DASD is the same part number as the original, install jumpers in the original positions; otherwise, use Figure 3-12 on page 3-20.

2. Ensure all required DASD jumpers are installed. Refer to "1.1GB, 2.2GB, 4.5GB, 9.1GB (50-pin and 60-pin) Single Ended Disk Drives", in the *Adapters, Devices, and Cable Information for Micro-Channel Bus Systems*, SA38-0533, for the required jumper information.
3. Install the new DASD into the DASD bracket using the four screws that were previously removed.
4. Connect the SCSI cable to the DASD.
5. Install the power supply connector(s) into the DASD(s).
6. Install the DASD bracket, and tighten the two screws that were previously removed.
7. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the node.

Removing Fan 1

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove Fan 1:

1. Refer to "Removing a Thin Processor Node" on page 3-6, to remove the RS/6000 SP thin processor nodes.
2. Remove the processor node cover by loosening the six captive screws on top of the processor node.
3. Remove fan bracket retaining screw.
4. If this is a thin node 2, remove CPU card.
5. Pull upward to remove fan and fan bracket.
6. Disconnect the fan plug.
7. Disengage shock mounts from chassis to remove fan.
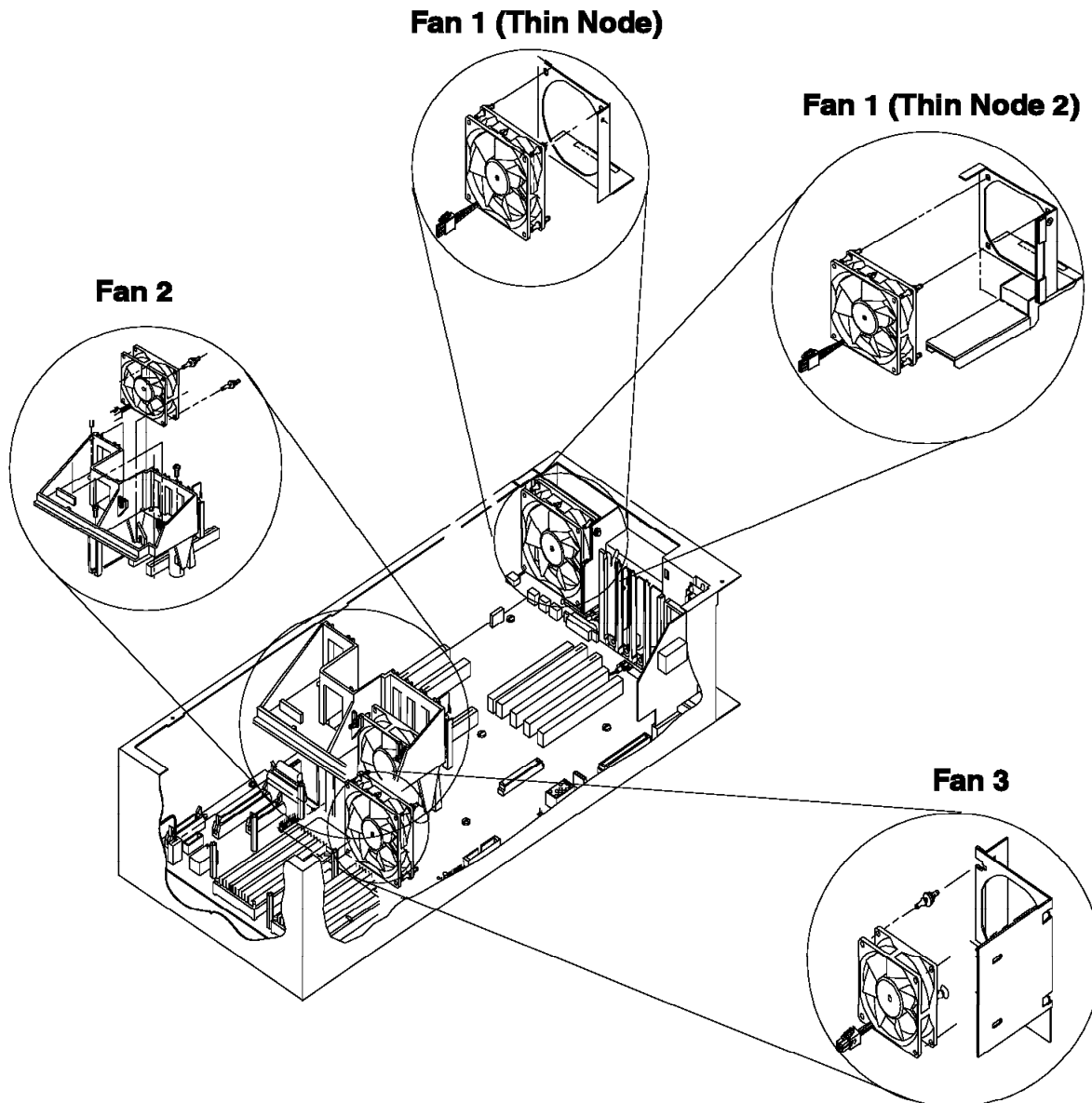
Figure   3-16. Fans 1, 2, 3 Assembly

Replacing Fan 1

1. Transfer shock mounts from old fan to new fan before reinstalling the new fan.
2. Reinstall new fan to fan bracket with wires to the bottom and the airflow indicator pointing toward bracket.
3. Connect fan plug to the Node Control Harness (**Do not connect the fan plug to the planar**).
4. Position fan bracket in orientation shown in Figure 3-16, line up bracket edge with chassis guide, then push down to locate.
5. Reinstall fan bracket retaining screw.
6. If necessary, reinstall CPU card.
7. Reinstall the processor node top cover and tighten the six captive screws.
8. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor nodes.

Removing Fan 2

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove Fan 2:

Note: Make note of card location before removing Micro Channel adapters and CPU card.

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove this processor node.
2. Remove the processor node cover by loosening the six captive screws on top of the processor node.
3. Remove Micro Channel adapters and CPU card.
4. Disconnect the fan plug.
5. Remove the shock mounts from the bracket and save for new fan.

Replacing Fan 2

1. Transfer shock mounts from old fan to new fan before reinstalling the new fan.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect Fan 2 plug.
4. Reinstall adapters and CPU card and CPU shield.
5. Reinstall the processor node top cover and tighten the six captive screws.
6. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor nodes.

Removing Fan 3

1. Refer to "Removing a Thin Processor Node" on page 3-6, to remove the RS/6000 SP thin processor nodes.
2. Remove the processor top node cover by loosening the six captive screws on top of the processor node.
3. Disconnect the fan plug.
4. Remove the four nuts which hold the bracket to the chassis.
5. Remove the bracket from the chassis.
6. Remove the shock mounts from the bracket and save for new fan.

Replacing Fan 3

1. Transfer shock mounts from old fan to new fan before reinstalling.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Reinstall bracket.
4. Reinstall the four nuts to fasten the bracket.
5. Connect Fan 3 plug.
6. Reinstall the processor node top cover and tighten the six captive screws.
7. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor nodes.

Removing the 120 or 160 MHz Thin Processor Node Fan 2

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove Fan 2 from the 120 or 160 MHz thin processor node:

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove this processor node.
2. Remove the processor node cover by loosening the six captive screws on top of the processor node.
3. Remove the two screws holding the fan mounting to card guide assembly, and remove the fan mount.
4. Disconnect the fan plug.
5. Remove the shock mounts from the bracket and save for new fan.

Replacing the 120 or 160 MHz Thin Processor Node Fan 2

1. Transfer shock mounts from old fan to new fan before reinstalling the new fan.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect Fan 2 plug.
4. Attach the fan mounting to the card guide assembly and tighten the two screws.
5. Reinstall the processor node top cover and tighten the six captive screws.
6. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor nodes.
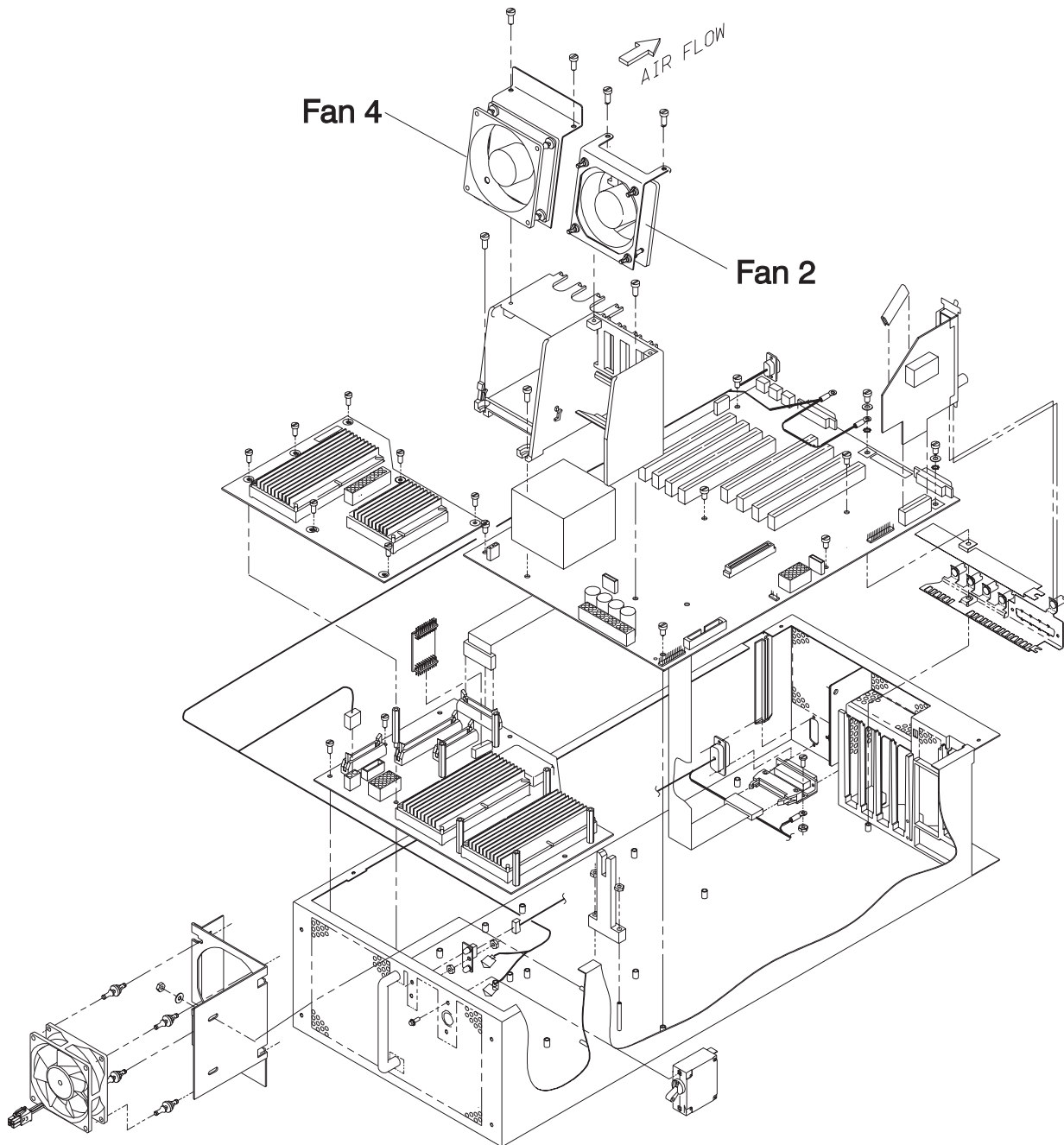
Figure   3-17. Removing the 120 or 160 MHz Thin Node Fans 2 and 4

Removing the 120 or 160 MHz Thin Processor Node Fan 4

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove Fan 4 from the 120 or 160 MHz thin processor node:

1. Refer to "Removing a Thin Processor Node" on page 3-6 to remove this processor node.
2. Remove the processor node cover by loosening the six captive screws on top of the processor node.
3. Remove the two screws holding the fan mounting to card guide assembly, and remove the fan mount.
4. Disconnect the fan plug.
5. Remove the shock mounts from the bracket and save for new fan.

Replacing the 120 or 160 MHz Thin Processor Node Fan 4

1. Transfer shock mounts from old fan to new fan before reinstalling the new fan.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect Fan 4 plug.
4. Attach the fan mounting to the card guide assembly and tighten the two screws.
5. Reinstall the processor node top cover and tighten the six captive screws.
6. Refer to "Replacing a Thin Processor Node" on page 3-8, to replace the RS/6000 SP thin processor nodes.

Procedures for Wide Processor Nodes

Attention: Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers. (See "Personal ESD Requirements" on page xviii for more details.) Do not touch the pins or circuitry on these components.

Opening a Wide Processor Node

Note: The RS/6000 SP processor nodes do not have to be removed from the frame for service. The wide processor node will slide out on rails and lock into place for easy access to components.

If required, use step ladder P/N 46G5947 or step stool P/N 93G1147.

CAUTION:

When using a step ladder or step stool, be sure that the work surface is level and the step ladder or step stool is in good working order.

CAUTION:

Due to the weight of each wide node, use care when sliding and closing wide processor nodes above shoulder height.

Perform the following procedures to slide the wide processor node out into the service position:

1. If there are nodes immediately above the wide node processor being serviced, install circuit breaker protection cover(s) (p/n 04H9439, in ship group) on the node(s) above (two covers on two thin nodes or one cover on one wide node).

Attention: Be very careful when installing the circuit breaker cover, because the circuit breaker is spring-loaded towards the Off position. Accidentally putting a circuit breaker in the Off position could impact customer applications.

2. Ensure that the processor node is offline (shutdown) from the control workstation and powered off from the control workstation.
3. Observe processor node for blinking green light. Turn the processor node front panel power switch to Off ('0').
4. Remove all attached cables in the rear of the wide processor node.
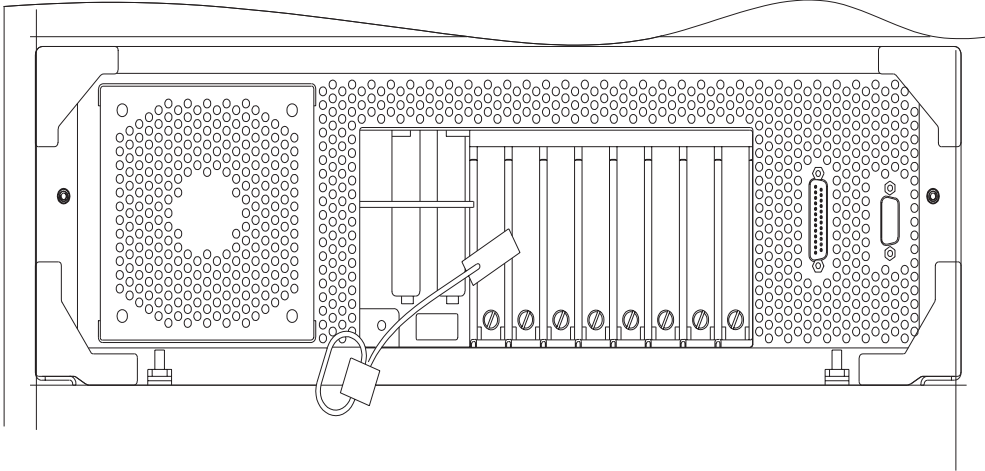
Figure   3-18. Opening a Wide Processor Node Drawer

5. When removing the 48-volt cable connector at J8, place protective cover p/n 48G3055 (from ship group) over the plug end.
6. Remove the drawer release screws located at the rear of the processor node (in the center, on both sides).

CAUTION:

Do not remove the drawer case mounting screws at the bottom of both sides.

7. Remove all front retaining screws that hold the processor node in place.
8. Pull the processor node from the front of the frame into the service position.
9. Install the stiffeners (p/n 93G1058) on each side of the processor node drawer.
10. Return to the procedure that directed you here.
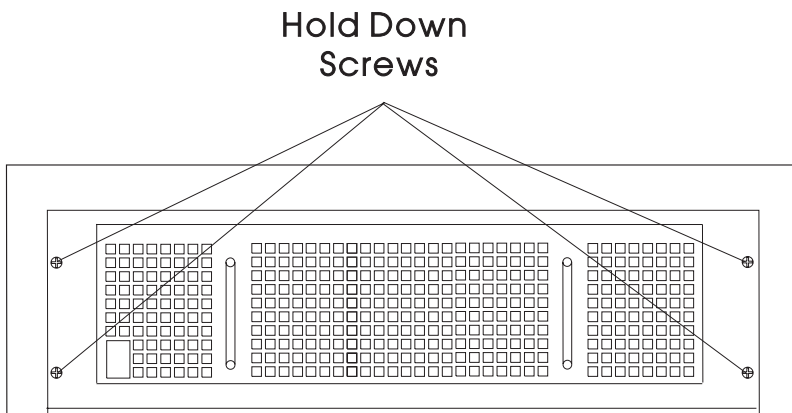
Figure   3-19. Wide Processor Node From Front of Frame

Closing a Wide Processor Node

Perform the following procedures to close a wide processor back into the frame:

1. Remove the stiffeners (p/n 93G1058) from each side of the processor node drawer. Store stiffeners (and ladder or step stool, if used) with the ship group tools.
2. Release slide latch mechanism.
3. Close the processor node from the front of the frame.

   CAUTION:

   Once the latch is released, push the drawer closed. Do not pull, as the drawer may disengage from the rails, creating a safety hazard.

4. Reinstall all hold-down screws that hold the front of the wide processor node.
5. Reinstall the drawer release screws located at the rear of the processor node.
6. Reattach all cables in the rear of the processor node.
7. Remove protective cover p/n 48G3055 from the cable end and install the 48-volt power cable in J8. (Ensure that the alignment arrow is pointing at the top of the connector.) Store protective cover with the ship group tools.
8. Put the circuit breaker at the front of the processor node in the On ('1') position.
9. Remove circuit breaker protection cover(s) (p/n 04H9439) from the node(s) immediately above and return them to the ship group.
10. Return to the procedure that directed you here.

Removing the Node Supervisor Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a wide node supervisor card:

1. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
2. Remove the power compartment cover by loosening the two screws.
3. From the rear of the wide processor node, remove the two screws holding the supervisor card.
4. Slide out the supervisor card.
5. Disconnect the following cables from the supervisor card:
   J102, JS37, JS39
6. Remove supervisor card from chassis.
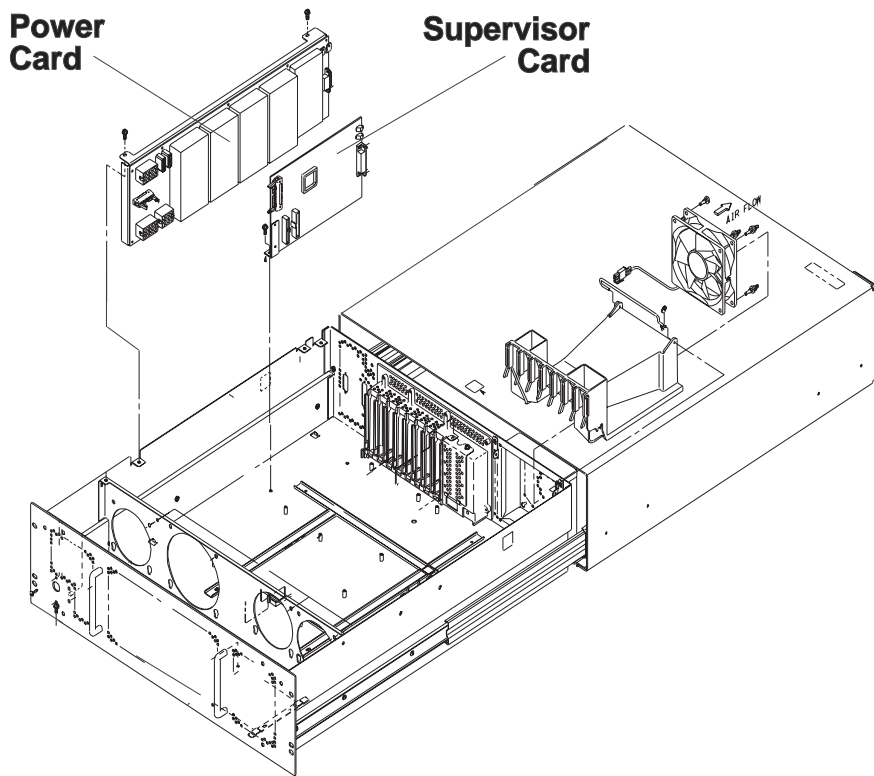
Figure 3-20. Wide Node Supervisor Card and Power Card

Replacing the Node Supervisor Card

Perform these procedures to replace a node supervisor card:

1. Reattach the following cables to the supervisor card:
     J102, JS37, JS39

   Note: Check that wires are not pinched under the node supervisor card.

2. Slide the supervisor card back into the rear of the wide processor node.
3. Reinstall the two screws to hold the supervisor card.
4. Reinstall the power compartment cover and tighten the two screws.
5. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.

Removing the Power Card

Perform these procedures to remove a wide processor node power card:

1. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
2. Remove the power compartment cover by loosening the two captive screws.
3. From the rear of the wide processor node, remove the two screws holding the power card bracket.
4. Disconnect the following cables from the power card:
     J1, J2, J40, J60, J13, J16, J45, J65
5. Remove power card from processor node.

Replacing the Power Card

Perform these procedures to replace a wide processor node power card:

1. Reattach the following cables to the power card:
   J1, J2, J40, J60, J13, J16, J45, J65
2. Reinstall the power card into the power card bracket.
3. Reinstall the power card bracket into the rear of the wide processor node.
4. Reinstall the two screws to hold the power card bracket.
5. Reinstall the power compartment cover and tighten the two captive screws.
6. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.

Removing the 135 MHz Wide Processor Node V dc Convert Daughter Card

Perform these procedures to remove a 135 MHz wide processor node V dc convert daughter card:

1. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
2. Remove the screw holding the V dc convert daughter card to the Micro Channel tailgate.
3. Remove the card.
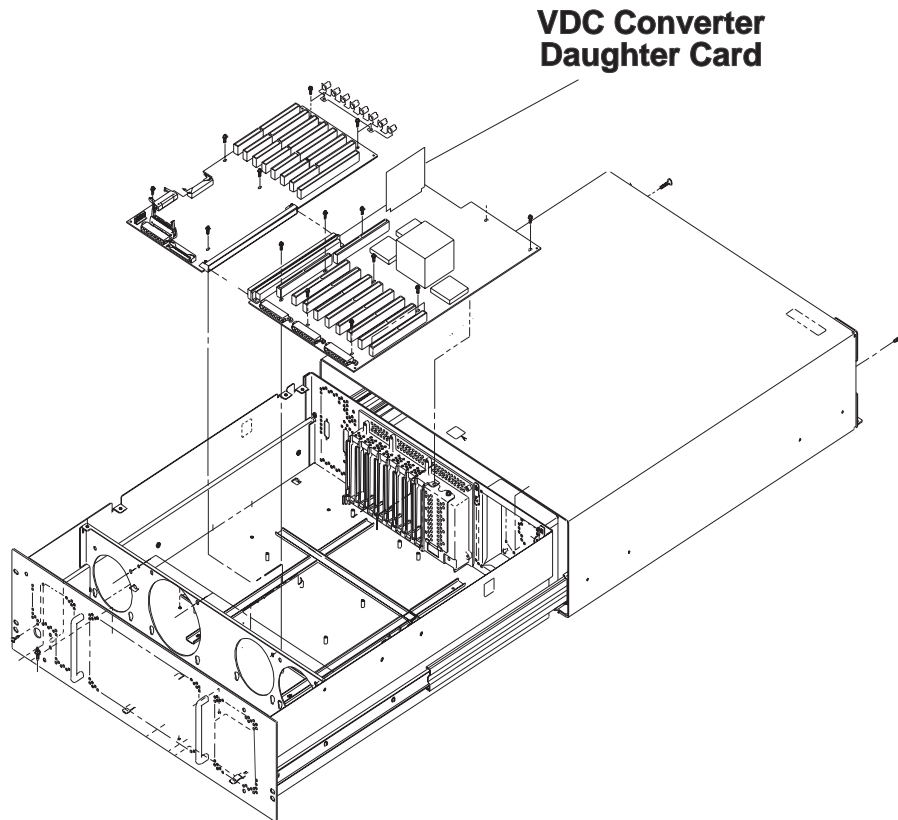
Figure 3-21. Removing the 135 MHz Wide Node V dc Convert Daughter Card

Replacing the 135 MHz Wide Processor Node V dc Convert Daughter Card

1. Reinstall the V dc convert daughter card.
2. Reinstall the screw holding the card to the Micro Channel tailgate.
3. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.

Removing the CPU and I/O Planar Cards

Attention: The CPU card ID will change when replacing a CPU card. Inform the Customer, **before** removing and replacing the CPU card, that some software applications that use the machine ID number for licensing purposes may be impacted by this change.

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6, before removing or replacing CPU or I/O planar cards in this system.

Perform these procedures to remove the CPU and I/O planar cards:

1. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
2. If this is a 135 MHz wide node, refer to "Removing the 135 MHz Wide Processor Node V dc Convert Daughter Card" on page 3-31.
3. Remove the card retainers.
4. Disconnect Fan 5 cable.
5. Remove the divider assembly and the divider that is located near the frame supervisor card.
6. Remove all memory and I/O cards.

   Note: Make note of card location before removing Micro Channel adapters and CPU card.

7. Disconnect the CPU planar power cables, the I/O planar power cables, and all other cables connected to the I/O and CPU planar card.

   CPU Card   J13, J14, J16

   I/O Planar   J03, J38, J39, J40, J41

8. Remove all sixteen screws that hold down the I/O and CPU planar cards. **Note the position of the ground spring**.
9. Lift out the I/O and CPU planar card. At this time, you can separate the two cards and replace accordingly.

   CAUTION:
   The ground strip may have sharp edges.

I/O Planar Card
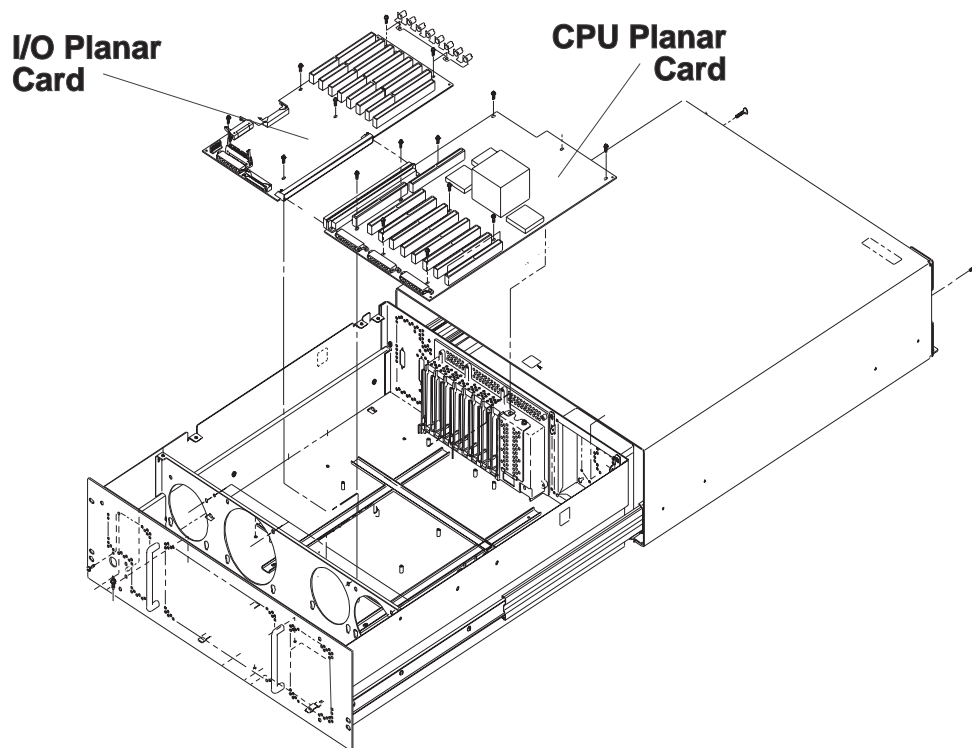
CPU Planar Card

Figure   3-22. Wide Node CPU and I/O Planar Cards

Replacing the CPU and I/O Planar Cards

Attention: The CPU card ID will change when replacing a CPU card. Inform the Customer, **before** removing and replacing the CPU card, that some software applications that use the machine ID number for licensing purposes may be impacted by this change.

Note: Inform the customer that time and date need to be reset after planar replacement.

Perform these procedures to replace the CPU and I/O planar cards:

1. Replace the I/O or CPU Planar card, depending on which component needed replacement.
2. Replace the sixteen screws that hold down the I/O and CPU cards in the card guide frame.
3. Plug the CPU and I/O planar cards together and then reinstall them as one unit into the chassis.
4. Reconnect the CPU planar power cables, the I/O planar power cables, and all other cables connected to the Micro Channel and CPU planar card.

   CPU Card   J13, J14, J16

   I/O Planar   J03, J38, J39, J40, J41

5. Replace all memory and Micro Channel cards in their original positions.
6. Replace the divider assembly and the divider that is located near the frame supervisor card.
7. Reinstall card retainers.
8. If this is a 135 MHz wide node, refer to "Replacing the 135 MHz Wide Processor Node V dc Convert Daughter Card" on page 3-32.
9. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.

Removing the Memory Card

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the wide processor node memory card:

1. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
2. Remove memory card retainer.
3. Remove the card by pulling on the top edge of the card.
4. For more information on exchanging memory SIMMs, refer to "Exchanging Memory SIMMs for Memory Upgrade" in *RS/6000 SP: Maintenance Information Volume 1*.

Attention: The latches on the SIMM connectors break easily, use care when handling.

Replacing the Memory Card

1. Align the card with front and rear guides and connector. Press the card down into connectors.
2. Reinstall memory card retainer.
3. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.

Removing the Micro Channel Adapters

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a Micro Channel adapter:

Make sure to note which adapters are in which slots, so that all adapters are returned to their original slots.

1. Loosen the knurled knob for this adapter at the rear of the processor node.
2. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
3. Remove Micro Channel card retainer.
4. Check for internal connections to other adapter cards or cables. Be sure to note these connections before removing.
5. If the adapter has a card extender (holding the front end of the adapter), release the extender by pressing the locking tab to the side.
6. Grasp the adapter by the pull tabs and pull out of the slot.

Replacing the Micro Channel Adapters

1. Align adapter in slot, then push card into slot.
2. If this card has any internal connections to other adapter cards or cables, be sure to reconnect them, as appropriate.
3. Check for any jumpers or switches to be set on this card, and set as appropriate.
4. Reinstall Micro Channel card retainer.
5. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.
6. Tighten the knurled knob for this adapter at the rear of the processor node.

Removing the DASD

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove a DASD (fixed disk).

```
┌─ Attention ─────────────────────────────────────────────────────────────┐
│                                                                          │
│ Before removing any DASDs, make sure the following steps have been performed to preserve cus- │
│ tomer data and configuration:                                            │
│                                                                          │
│  1. Log into the processor node as "root".                              │
│  2. Enter lspv to list currently installed DASD. You should get a result like the following: │
│                                                                          │
│        hdisk0          0000100361ea28cf    rootvg                        │
│        hdisk1          0000237467384004    rootvg                        │
│                                                                          │
│  3. Make sure the customer has backed up any required data from the volume group on the disk(s) to │
│     be removed. If the volume group is "rootvg", then AIX will need to be reinstalled on the processor │
│     node following DASD upgrade.                                          │
│  4. Have the customer remove the disk(s) from volume group(s) using SMIT. │
│  5. Have the customer remove the disk device(s) from the system using SMIT. │
│  6. Enter lspv to list currently installed DASD. The disk(s) removed should no longer appear. │
│                                                                          │
│        hdisk0          0000100361ea28cf    rootvg                        │
│                                                                          │
│  7. Enter shutdown -F to shutdown the processor node.                    │
│                                                                          │
└──────────────────────────────────────────────────────────────────────────┘
```

Note: The top DASD shelf has to be removed to access the bottom DASD.

1. Refer to "Opening a Wide Processor Node" on page 3-27 to slide out the processor node.
2. Disconnect cables at the DASD(s).
3. Loosen the two screws that hold the bracket to the chassis.
4. Slide out the bracket.
5. Remove the four screws (or standoffs) holding the DASD to the bracket, then slide out the DASD.
6. Note the position of any address jumpers near the connector end of the DASD, these address jumpers must be transferred to the new DASD.
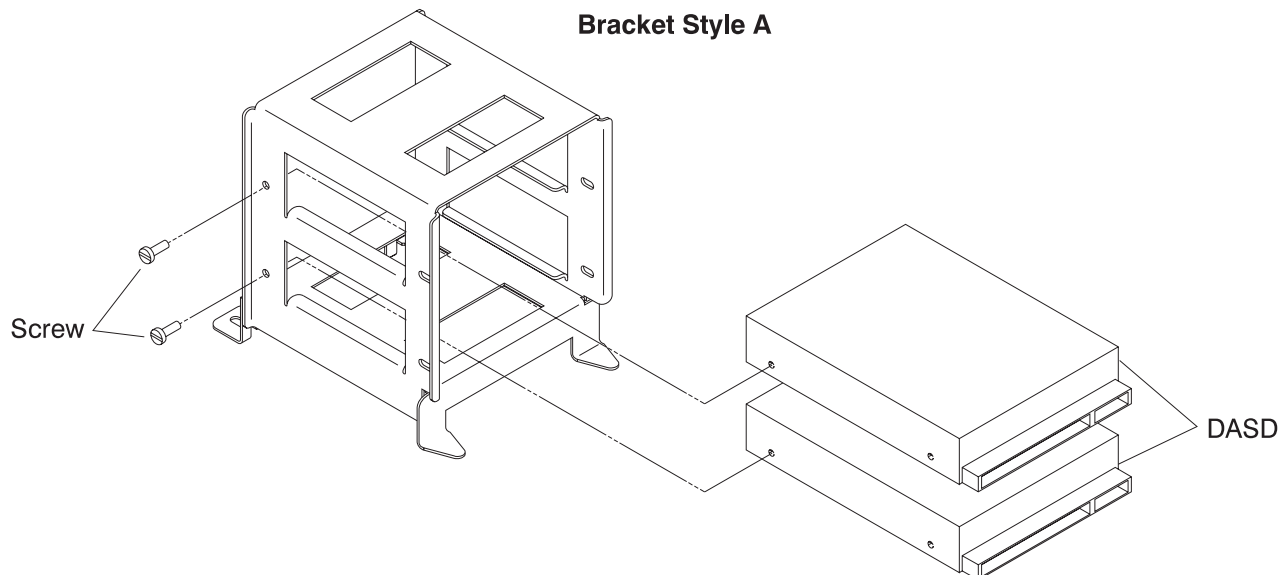
Figure 3-23. Removing the Wide Processor Node DASD (Bracket Style A)

Bracket Style B   **Bracket Style C**
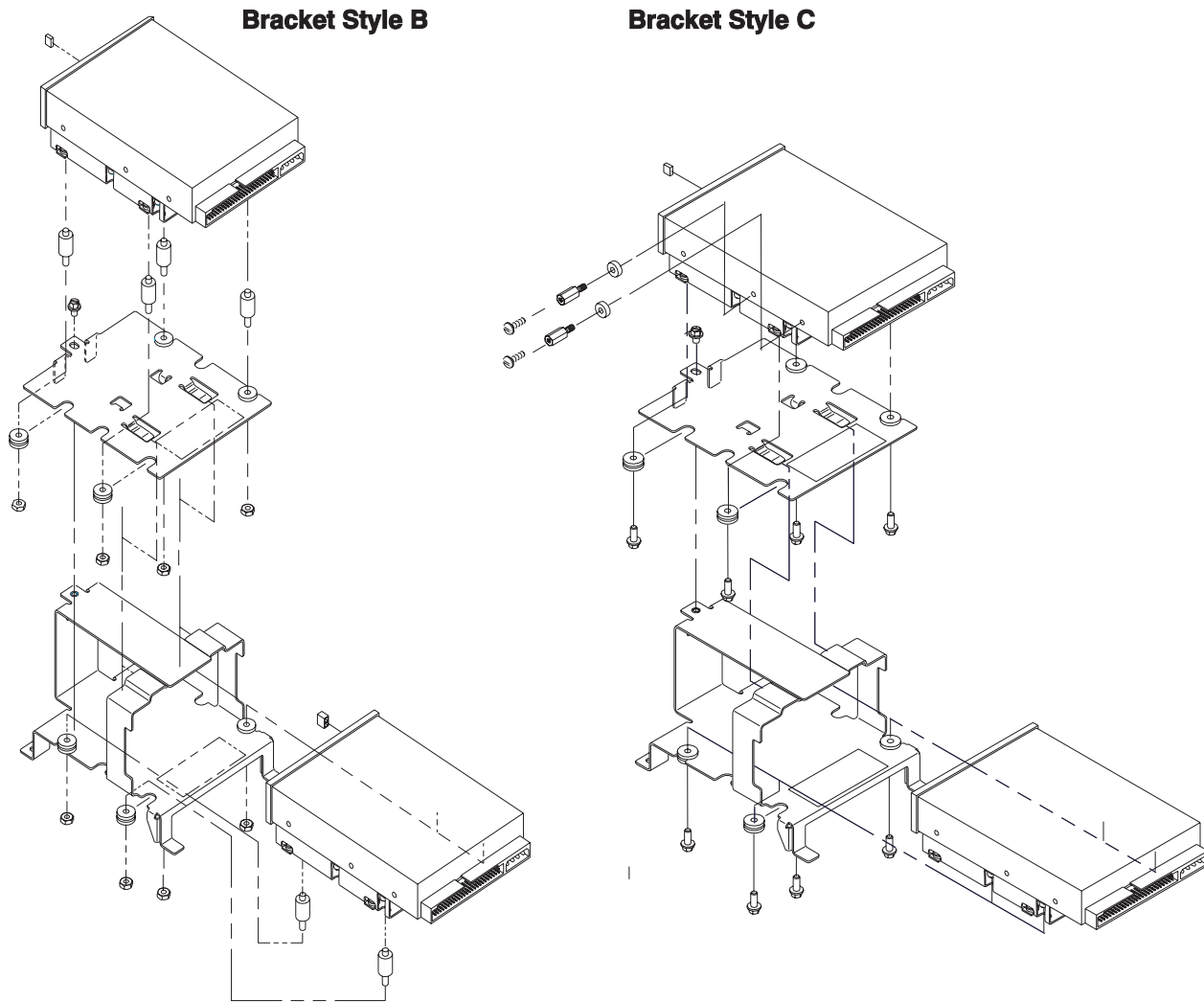
Figure   3-24. Removing the Wide Processor Node DASD (Bracket Style B and C)

Replacing the DASD

Perform the following steps to replace a DASD (fixed disk).

1. Install any address jumper(s) at the appropriate positions.

   Note: If the replacement DASD is the same part number as the original, install jumpers in the original positions; otherwise, use Figure 3-12 on page 3-20.

2. Ensure all required DASD jumpers are installed. Refer to "1.1GB, 2.2GB, 4.5GB, 9.1GB (50-pin and 60-pin) Single Ended Disk Drives", in the *Adapters, Devices, and Cable Information for Micro-Channel Bus Systems*, SA38-0533, for the required jumper information.
3. Install the DASD to the bracket using four screws (or standoffs).
4. Install the bracket to the chassis by tightening the two screws.
5. Reconnect DASD cables.
6. Refer to "Closing a Wide Processor Node" on page 3-29 to slide in the processor node.

Removing Fan 1

Perform these procedures to remove Fan 1:

1. Refer to "Opening a Wide Processor Node" on page 3-27.
2. Remove the two power compartment cover screws and remove cover.
3. Locate and disconnect the fan plug.
4. Disengage shock mounts from fan frame to remove fan.

Replacing Fan 1

1. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
2. Connect the fan plug.
3. Reinstall the power compartment cover and then reinstall the two screws.
4. Refer to "Closing a Wide Processor Node" on page 3-29.

Figure 3-25. Wide Node Fans

Removing Fan 2

Perform these procedures to remove Fan 2:

1. Refer to "Opening a Wide Processor Node" on page 3-27 to open this processor node.
2. Locate and disconnect the fan plug.
3. Remove the shock mounts from the bracket and save for new fan.

Replacing Fan 2

1. Transfer shock mounts from old fan to new fan before reinstallation.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect Fan 2 plug.
4. Refer to "Closing a Wide Processor Node" on page 3-29.

Removing Fans 3 or 4

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove Fan 3 or Fan 4:

1. Refer to "Opening a Wide Processor Node" on page 3-27.
2. Remove the memory card retainer and memory cards.
3. Locate and disconnect the fan plug.
4. Remove the shock mounts from the bracket and save for new fan.

Replacing Fans 3 or 4

1. Transfer shock mounts from old fan to new fan before reinstalling.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect the fan plug.
4. Replace the memory cards and their retainer.
5. Refer to "Closing a Wide Processor Node" on page 3-29.
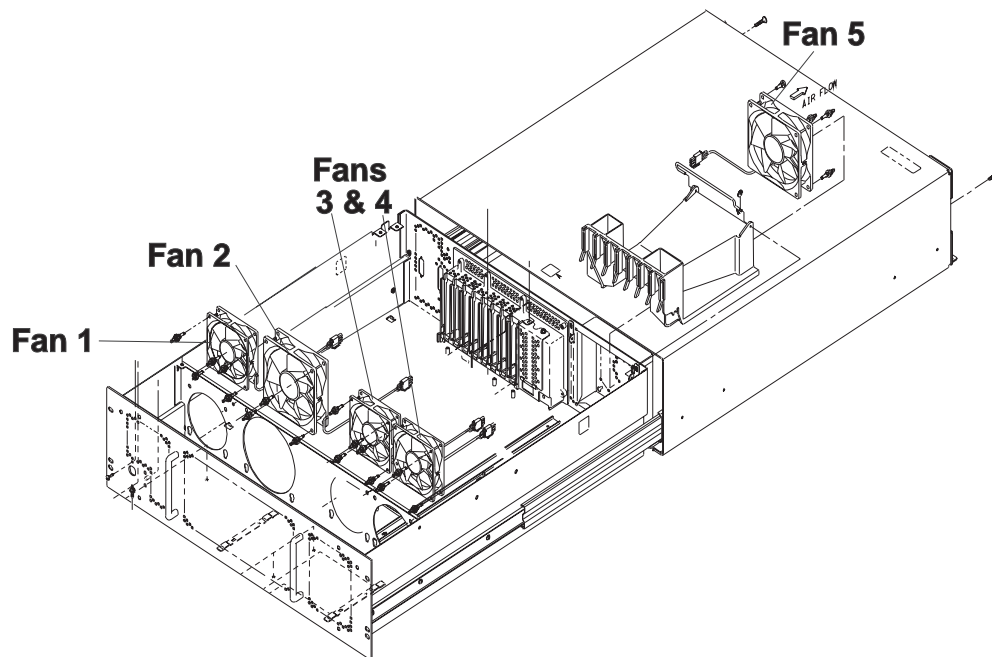
Removing Fan 5

Perform these procedures to remove Fan 5:

1. Refer to "Opening a Wide Processor Node" on page 3-27.
2. Lift air baffle covering the rear of the CPU Planar.
3. Locate and disconnect the fan plug.
4. Disconnect the shock mounts from the rear of the chassis by closing the processor node. To remove the fan, reopen the processor node.

Replacing Fan 5

1. Transfer shock mounts from old fan to new fan before reinstalling.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect the fan plug.
4. Lower air baffle back into place.
5. Refer to "Closing a Wide Processor Node" on page 3-29.

Procedures for 604 or 604e High Processor Nodes

These procedures cover the removal and replacement of 604 or 604e high processor node components.

Removing the Node Front Access Plate

1. Ensure ESD antistatic wrist device is attached.
2. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
3. Place both circuit breaker assembly switches in the Off ('0') position.
4. Remove the hex head retainer screws from the front of the node. Retain the screws.
5. Remove the front access plate.
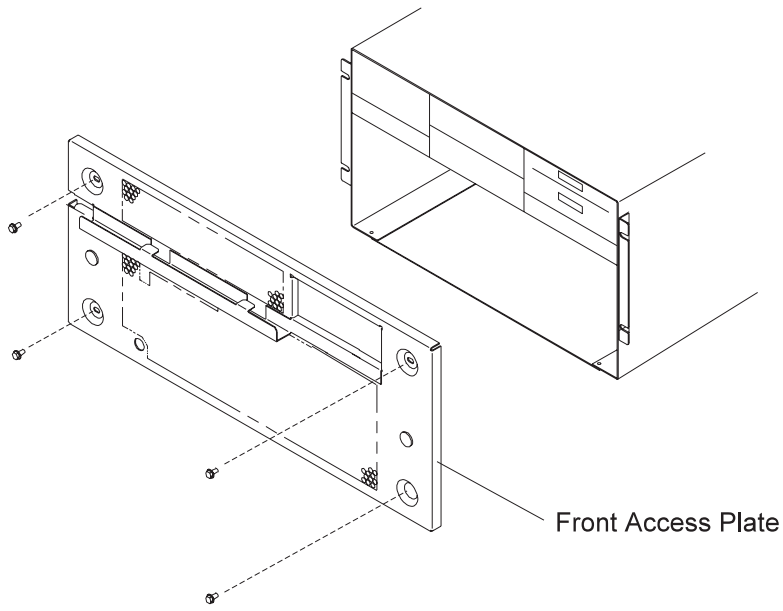
Front Access Plate

Figure 3-26. Removing the 604 or 604e High Node Front Access Plate

Replacing the Node Front Access Plate

1. Ensure ESD antistatic wrist device is attached.
2. Replace the front access plate in the front of the node and secure with the hex head screws that were previously removed.
3. Place both circuit breaker assembly switches in the On ('1') position.
4. Perform "Updating the Node Supervisor Code" on page 2-21.

Removing the Media Module

1. Perform "Removing the Node Front Access Plate" on page 3-38.
2. Disconnect the operator panel cable (push the connector tabs away from the center of the connector).
3. Disconnect the media power cable.
4. **604e only**– Disconnect the two supervisor data cables.
5. Disconnect the SCSI cable:

SCSI Cable (604 only)   DASD   Supervisor Card Connectors

Operator Panel Cable

Media Power Cable
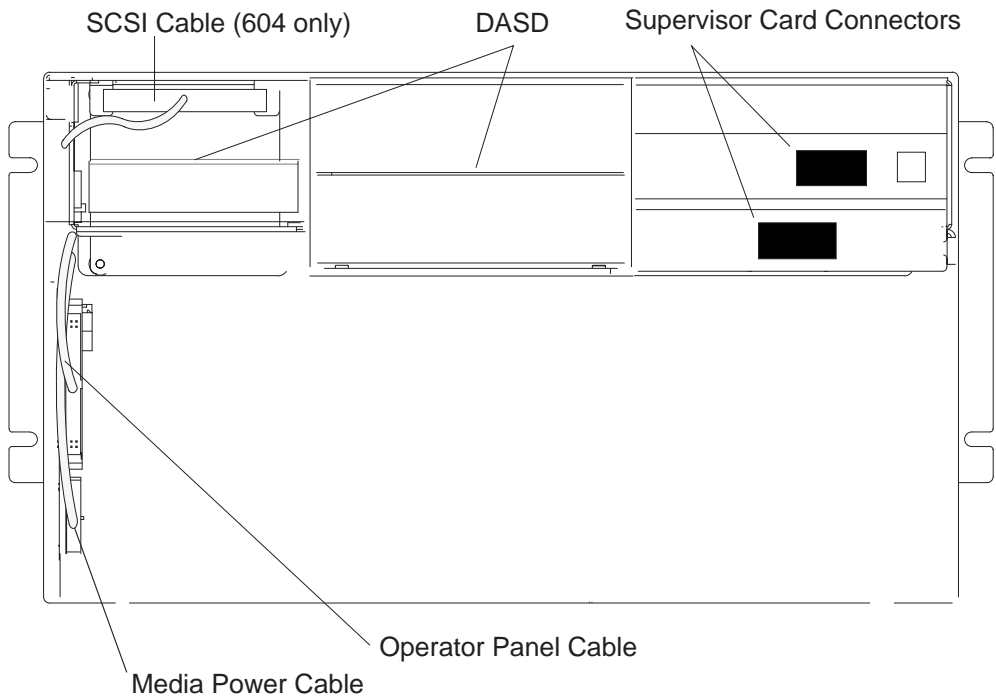
Figure 3-27. Removing the 604e High Node Media Module

- **604 High Nodes** – Remove the connector on the front of the DASD.

- **604e High Nodes** – Slide the media module toward you until you can access the bottom of the disk drive docking connector card, then remove the SCSI cable connector from the bottom of the docking connector card.

604e SCSI Cable Connector

Front of Media Module

Bottom of Media Module

Disk Drive Docking Connector Card

Rear of
Media Module
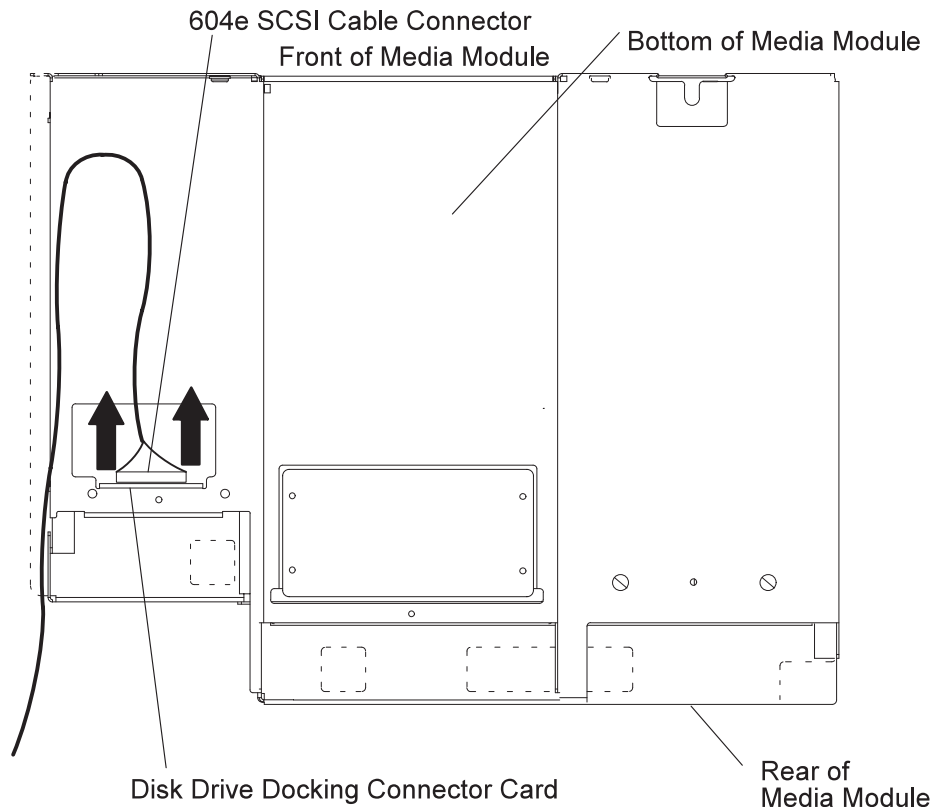
Figure   3-28. Removing the 604e High Node Media Module

6. Slide the media module toward you until you can place your hand under it, then slide the media module out of the node chassis.
7. Place the media module on a stable surface.

Replacing the Media Module

1. Ensure ESD antistatic wrist device is attached.
2. SCSI cable:

   - 604 nodes–Slide the media module in completely, then reconnect the SCSI cable.

   - 604e nodes–Slide the module part-way in, re-attach the SCSI connector to the bottom of the module, then slide the module in completely.

3. Reconnect the media power cable.
4. Reconnect the operator panel cable.
5. Reconnect the two supervisor data cables.
6. Perform "Replacing the Node Front Access Plate" on page 3-39.

Removing the Media Module Fans

1. Perform "Removing the Media Module" on page 3-39.
2. Disconnect the fan power cable for the fan you are removing.
3. Remove all four vibration isolators by pulling the fan, either downward or away from the media module, until the vibration isolators disengage from either the fan or the media module. See Figure 3-29 on page 3-42 and Figure 3-30 on page 3-43.
4. Pull the fan out of (or away from) the media module.

Fan # 7

Fan # 5
(not shown)

Fan # 6

Media Module

Fan Power
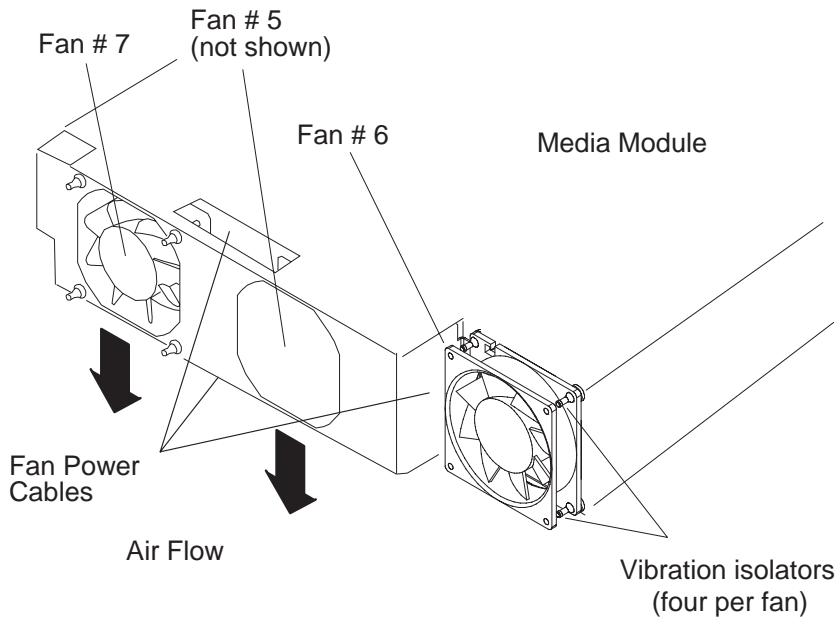Cables

Air Flow

Vibration isolators
(four per fan)

Figure   3-29. Removing the 604 or 604e High Node Media Module Fan

Replacing the Media Module Fans

 1. Ensure ESD antistatic wrist device is attached.
 2. Replace the vibration isolators.
    a. Check the direction of the air flow marked on the fan, then place the long end of the vibration isolator through the mounting hole of the fan.
    b. Pull the long end of the vibration isolator through the mounting hole until the center ring of the vibration isolator is against the fan.
    c. Repeat the two previous steps until all four vibration isolators are mounted on the fan.
    d. Place the short end of each vibration isolator through the mounting holes of the fan mounting bracket. If you are replacing a fan that mounts inside the media module, slide the fan inside the media module, then pull each short end of the vibration isolators through the fan mounting bracket.
    e. Pull the short end of each vibration isolator through the mounting holes of the fan mounting bracket until the center ring of the vibration isolator is against the bracket.
 3. Reinstall the fan into the media module.
 4. Reconnect the fan power cable.
 5. Reconnect the operator panel cable.
 6. Perform "Replacing the Media Module" on page 3-41.

Fans
(not shown)

Media Module

Vibration Isolators
(four per fan)

Fan Mounting
Bracket

Short End of
Vibration Isolator

Center Ring of
Vibration Isolator

Long End of
Vibration Isolator
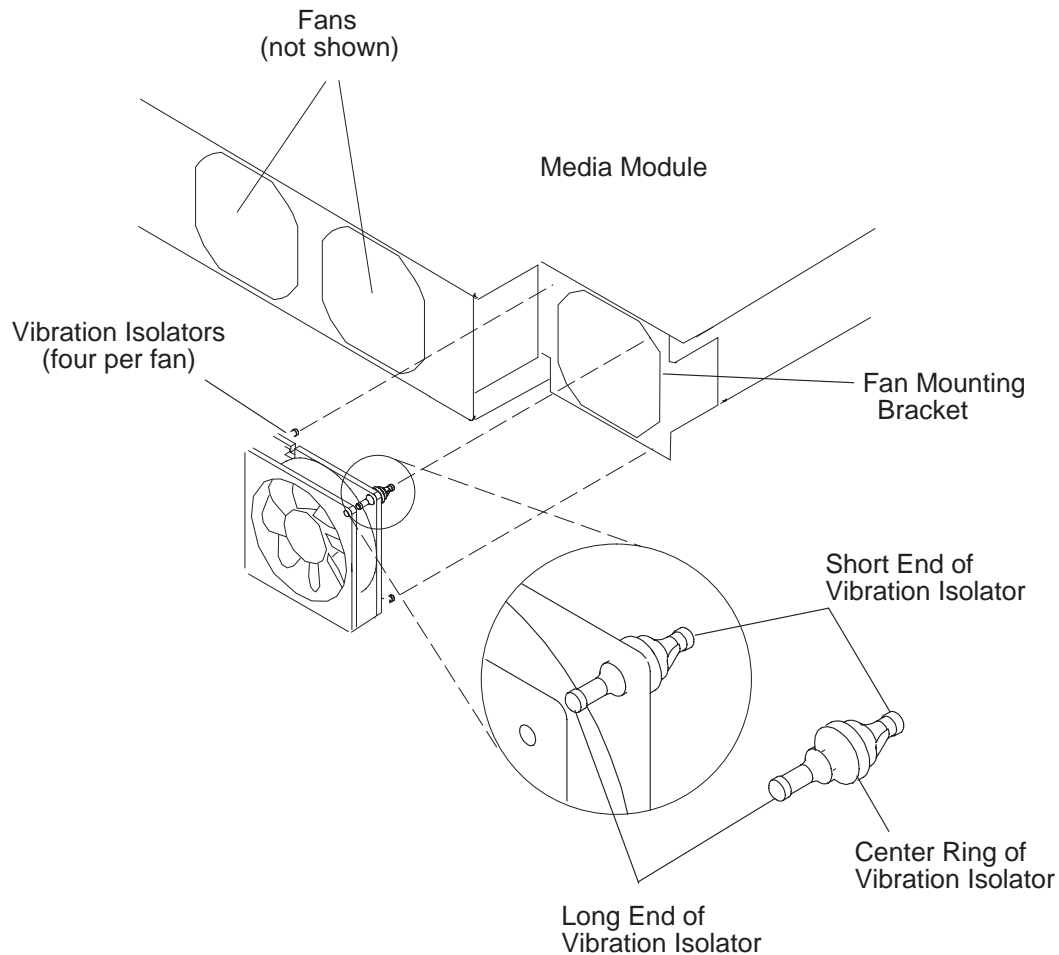
Figure   3-30. Replacing the 604 or 604e High Node Media Module Fan

Removing the Media Module Cables and Docking Connector Cards

Notes:

1. If you are removing the **SCSI cable** connected to the disk drive and media docking cards, perform steps 1-10 .

2. If you are removing the **disk drive docking connector card**, perform steps 1-3 , 5-6 , and 12- 14.

3. If you are removing the **power cable cluster**, perform steps 1-9 , 11-12 , and 15.

1. Perform "Removing the DASD" on page 3-83.
2. Perform "Removing the Media Module" on page 3-39.
3. Place the media module upside-down on a stable surface with the rear of the media module facing you.
4. If you are removing the SCSI cable connected to the media and disk drive docking cards, remove the two mounting screws attaching the SCSI connector in the front of the disk drive position (604e high nodes do not have this connector).

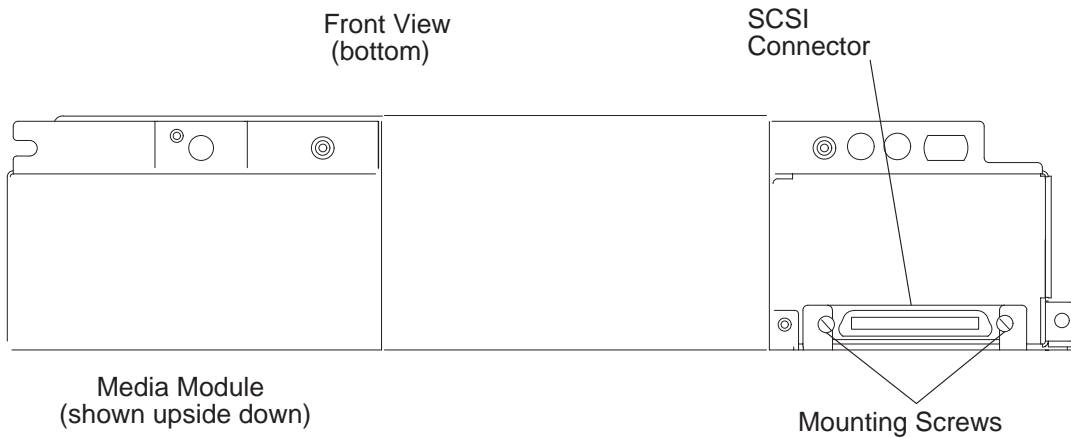Figure 3-31. Front View of 604 or 604e High Node Media Module

5. Remove the disk drive fan and media fan. Refer to "Removing the Media Module Fans" on page 3-41.
6. Disconnect the SCSI cable connector on the rear of the disk drive docking connector card.
7. Remove the two rear mounting screws attaching the media docking connector bracket to the rear of the media module (these screws are not present on all media modules).
8. Remove the four mounting screws on the media docking bracket, then lift the media docking bracket out of the media module to access the SCSI cable connector on the media docking connector card.
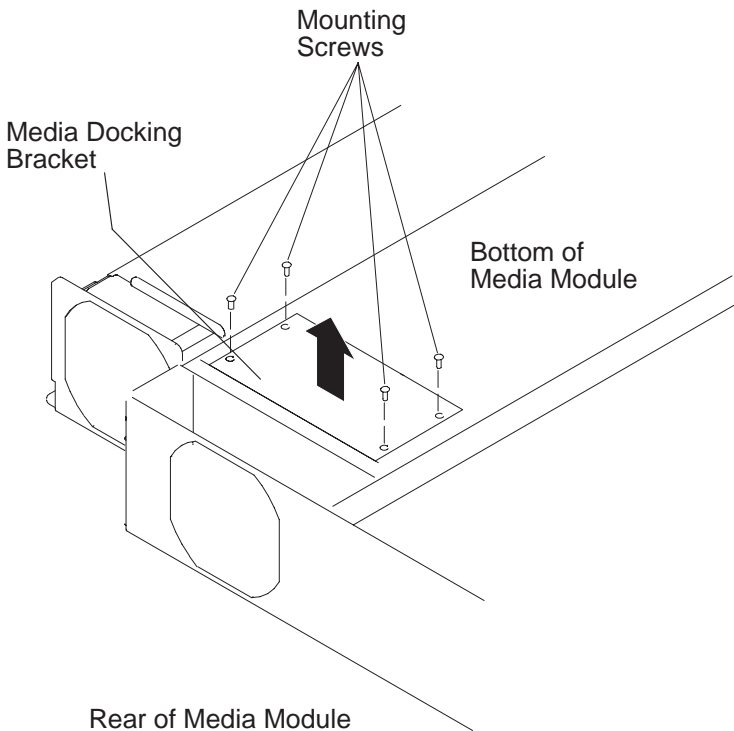
Figure 3-32. Rear View of 604 or 604e High Node Media Module (Upside-down)

 9. Disconnect the SCSI cable connector on the media docking connector card.
10. Guide the SCSI cable out of the media module through the disk drive opening.
11. If you are removing either the docking connector card or the power cable assembly, disconnect the two power cable connectors (P75 and P76) from the docking connector card.
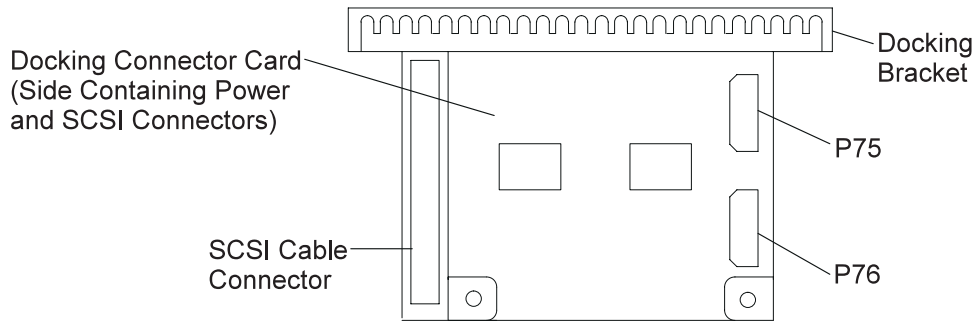
Figure   3-33. 604 or 604e High Node Docking Connector Card

12. If you are removing the docking connector card on the disk drive docking bracket, disconnect the power cable connector on the docking connector card.
13. Remove the two mounting screws attaching the docking bracket, then guide the bracket through the rear of the media module.
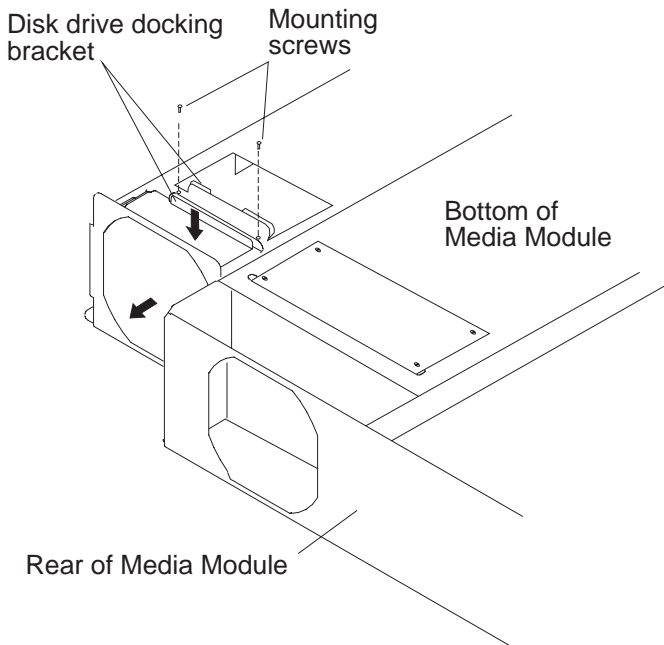
Figure   3-34. Removing the 604 or 604e High Node Media Module Disk Drive Docking Bracket

14. If you are removing the disk drive docking connector card from the docking bracket, remove the four mounting screws, then remove the docking connector card.
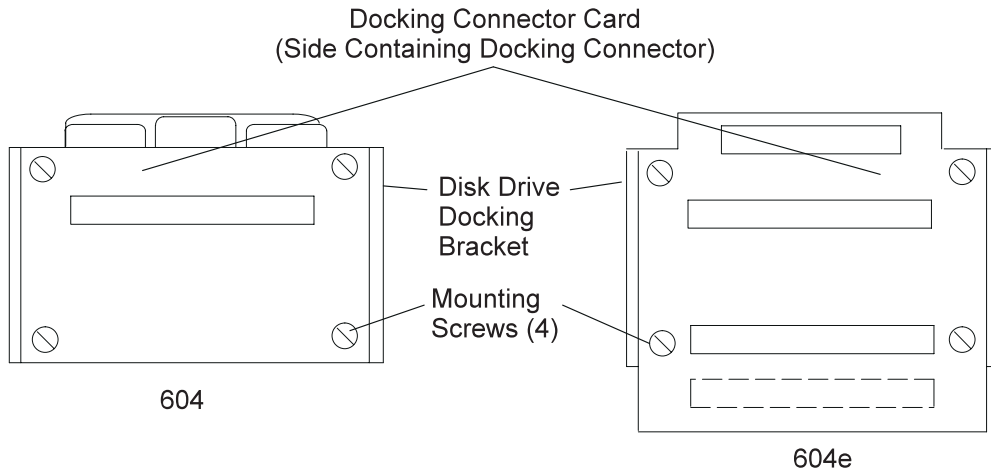
Figure 3-35. Removing the 604 or 604e High Node Media Module Disk Drive Docking Connector Card

15. If you are removing the power cable assembly, perform the following:
    a. Using pliers, gently remove connectors P71, P72, and P73 from the rear of the media module.
    b. Remove the power cable from the plastic cable retainers, then guide the power cable out of the media module.
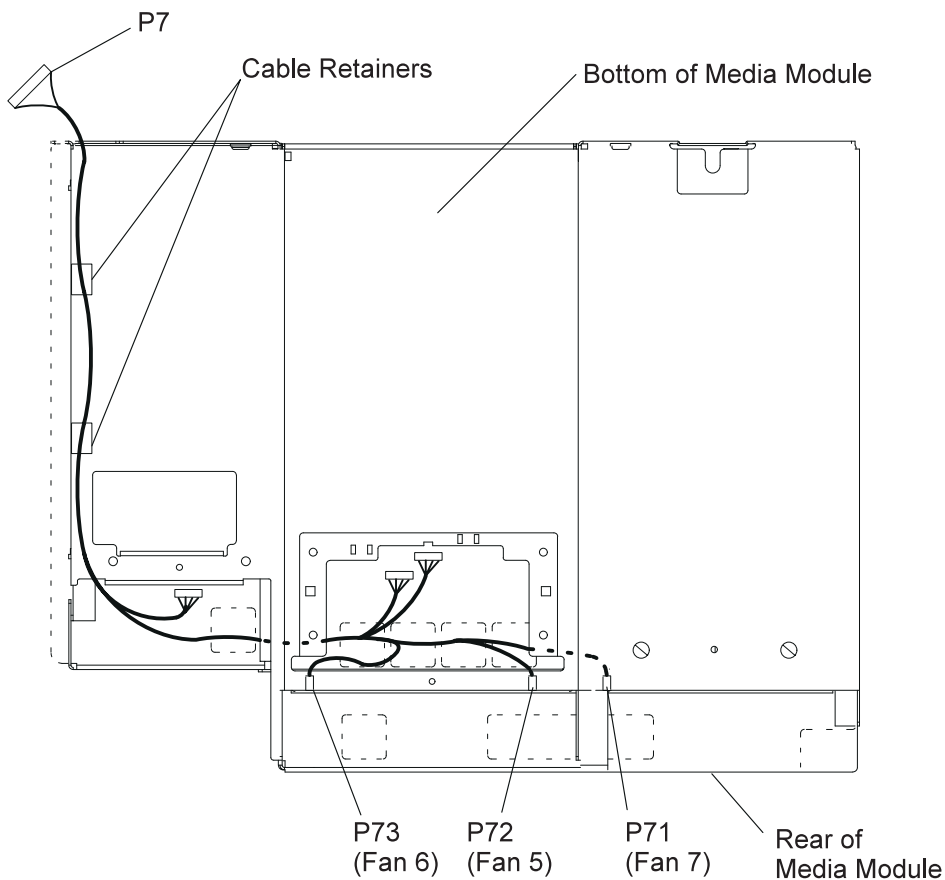
Figure 3-36. Bottom View of 604 or 604e High Node Media Module

> **Note:** If connector P71 on your cable is marked "Fan 4", disregard. This connector connects Fan 7, as shown in Figure 3-36.

Replacing the Media Module Cables and Docking Connector Cards

Depending on which cable or docking connector card was removed, replace (in reverse order) using "Removing the Media Module Cables and Docking Connector Cards" on page 3-43 as a guide.

Removing the CPU Module

1. Perform "Removing the Node Front Access Plate" on page 3-38.
2. Disconnect the operator panel cable and the media power cable, then move the cables away from the front of the CPU module.

CPU module

Operator Panel Cable

Media Power Cable
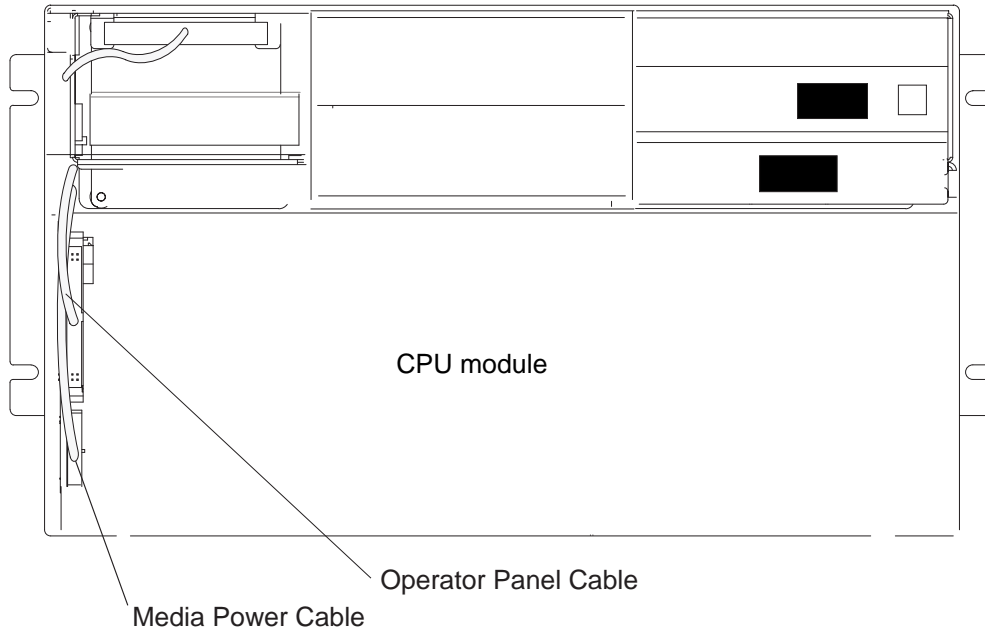
Figure   3-37. Removing the 604 or 604e High Node CPU Module

3. Remove the two retainer screws.
4. Loosen the docking screw until the CPU module is disengaged from the I/O planar interface connectors.
5. Grasp the front of the CPU module and pull it toward you until you can grasp each side of the CPU module.
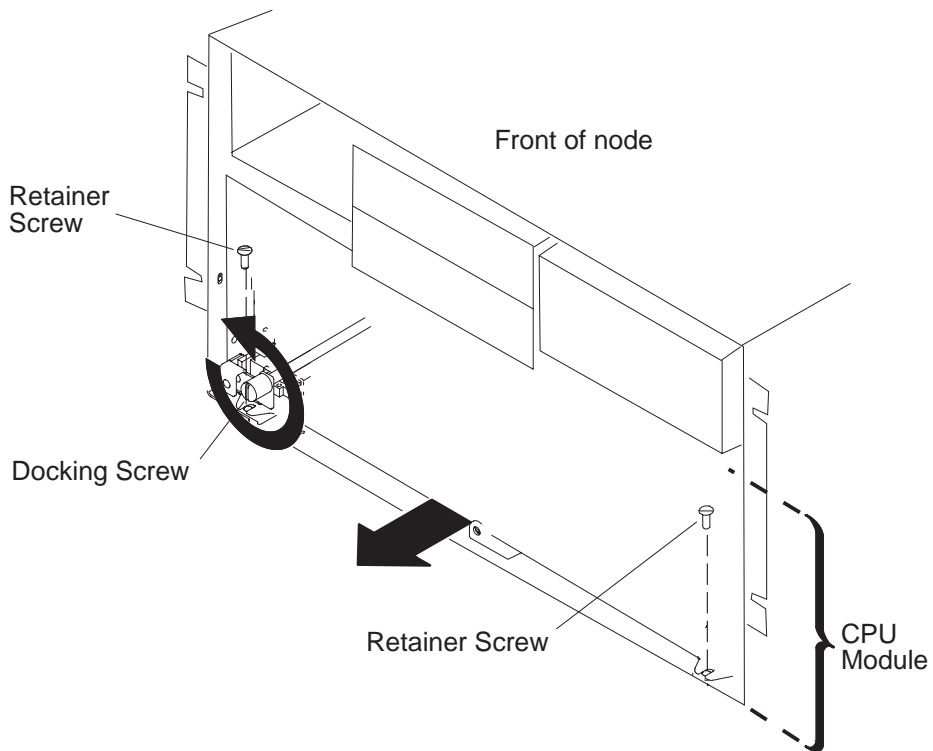
Figure   3-38. Removing the 604 or 604e High Node CPU Module

Note: Make sure that the operator panel cable an the media power cable are placed out of the path of the CPU module.

6. Grasp each side of the CPU module (bottom) and pull it toward you until it is out of the chassis, then place the CPU module on a stable surface.

Media Power Cable

Operator Panel Cable

Front of Node Chassis
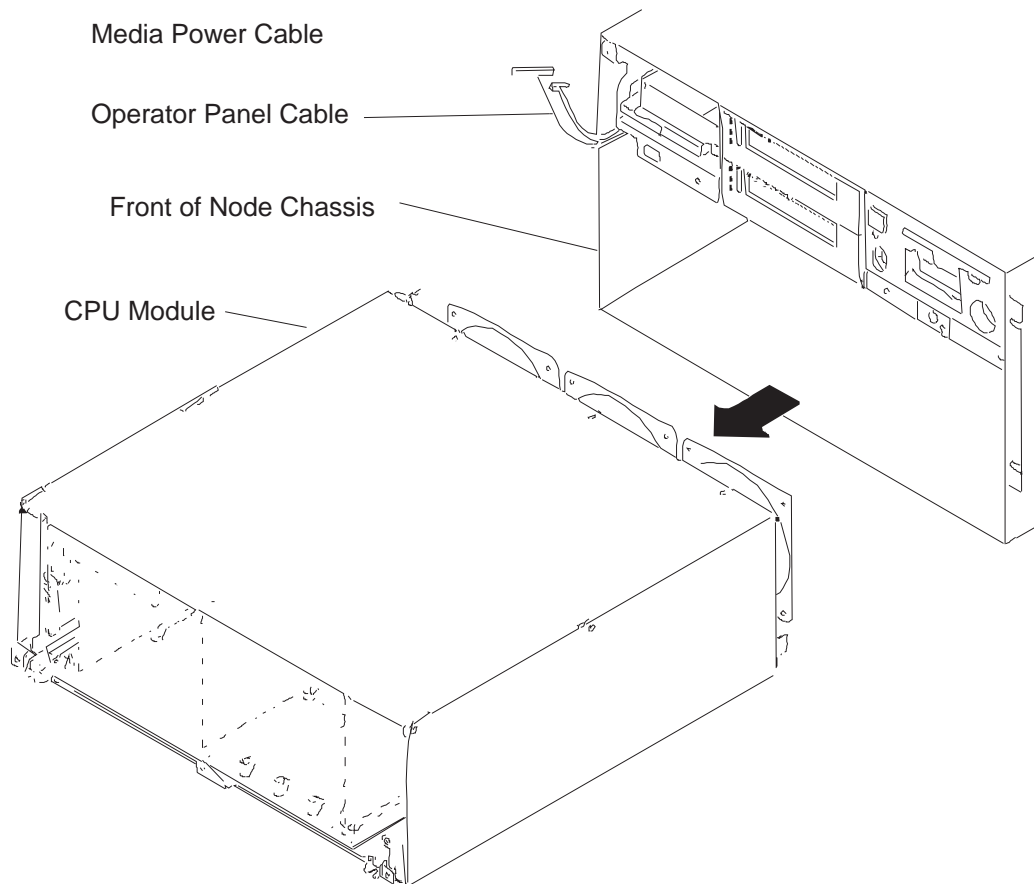
CPU Module

Figure 3-39. Removing the 604 or 604e High Node CPU Module

Replacing the CPU Module

Note: When placing the CPU module in the node chassis, make sure that the operator panel cable and the media power cable are placed out of the path of the CPU module.

1. Ensure ESD antistatic wrist device is attached.
2. Grasp the bottom of the CPU module with both hands and slowly slide it into the node chassis until the threaded tip of the docking screw touches the nut in the I/O module.

   Note: The CPU module should slide easily into the node chassis until the docking screw meets its nut in the I/O module. The system planar edge should be approximately 2mm inside the bottom front edge of the node chassis.

3. Start tightening the docking screw just until the CPU module is far enough into the node chassis to install the two retaining screws.
4. Install the two retaining screws, but do not tighten them.
5. Tighten the docking screw.
6. Tighten the two retaining screws.

Removing the Interlock Cable

1. Ensure ESD antistatic wrist device is attached.
2. Perform "Removing the CPU Module" on page 3-47.
3. Remove the seven screws from the CPU module top cover, then remove the top cover.
4. Disconnect the interlock cable connector from the lateral planar 1 card, then remove the interlock switch from the CPU-module frame.
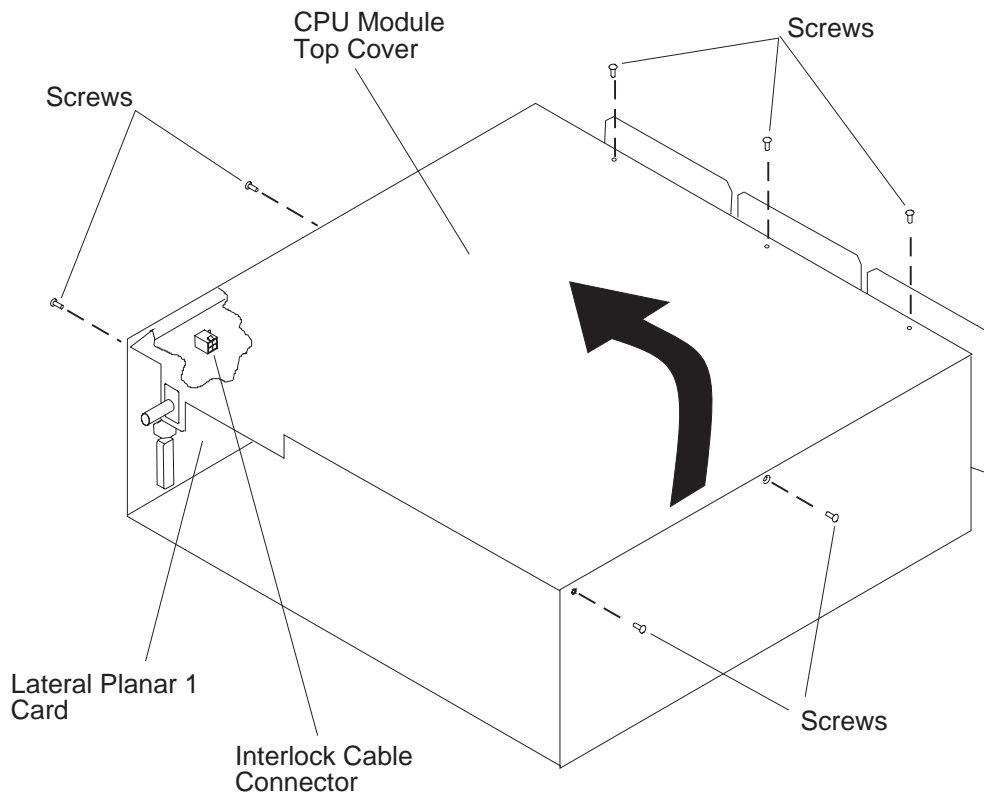
Figure 3-40. Removing the 604 or 604e High Node Interlock Cable

Replacing the Interlock Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the interlock cable connector to the lateral planar 1 card, then connect the interlock switch to the CPU-module frame.
3. Replace the CPU top cover, then replace the seven screws in the CPU module top cover.
4. Perform "Replacing the CPU Module" on page 3-49.

Removing Memory, CPU and I/O Cards

Note: Removing the memory, CPU, or I/O card requires using the extraction tools which are stored on the left side of the front access plate. Loosen the two screws from their standoffs to release the extraction tools.

1. Ensure ESD antistatic wrist device is attached.
2. Perform "Removing the CPU Module" on page 3-47.
3. Remove the seven screws from the CPU module top cover, then remove the top cover.

Screws

CPU Module Top Cover

Screws

Screws

Lateral Planar 1 Card

Interlock Cable Connector
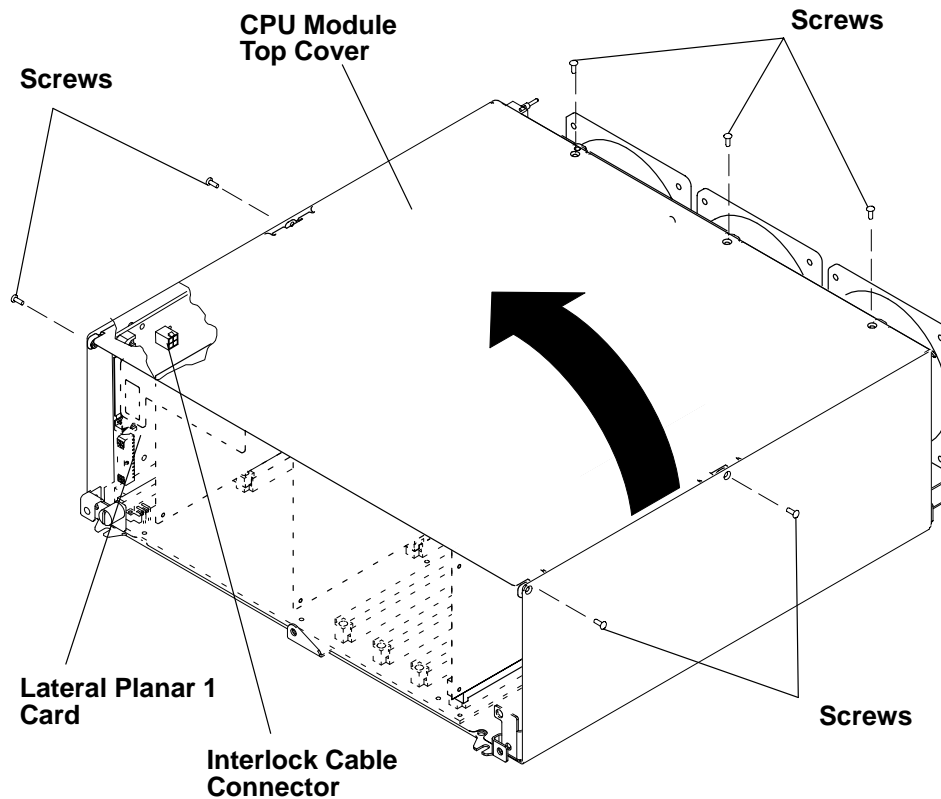
Figure 3-41. Removing the 604 or 604e High Node Memory, CPU, and I/O Cards

4. If you are removing the I/O card, disconnect both flex cables connected to the I/O card.
5. Locate the card you are removing and position the extraction tools with their pins through the holes in the top corners of the card.

Attention: 604 only – Ensure that the bottom of the dual-piece extraction tool is placed under the system planar (on the frame of the CPU module) before removing a card. Do not place the dual-piece extraction tool on the system planar since it can cause damage to the planar.

Top of Fan Mounting Bracket

Flex Cable Connectors
(on back of card)

Handle

Single-Piece
Extraction Tool

Handle

S R Q P D C B A

I/O
Card

CPU
Card

Dual-Piece
Extraction
Tool

Memory
Card

Bottom of CPU Module

Pins of
Extraction
Tools
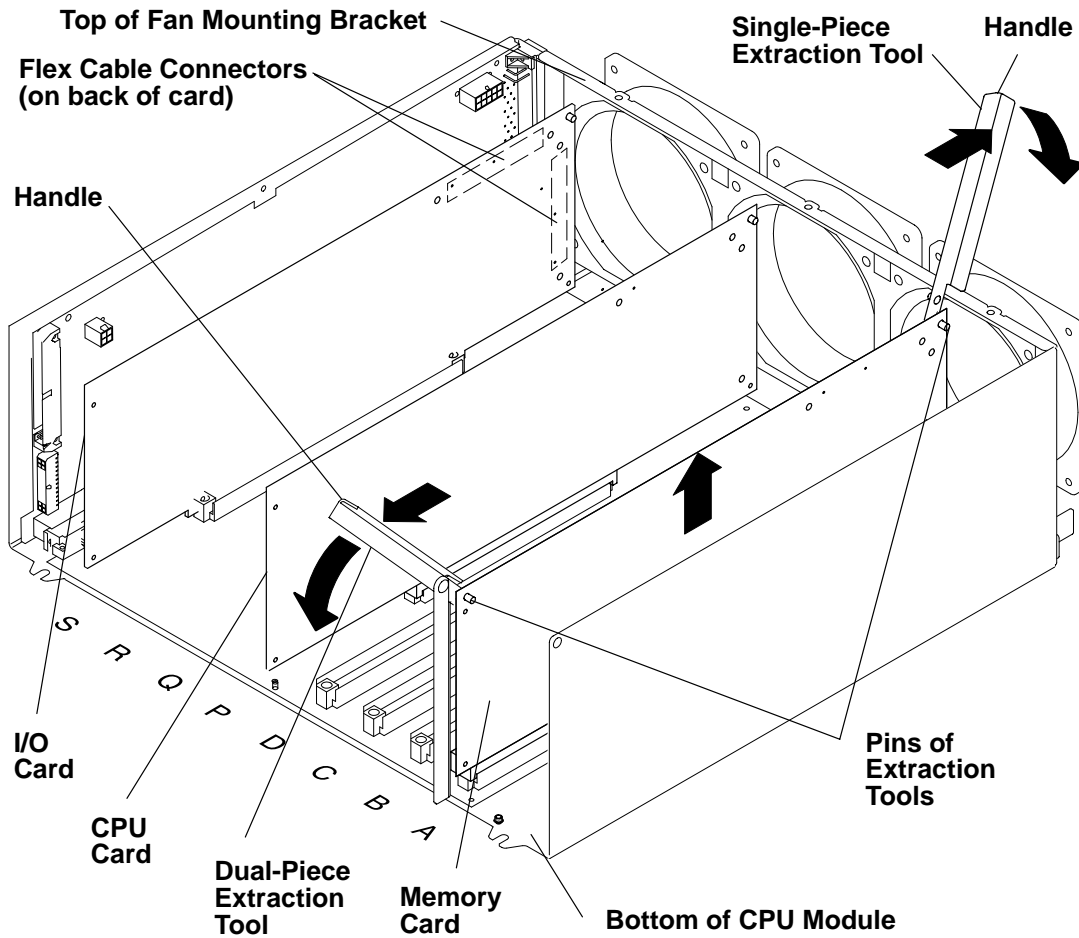
Figure 3-42. Removing the 604 High Node Memory, CPU, and I/O Cards
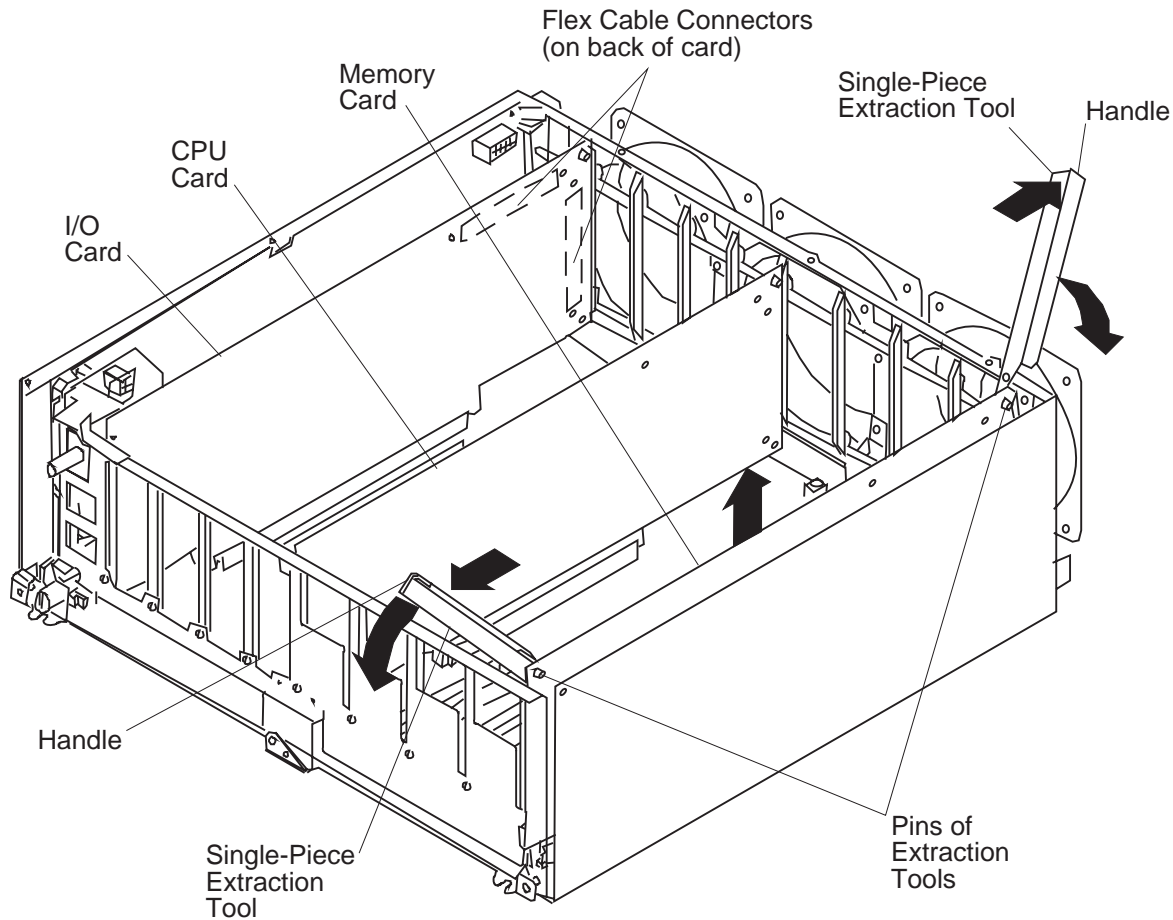
Figure 3-43. Removing the 604e High Node Memory, CPU, and I/O Cards

6. With both extraction tools positioned on the card, firmly rotate both handles of the extraction tools downward until the card disengages from the slot, then remove the card.
7. If you are removing a single in-line memory module from a memory card, refer to "Removing Memory Modules" on page 3-54.

Replacing Memory, CPU and I/O Cards

Notes:

- Install the memory cards in a right-to-left sequence, beginning with slot A, then continuing with slots B, C, and D. Memory cards must be installed with no empty slots between installed memory cards.

- Install CPU cards in a right-to-left sequence beginning with slot P, then continuing with slots Q, R, and S. CPU cards must be installed with no empty slots between installed CPU cards.

- See "604 or 604e High Processor Node Locations" on page 1-25.

Replace cards by carefully lining up their connectors and then firmly inserting the cards into place.

For more information about memory cards and memory types, refer to *Diagnostic Information for Micro Channel Bus Systems*.

Removing Memory Modules

1. Ensure ESD antistatic wrist device is attached.
2. Remove the memory card, see "Removing Memory, CPU and I/O Cards" on page 3-50.
3. Push the release tabs away from the memory module until the memory module disengages from the slot, then remove the memory module.
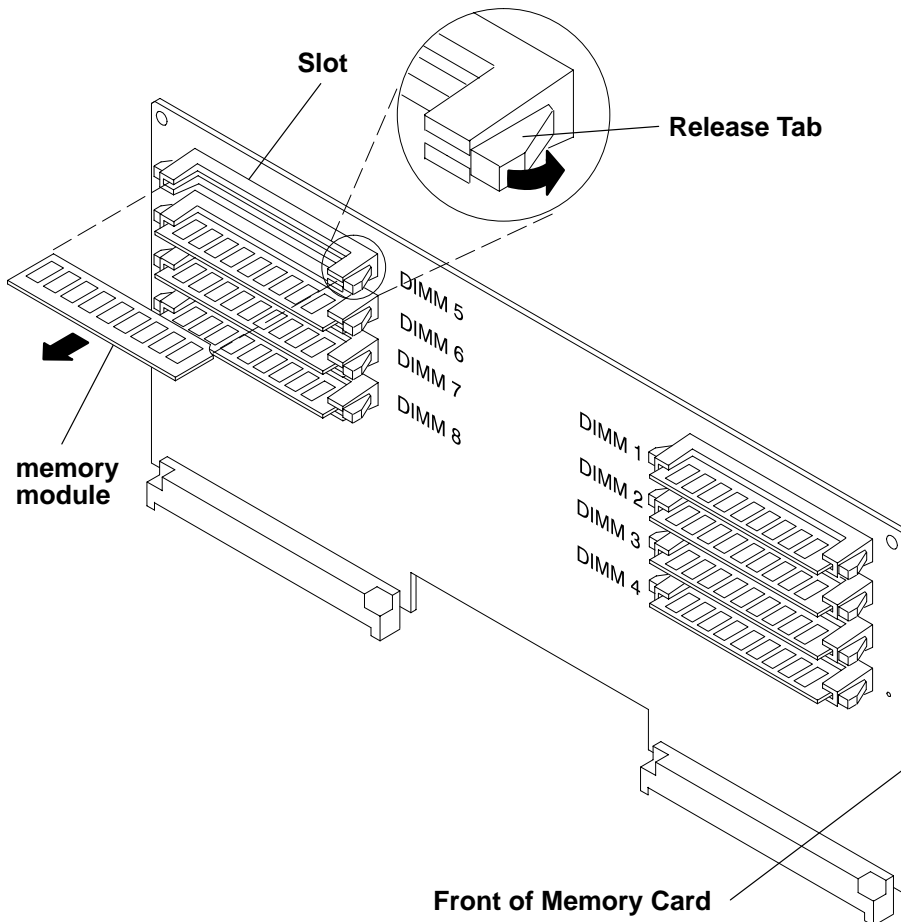
Figure 3-44. Removing the 604 or 604e High Node Memory Modules

Replacing Memory Modules

1. Place the memory module in the slot on the memory card, then press the memory module into the slot until the memory module is firmly seated.
2. Replace the memory card. See "Replacing Memory, CPU and I/O Cards" on page 3-53.

For more information about memory type, memory module size, and memory module part numbers, refer to *Diagnostic Information for Micro Channel Bus Systems*.

Removing CPU Module Fans

1. Ensure ESD antistatic wrist device is attached.
2. Perform "Removing the CPU Module" on page 3-47.
3. Remove the cable tie holding the fan power cable connector, then disconnect the fan power cable connector.
4. Remove all four vibration isolators by pulling the fan away from the media module until the vibration isolators disengage from either the fan or the media module.

5. Remove the fan.
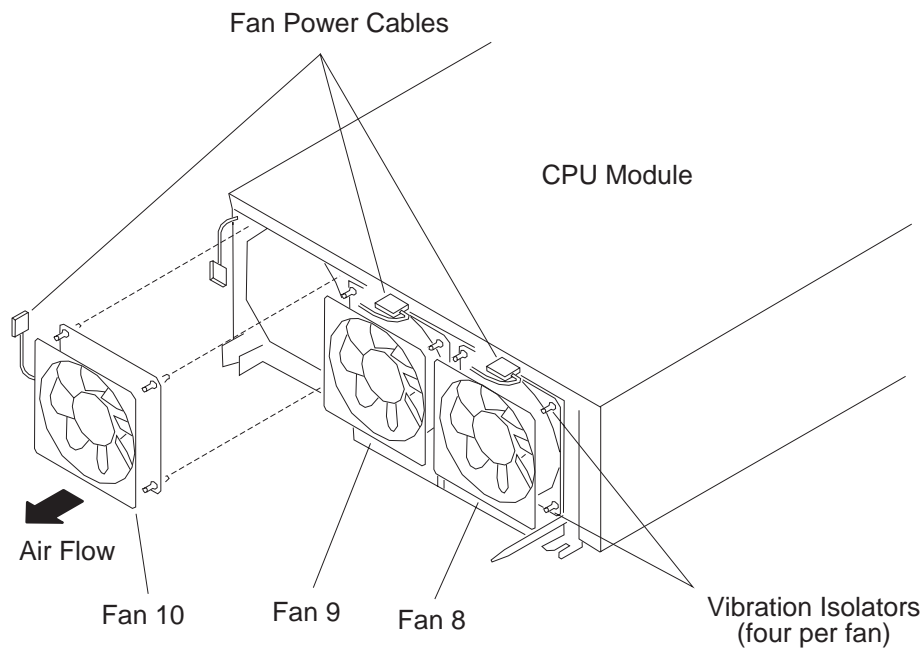
Figure 3-45. Removing the 604 or 604e High Node CPU Module Fans

Replacing CPU Module Fans

1. Remove the module top cover and I/O card, refer to "Removing Memory, CPU and I/O Cards" on page 3-50.
2. Check the direction of the air flow marked on the fan, then place the long end of the vibration isolator through the mounting hole of the fan.
3. Pull the long end of the vibration isolator through the mounting hole until the center ring of the vibration isolator is against the fan.
4. Repeat the two previous steps until all four vibration isolators are mounted on the fan.
5. Place the short end of each vibration isolator through the mounting holes of the fan mounting bracket.
6. Pull the short end of each vibration isolator through the mounting holes of the fan mounting bracket until the center ring of the vibration isolator is against the bracket.
7. Connect the fan power cable.
8. Secure the fan power cable connector with a cable tie.
9. Perform "Replacing the CPU Module" on page 3-49.

Vibration Isolators
(four per fan)

Air Flow

Short End of
Vibration Isolator

Center Ring of
Vibration Isolator

Long End of
Vibration Isolator
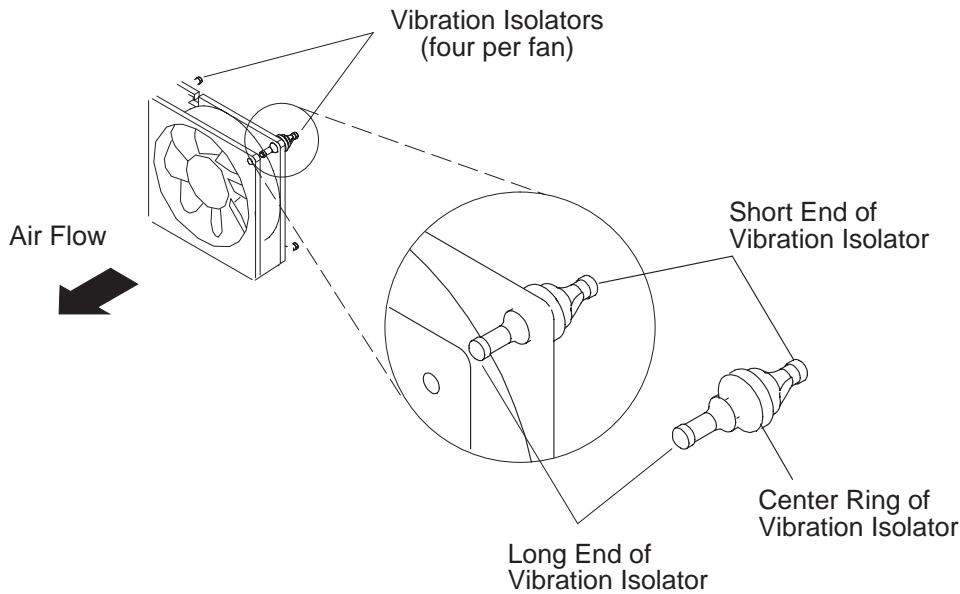
Figure 3-46. Replacing 604 or 604e High Node CPU Module Fans

Removing the System Planar

1. Ensure ESD antistatic wrist device is attached.
2. Perform "Removing the Interlock Cable" on page 3-49.
3. Perform "Removing Memory, CPU and I/O Cards" on page 3-50 to remove all of the memory, CPU, and I/O cards.
4. **604e high nodes** – Remove the seven screws holding the front guide bracket, then lift the bracket out of the CPU module.

System
planar

Front
guide bracket
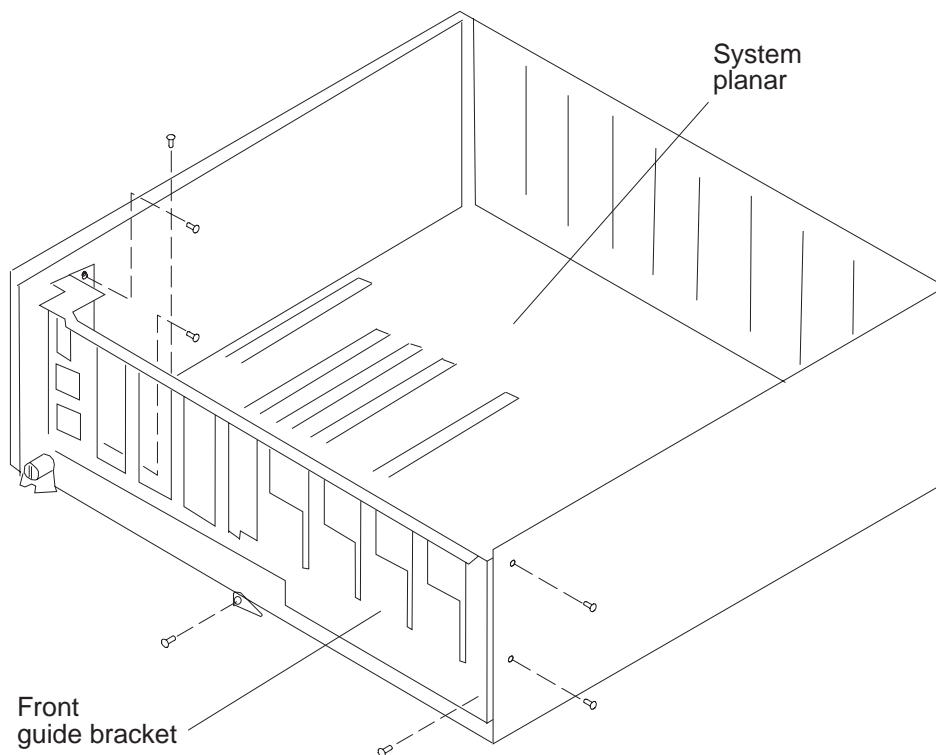
Figure 3-47. Removing the 604 or 604e High Node System Planar

If the node chassis has a docking screw retention bracket, perform the next two steps, otherwise, go to step 8 on page 3-57.

5. Remove the screw holding the docking screw retention bracket.
6. Move the docking screw aside to provide access to the system planar mounting screws.
7. Go to step 9.
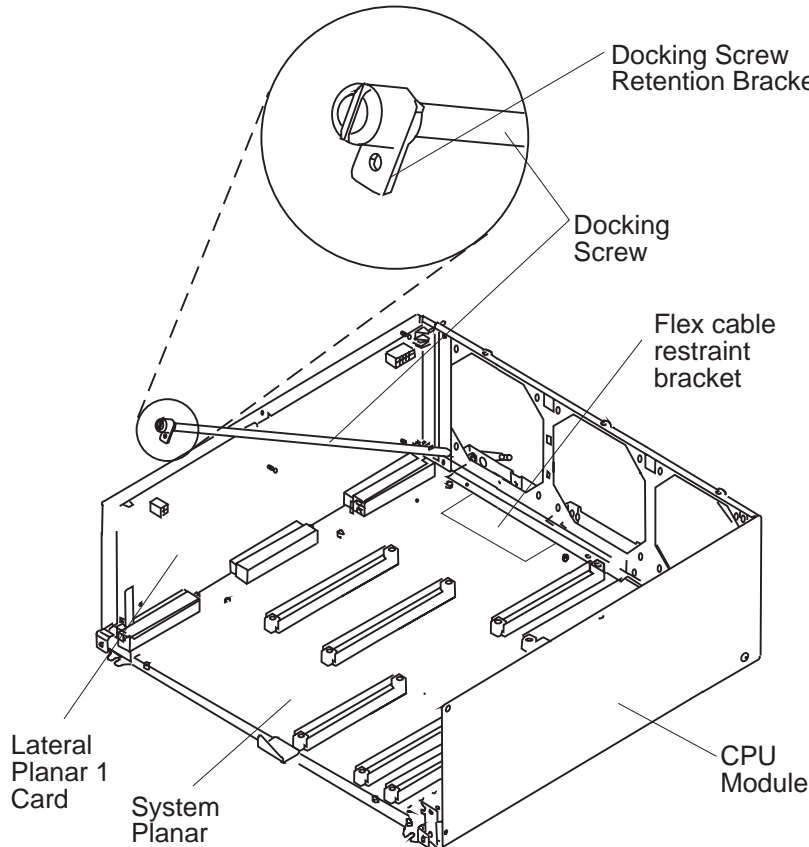
Figure 3-48. Removing the 604 or 604e High Node System Planar

If the node chassis does NOT have a docking screw retention bracket, perform the next step, otherwise, go to step 9.

8. For earlier versions of the CPU module, remove the docking screw by removing the two retainer clips and the three washers, then remove the docking screw.
9. Remove the flex cable restraint bracket retainer screw and the flex cable restraint bracket from the CPU module.
10. Remove the nine mounting screws (604e high node uses 12 screws) attaching the system planar to the CPU module.
11. Grasp the system planar near the three power interface connectors, then pull the system planar away from the lateral planar 1 card until the system planar disconnects from the lateral planar 1 card; immediately lift the system planar out of the CPU module.

    Attention: As soon as the system planar is disconnected from the lateral planar 1 card, lift the planar upward to avoid sliding the bottom of the system planar on the CPU module which can damage the soldered connectors on the bottom of the system planar.
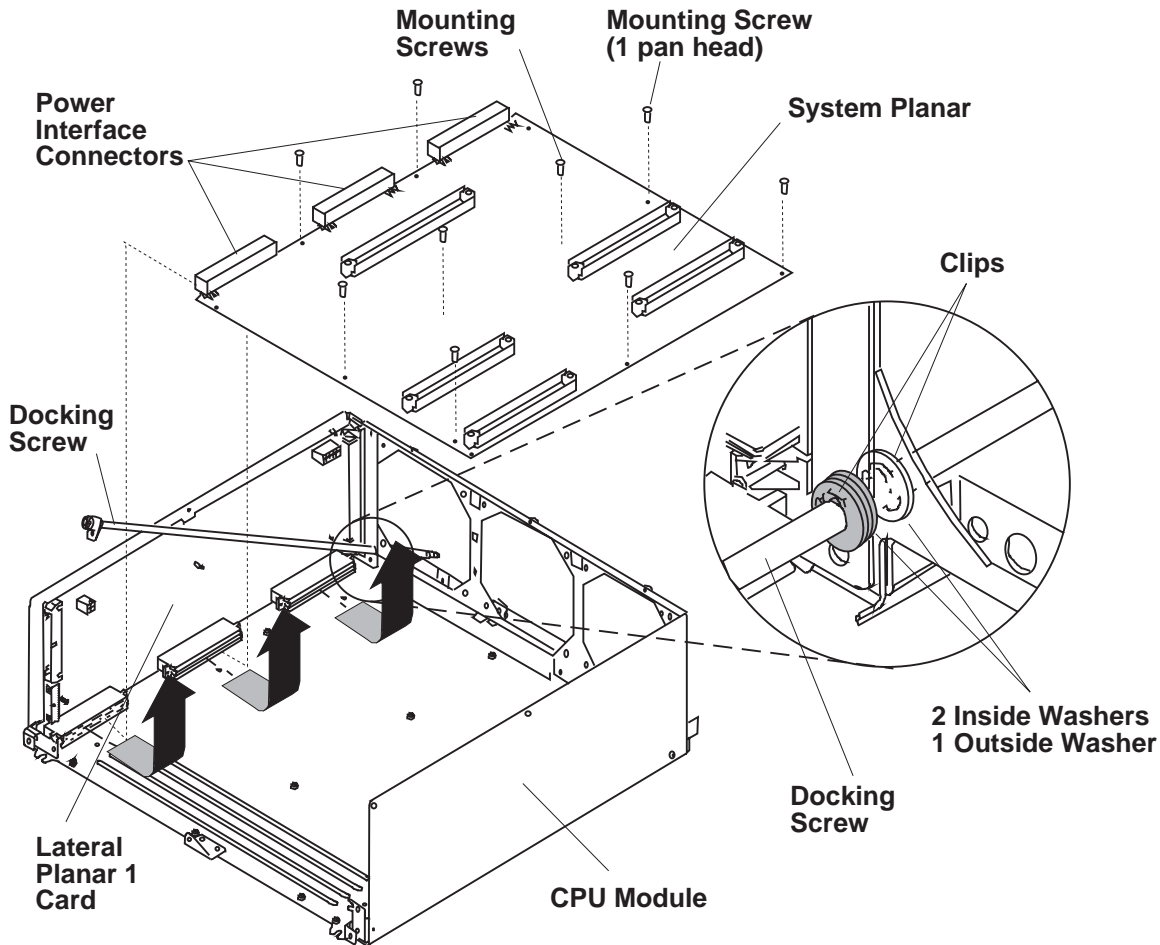
Figure 3-49. Removing the 604 or 604e High Node System Planar

Replacing the System Planar

1. Ensure ESD antistatic wrist device is attached.
2. Connect the system planar to the power connectors.
3. Position the system planar over the mounting holes and install the mounting screws.

   Note: Do not tighten the mounting screws until all of the screws are started in the mounting holes.

4. After all mounting screws are started in the mounting holes, tighten all of the screws.
5. Reconnect the flex cable restraint bracket and retainer screw.
6. If applicable, install the docking screw, two retainer clips and three washers.
7. If applicable, install the screw to secure the docking screw retention bracket.
8. **604e high nodes** – Reinstall seven screws to secure the front guide bracket in the CPU module.
9. Perform "Replacing Memory, CPU and I/O Cards" on page 3-53.
10. Perform "Replacing the Interlock Cable" on page 3-50.

Removing Lateral Planar 1 Card

Note:

1. Ensure ESD antistatic wrist device is attached.
2. Remove the lateral planar 1 card using the following procedures:
   a. "Removing the CPU Module" on page 3-47.
   b. "Removing Memory, CPU and I/O Cards" on page 3-50 to remove all of the memory cards, CPU cards, and I/O card.

c. "Removing the System Planar" on page 3-56
3. Disconnect the fan power cable connector.
4. Remove the mounting screws (and standoff/screws if applicable) attaching the lateral planar 1 card to the CPU module, then remove the lateral planar 1 card.
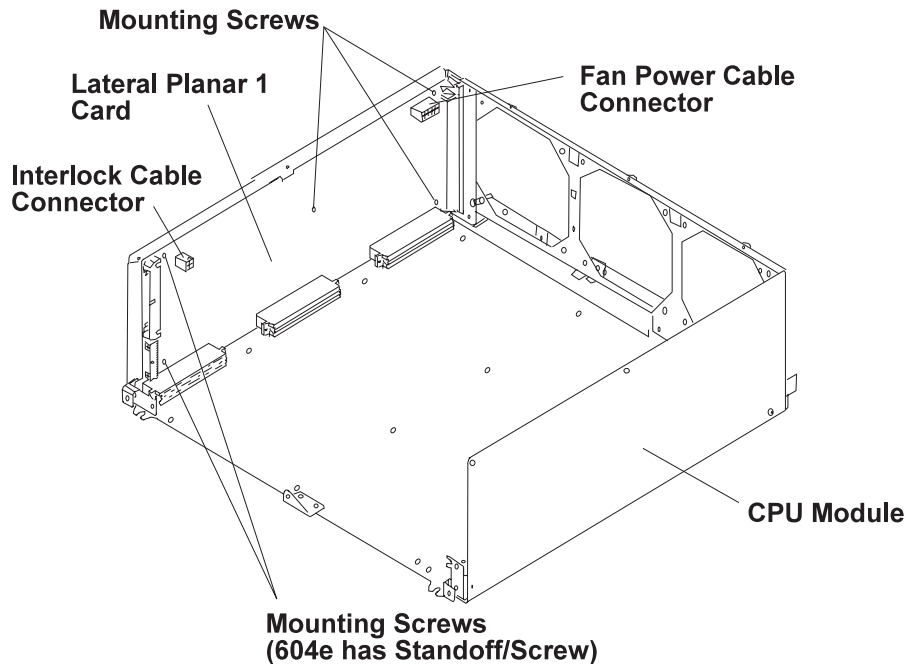
Figure   3-50. Removing the 604 or 604e High Node CPU Lateral Planar 1 Card

Replacing Lateral Planar 1 Card

1. Ensure ESD antistatic wrist device is attached.
2. Attach the lateral planar 1 card to the CPU module, then install the mounting screws (and standoff/screws if applicable).
3. Connect the fan power cable connector.
4. Perform the following procedures:
     a. "Replacing the System Planar" on page 3-58
     b. "Replacing Memory, CPU and I/O Cards" on page 3-53 to replace all of the memory cards, CPU cards, and I/O card.
     c. "Replacing the CPU Module" on page 3-49.

Removing CPU Module Flex Cables

1. Perform "Removing the CPU Module" on page 3-47.
2. Perform "Removing Memory, CPU and I/O Cards" on page 3-50 to remove the I/O card, and all of the CPU cards.
3. Remove the mounting screw on the flex cable retainer bracket.
4. Rotate the retainer bracket upwards until you can pull the retainer bracket out of the retainer bracket tab opening, then remove the retainer bracket.
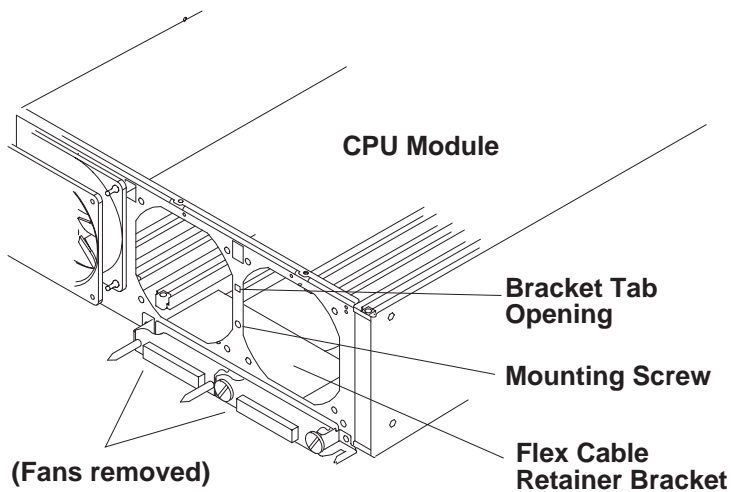
Figure 3-51. Removing the 604 High Node CPU Module Flex Cables
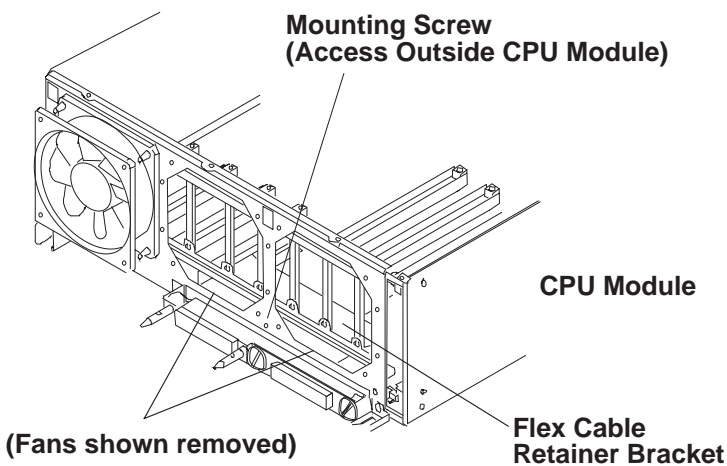
Figure 3-52. Removing the 604e High Node CPU Module Flex Cables

5. Record the location of the flex cable connectors.
6. If you are removing the flex cable connected to the horizontal connector on the I/O card, remove the two large slotted mounting screws.

   If you are removing the flex cable connected to the vertical connector on the I/O card, remove the two guide pin mounting screws.

Attention: To prevent damage to the guide pins, do not use pliers to remove them. Use an open-end wrench in the slots in the pins.

7. Remove the fan located above the flex cable connector you are removing. Refer to "Removing CPU Module Fans" on page 3-54.
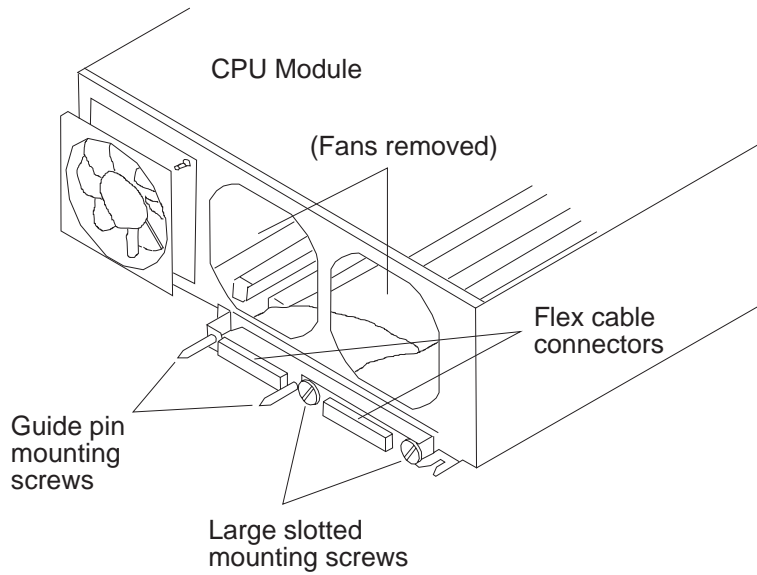
Figure   3-53. Removing the 604 or 604e High Node CPU Module Flex Cables

8. Guide the flex cable you are removing over the connector mounting bracket, then guide the I/O card
   connector end under the fan mounting bracket; remove the flex cable.
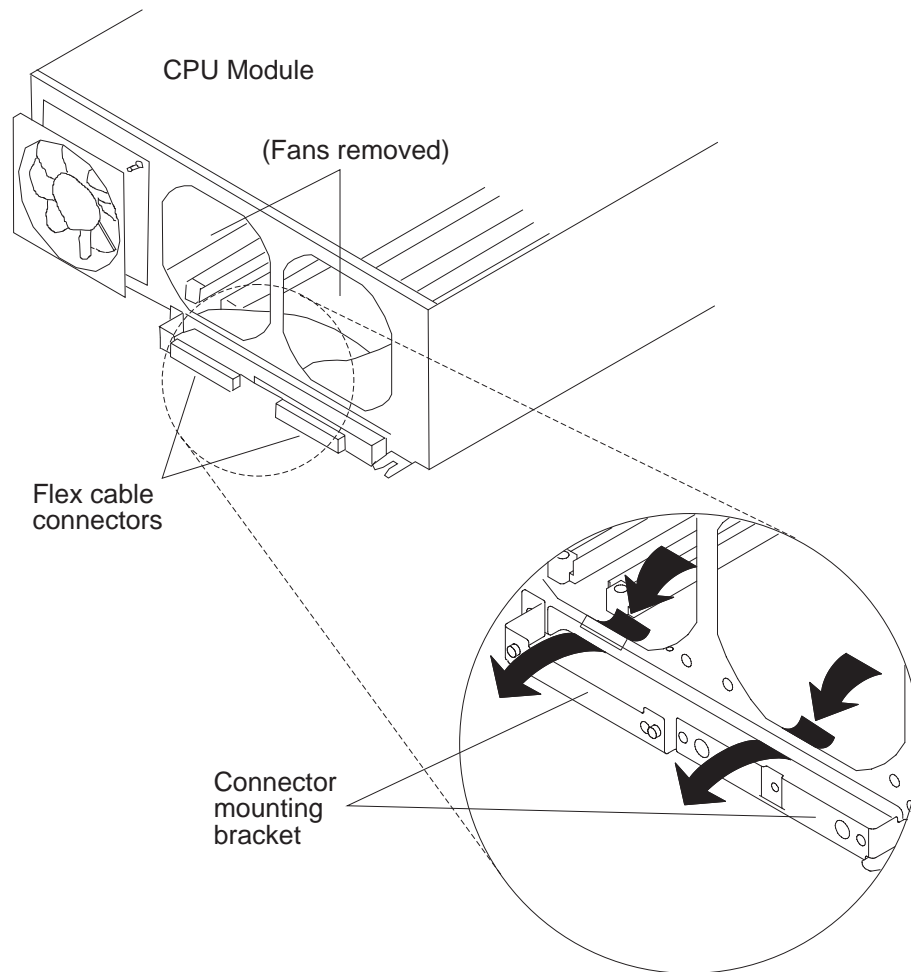
Figure   3-54. Removing the 604 or 604e High Node CPU Module Flex Cables

Replacing CPU Module Flex Cables

1. Guide the I/O card connector end of the flex cable under the fan mounting bracket, then over the connector mounting bracket.
2. Replace the fan located above the flex cable connector. Refer to "Replacing CPU Module Fans" on page 3-55.
3. Connect the flex cable connectors in the location recorded in the remove procedure.

   If you are replacing the flex cable in the horizontal connector on the I/O card, replace the two large slotted mounting screws.

   If you are replacing the flex cable in the vertical connector on the I/O card, replace the two guide pin mounting screws.
4. Install the flex cable retainer bracket in the retainer bracket tab opening.
5. Replace the mounting screw on the flex cable retainer bracket.
6. Perform "Replacing Memory, CPU and I/O Cards" on page 3-53 to replace the I/O card, and all of the CPU cards.
7. Perform "Replacing the CPU Module" on page 3-49.

Removing Rear EMC Cover

1. Ensure ESD antistatic wrist device is attached.
2. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
3. Place both circuit breaker assembly switches in the Off ('0') position.
4. Loosen the four retainer screws until the screws disengage from the node chassis then pull the rear EMC cover away from the node chassis.
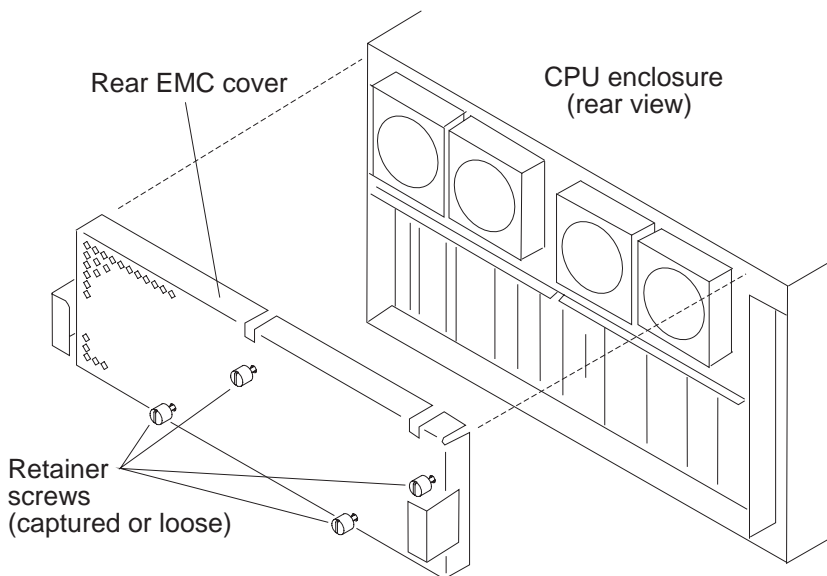
Figure 3-55. Removing the 604 or 604e High Node Rear EMC Cover

Replacing Rear EMC Cover

1. Reinstall the rear EMC cover with four retainer screws.

    Notes:

    a. Ensure the grounding strips located around the edges of the rear EMC cover are firmly attached and in place before replacing the rear EMC cover.

    b. Do not over tighten the four retainer screws on the rear EMC cover.

2. Place both circuit breaker assembly switches in the On ('1') position.

Power Supplies or Cooling Units

Perform one of the following procedures to remove the 604/604e power supplies or cooling units depending whether the system power is on or off.

Removing a Power Supply or Cooling Unit While System Power is Off: The power supply position farthest from the system interface board can contain either an optional power supply or a cooling unit.

DANGER

> **Do not attempt to open the covers of the power supply. The power supply is not service-able and is to be replaced as a unit.**

1. Perform "Removing Rear EMC Cover" on page 3-62.

Attention: This unit may have more than one power supply cord. To completely remove power, you must disconnect all power supply cords.

2. If you are removing the power supply, disconnect the power supply power cord from the power distrib-ution system installed in the frame.
3. Loosen the docking screw until the screw is disengaged.
4. Slowly pull the power supply or cooling unit toward you until you can place a hand under it for support, and then remove the power supply or cooling unit from the node chassis.
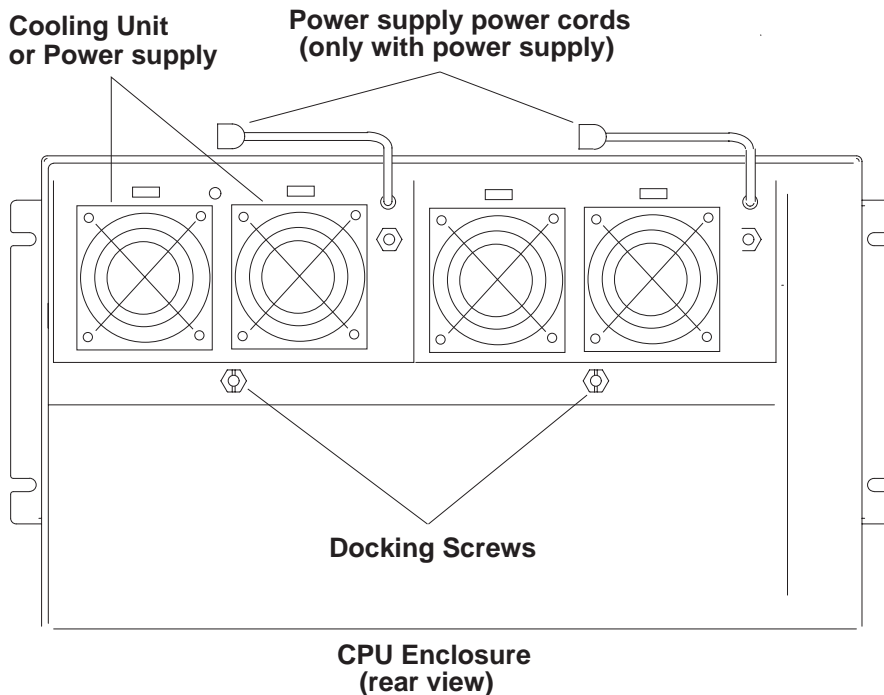
Figure   3-56. Removing the 604 or 604e High Node Power Supplies or Cooling Units

Replacing Power Supplies or Cooling Units While System Power is Off:

Attention: Ensure you completely replace the power supply before plugging the power supply power cord. Possible data loss will occur if the power cord is plugged before completing the power supply replacement.

1. Ensure guide rails are engaged, then slowly slide the power supply or cooling unit into the enclosure.
2. Tighten the docking screw.
3. Perform "Replacing Rear EMC Cover" on page 3-63.
4. Reconnect all power cords.

Removing and Replacing a Power Supply While System Power is On:

Attention: If system power must be removed before the power supply can be removed, see "Removing a Power Supply or Cooling Unit While System Power is Off" on page 3-63.

When you see the following message:

```
Broadcast message from UNKNOWN@localhost (tty) at 16:55:22 ...

rc.powerfail: init has received a SIGPWR signal.
The system is now operating with a power problem. ...
```

Inspect the LEDs on the top rear of the power supplies. If an LED is not lit, suspect a malfunctioning power supply.

1. Disconnect the ac line cord from the malfunctioning power supply.
2. Loosen the mounting screw of the disconnected power supply.

    Attention: A shutdown timer starts once the power supply is disengaged. The power supply must be replaced within eight minutes. The timer is started or restarted each time the power supply is disengaged. The timer is stopped and reset when the power supply is engaged.

    The following messages appear:

```
Broadcast message from UNKNOWN@localhost (tty) at 16:56:25 ...

rc.powerfail: init has received a SIGPWR signal.
    The system has no backup cooling .
    The system will shut down in 8 minutes unless the problem is
    resolved before then. Execute rc.powerfail --h as the root user
    for more information. ......

Broadcast message from UNKNOWN@localhost (tty) at 16:56:30 ...

rc.powerfail: The system will shut down in 8 minutes.
    The system will shut down because either a fan failure has occurred
    or the system is running on battery backup power. ....
```

At the same time the fans of the remaining power supplies increase in speed.
3. Remove the disconnected power supply.
4. Insert the new power supply.
5. Tighten the mounting bolt of the new power supply.

As you tighten the bolt the SIB LED turns off. When the bolt is sufficiently tightened, the SIB LED lights, the fans return to normal speed and the following messages appear:

Note: These messages may take several minutes to appear.

```
.Broadcast message from UNKNOWN@localhost (tty) at 16:58:29 ...

rc.powerfail: The power status has changed.
    The system shutdown has been canceled. .....

Broadcast message from UNKNOWN@localhost (tty) at 16:58:29 ...

rc.powerfail: init has received a SIGPWR signal.
    The system is now operating without backup power. ....
```

6. Reconnect ac line of new power supply.

   a. The LED of the new power supply comes on

   b. The SIB LED comes on

Note: These messages may take several minutes to appear.

```
.Broadcast message from UNKNOWN@localhost (tty) at 16:59:24 ...

rc.powerfail: init has received a SIGPWR signal.
    The power status is currently 0.
    The system may power down immediately.
    Execute rc.powerfail --h as the root user for more information. ....
```

Removing Power Supply or Cooling Unit Fans

1. Perform "Removing Rear EMC Cover" on page 3-62.
2. Disconnect the power cable connector for the power supply fan or the cooling unit fan you are removing.
3. Remove all four vibration isolators by pulling the fan away from the power supply or cooling unit until the vibration isolators disengage from either the fan, power supply, or cooling unit.
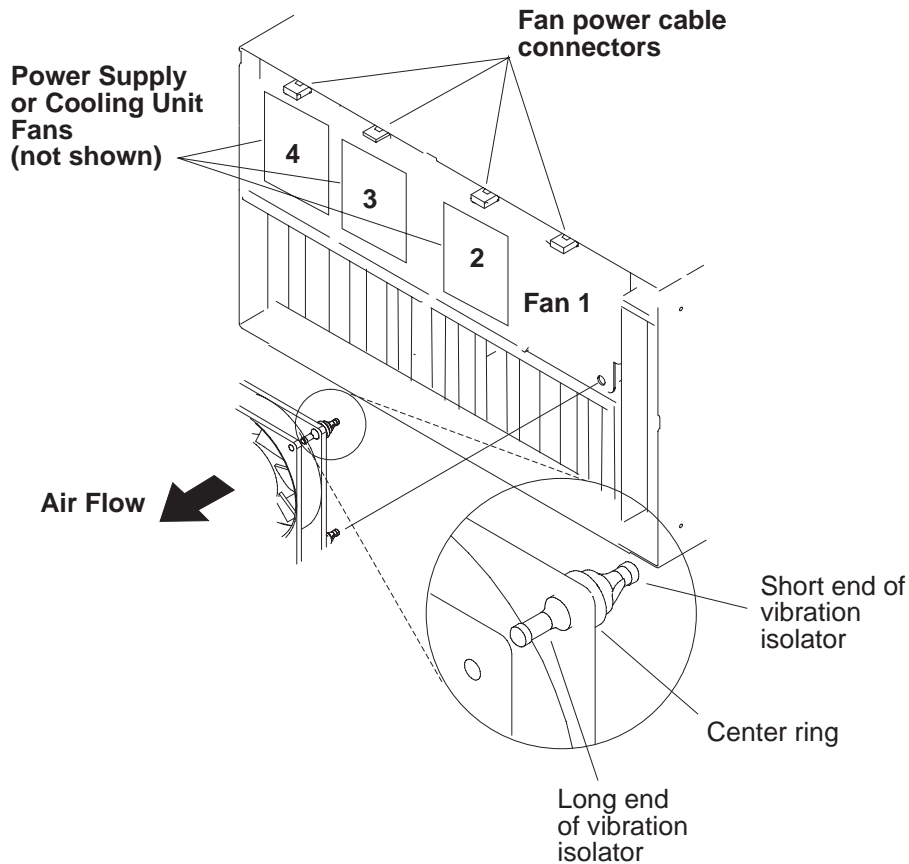
Figure 3-57. Removing the 604 or 604e High Node Power Supply or Cooling Unit Fans

Note: If a cooling unit is installed in the optional power supply position, Fan #4 and Fan #3 are reversed.

Replacing Power Supply or Cooling Unit Fans

Note: Check the air flow direction on the fan before replacing the fan.

1. Replace all four vibration isolators in the fan.
2. Connect the power cable connector for the power supply fan or the cooling unit fan you are replacing.
3. Perform "Replacing Rear EMC Cover" on page 3-63.

System Interface Board (SIB)

Attention: Lateral planar 2 and system interface board (SIB) EEPROMs contain the SYSID of the system. When one of the two components is to be replaced (for example the Lateral Planar 2), the SYSID information is copied from SIB EEPROM into the lateral planar 2 EEPROM when you start the system.

To avoid losing this information, do not replace both components at the same time. When both components are to be replaced, proceed as follows:

1. Replace the SIB and start up the system: the SYSID information is copied from the lateral planar 2 EEPROM to the SIB EEPROM.
2. Replace the lateral planar 2 and start up the system: the SYSID information is copied from SIB EEPROM to the Lateral Planar 2 EEPROM. (See "Removing Lateral Planar 2 Card" on page 3-71.)

Removing System Interface Board (SIB)

1. Ensure ESD antistatic wrist device is attached.
2. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
3. Place both circuit breaker assembly switches in the Off ('0') position.
4. Loosen, but do not remove the two mounting screws.
5. Pull the SIB toward you until the SIB disengages, then remove it from the node chassis.

CPU enclosure
(rear view)

Mounting screws

System
interface
board
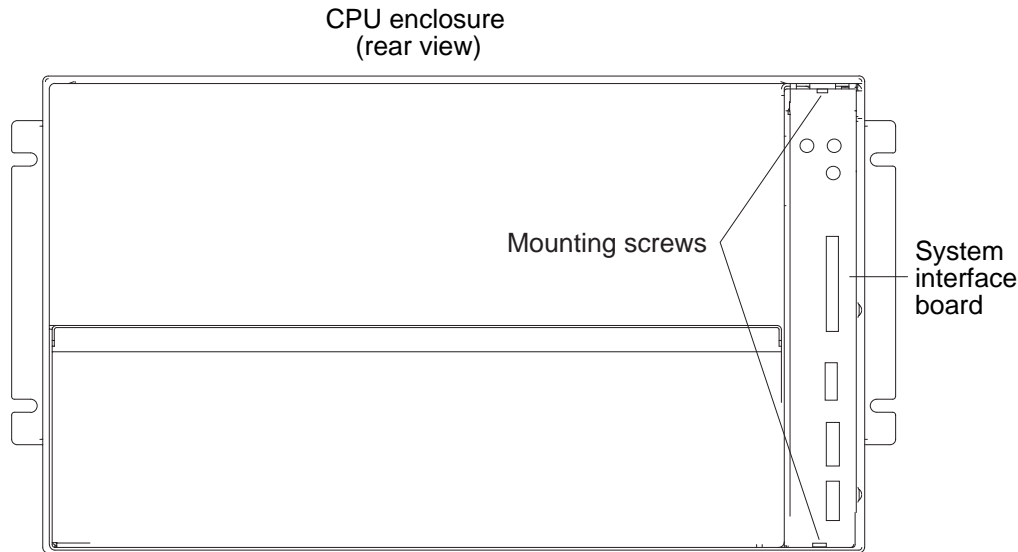
Figure   3-58. Removing the 604 or 604e High Node System Interface Board (SIB)

Replacing System Interface Board (SIB)

Note: Before replacing the SIB in the I/O module, make sure the SIB is placed correctly on the guide rails.

1. Ensure ESD antistatic wrist device is attached.
2. Insert the SIB into the enclosure and push the SIB until it is engaged.
3. Tighten the two mounting screws.
4. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
5. Place both circuit breaker assembly switches in the On ('1') position.

Removing the I/O Module

1. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
2. Place both circuit breaker assembly switches in the Off ('0') position.
3. Perform "Removing Adapter Cables" on page 3-72.
4. Remove the power supply and cooling unit (or optional power supply). Refer to"Power Supplies or Cooling Units" on page 3-63.
5. Remove the SIB (see "System Interface Board (SIB)" on page 3-66).
6. Disconnect the SCSI-2 cable connector from the top center of the SCSI-2 adapter.
7. Remove the SCSI-2 cable from the retainer clips by pulling the cable downward, then guide the SCSI cable through the opening for the system interface board and out the I/O module.

SCSI-2 cable connector
on top of SCSI-2 adapter
(inside)

Retainer Clips
(Left of System Interface Board)

Opening for System
Interface Board

SCSI-2 Adapter slot
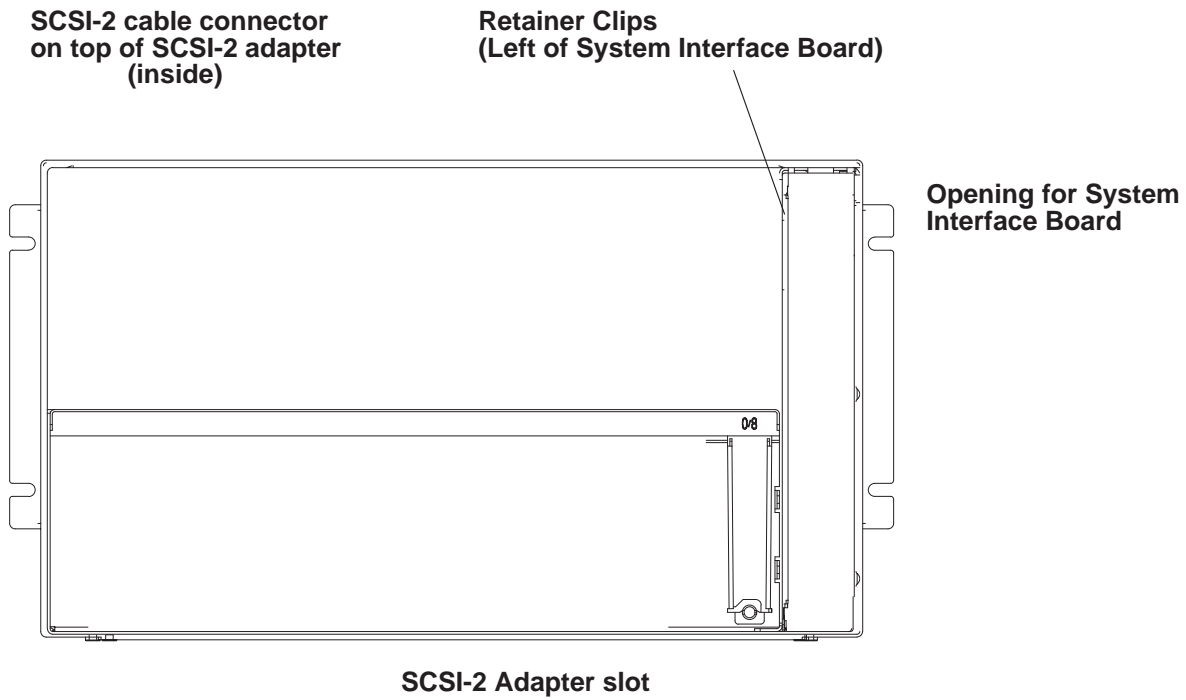
Figure   3-59. Removing the 604 or 604e High Node I/O Module

Note: The retainer screw on your right is also one of the retainer screws for attaching the system inter-
face board in the I/O module.

8. Remove the remaining retainer screw.

Retainer screw

Retainer screw
(also used for System Interface Board)

Figure   3-60. Removing the 604 or 604e High Node I/O Module

9. Loosen the docking screw on the front of the CPU module until the I/O module disengages.
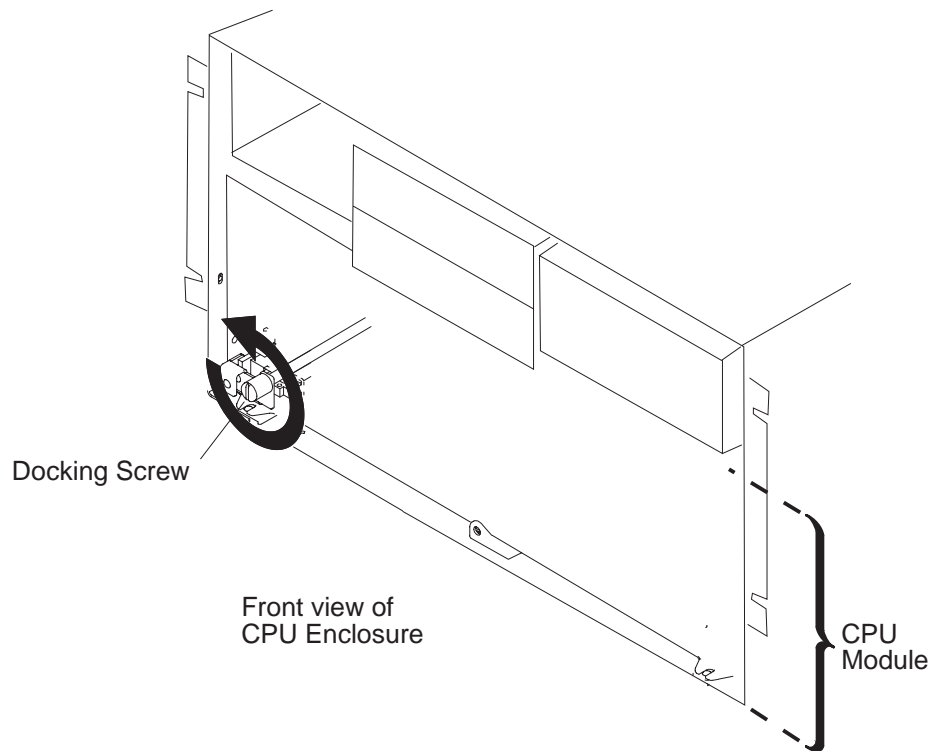
Figure 3-61. Removing the 604 or 604e High Node I/O Module

10. Slide the I/O module toward you until you can grasp the bottom of the I/O module on both sides, then remove the I/O module from the node chassis.
11. Place the I/O module on a stable surface.

I/O Module

Retainer Screw

Grasp Here on Both Sides

Retainer Screw
(Also Used for System Interface Board)
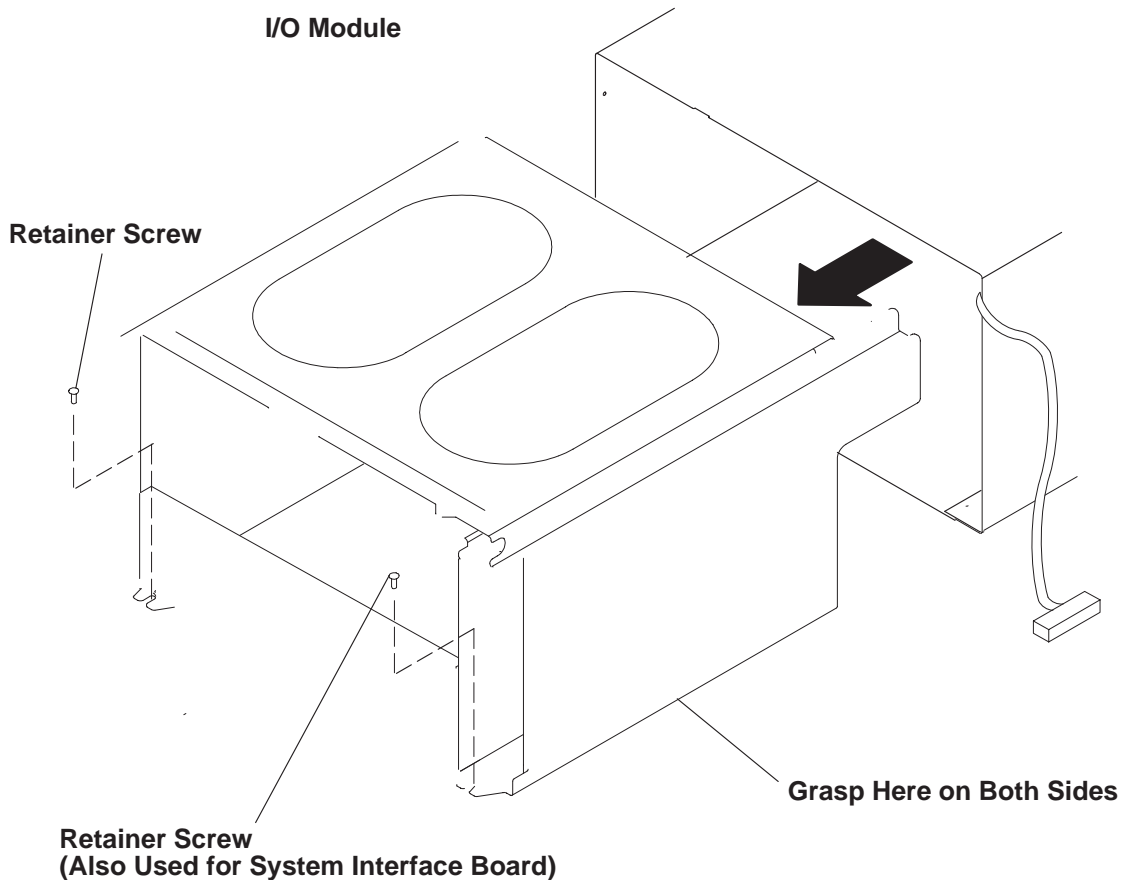
Figure   3-62. Removing the 604 or 604e High Node I/O Module

Replacing the I/O Module

1. Grasp the bottom of the I/O module with both hands and slowly slide it into the node chassis until the nut on the I/O module touches the tip of the docking screw on the CPU module.

   Note: The I/O module should easily slide into the node chassis until it touches the docking screw. When this occurs, the bottom rear edge of the I/O module should be approximately 9mm outside the bottom rear edge of the node chassis.
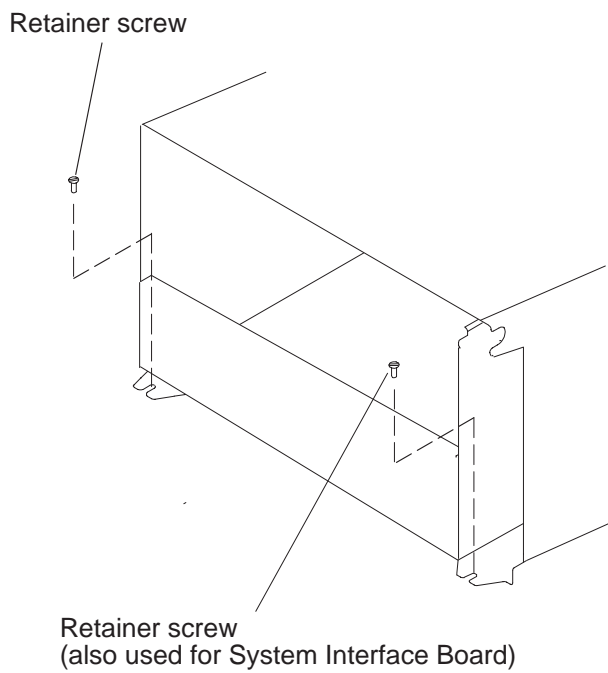
2. Turn the docking screw until the I/O module is pulled far enough into the enclosure to install the two retaining screws.
3. Install the two retaining screws but do not tighten them.
4. Tighten the docking screw.
5. Tighten the two retaining screws.
6. Guide the SCSI-2 cable in the I/O module and through the opening for the system interface board.
7. Connect the SCSI-2 cable connector to the top center of the SCSI-2 adapter.
8. Install the cable in the retainer clips.
9. Replace the SIB (see "System Interface Board (SIB)" on page 3-66).
10. Replace the cooling unit and the power supply. (Refer to "Power Supplies or Cooling Units" on page 3-63.
11. Perform "Replacing Adapter Cables" on page 3-74.
12. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
13. Place both circuit breaker assembly switches in the On ('1') position.

Lateral Planar 2 Card

Attention: After the lateral planar 2 card is installed and the system is powered-up, the system ID is down-loaded to the lateral planar 2 card from a backup source within the system. This ID becomes permanent on the lateral planar 2 and cannot be altered without special tools. Therefore, the lateral planar 2 cannot be transferred to another system. It must be returned to the plant of manufacture as a new defective part.

Attention: Lateral planar 2 and SIB EEPROMs contain the SYSID of the system. When one of the two components is to be replaced (for example the lateral planar 2), the SYSID information is copied from SIB EEPROM into the lateral planar 2 EEPROM when you start the system.

To avoid losing this information, do not replace both components at the same time. When both components are to be replaced, proceed as follows:

1. Replace the SIB and start up the system: the SYSID information is copied from lateral planar 2 EEPROM to the SIB EEPROM. (See "System Interface Board (SIB)" on page 3-66.)
2. Replace the lateral planar 2 and start up the system: the SYSID information is copied from SIB EEPROM to the lateral planar 2 EEPROM.

Removing Lateral Planar 2 Card

1. Perform "Removing the I/O Module" on page 3-67.
2. Disconnect connectors P10, P11, P12, P12A, P13, and P14.
3. Remove the mounting screw holding the air deflector, then remove the air deflector.
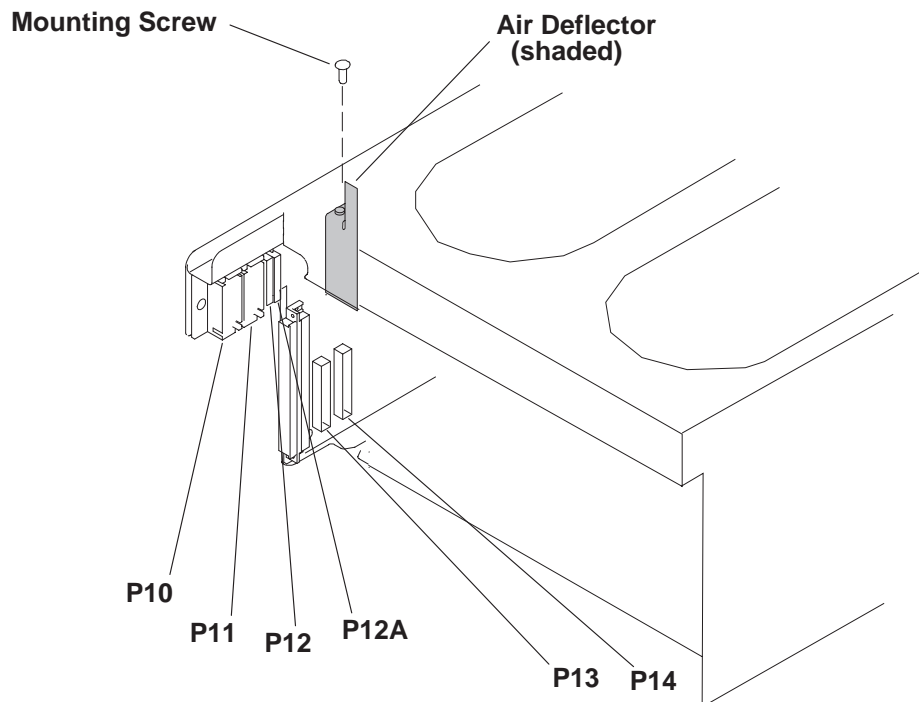
Figure   3-63. Removing the 604 or 604e High Node Lateral Planar 2 Card

4. Remove the system interface board (see "System Interface Board (SIB)" on page 3-66).
5. Remove the mounting screws.
6. If necessary, remove any other card that obstructs access to the lateral planar 2 card.
7. Pull the lateral planar 2 card away from the side of the I/O module, and then remove the lateral planar 2 card from the I/O module.

System Interface Board

Lateral Planar 2 Card
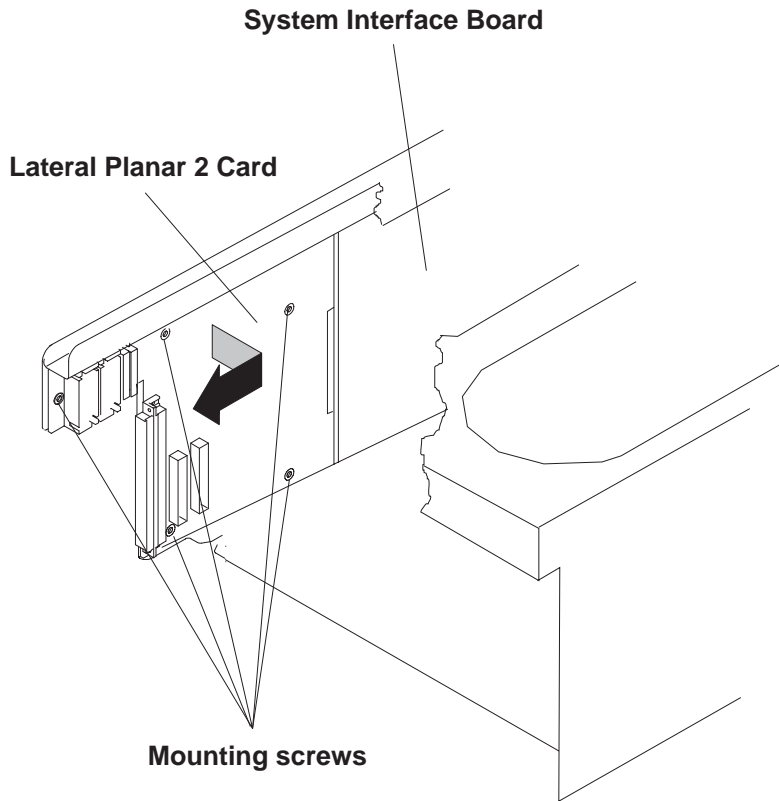
Mounting screws

Figure   3-64. Removing the 604 or 604e High Node Lateral Planar 2 Card

Replacing Lateral Planar 2 Card

1. Replace the lateral planar 2 card in the I/O module.
2. If necessary, replace any other card that was removed.
3. Replace the mounting screws.
4. Replace the system interface board (see "System Interface Board (SIB)" on page 3-66).
5. Replace the air deflector and secure with the mounting screw.
6. Install connectors P10, P11, P12, P12A, P13, and P14.
7. Perform "Replacing the I/O Module" on page 3-70.

Removing Adapter Cables

DANGER

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

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

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

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

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

1. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
2. Place both circuit breaker assembly switches in the Off ('0') position.
3. Record the location and label each adapter cable being removed.
4. To remove adapter cables, do either of the following:

   - If screws are used to connect the adapter cable connector to the adapter, remove the screws, then remove the cable.

   - If retainer clips are used to connect the adapter cable connector to the adapter, rotate the clips away from the cable connector, then remove the cable.

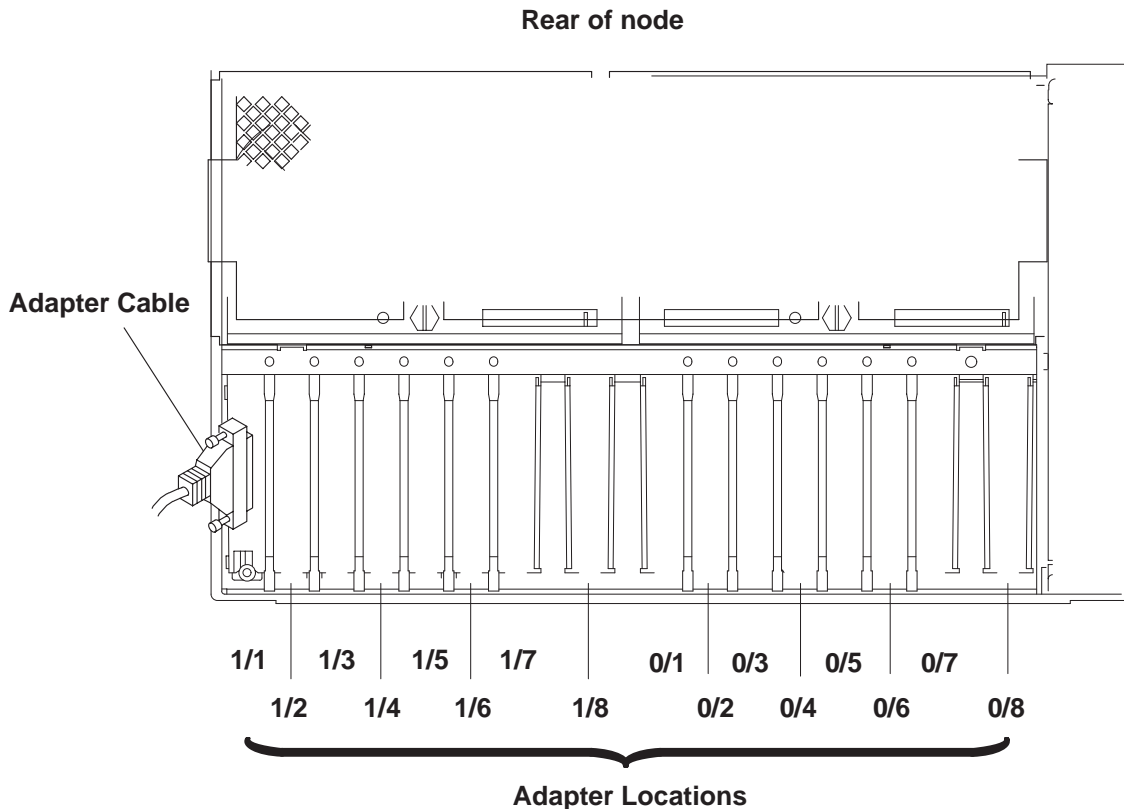   - For BNC connectors, twist counter-clockwise and remove.

Rear of node

Figure 3-65. Removing the 604 or 604e High Node Adapter Cable

Replacing Adapter Cables

1. To replace an adapter cable (labeled in the removal procedure), do either of the following:

   - If screws are used to connect the adapter cable connector to the adapter, replace the cable and secure with two screws.

   - If retainer clips are used to connect the adapter cable connector to the adapter, replace the cable and rotate the clips toward the cable connector.

   - For BNC connectors, line up pins and twist clockwise until tightened.

2. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
3. Place both circuit breaker assembly switches in the On ('1') position.

Removing an Adapter

1. Ensure ESD antistatic wrist device is attached.
2. Remove the power supply or cooling unit located above the adapter you are removing (see "Power Supplies or Cooling Units" on page 3-63).
3. Perform "Removing Adapter Cables" on page 3-72 for the adapter you are removing.
4. Loosen the thumbscrew on the adapter you are removing.

   Note: If you are removing the SCSI-2 adapter, disconnect the SCSI-2 cable from the top center of the SCSI-2 adapter.

5. Reach through the access opening above the adapters, then lift both ends of the top of the adapter until the adapter disconnects from the slot.
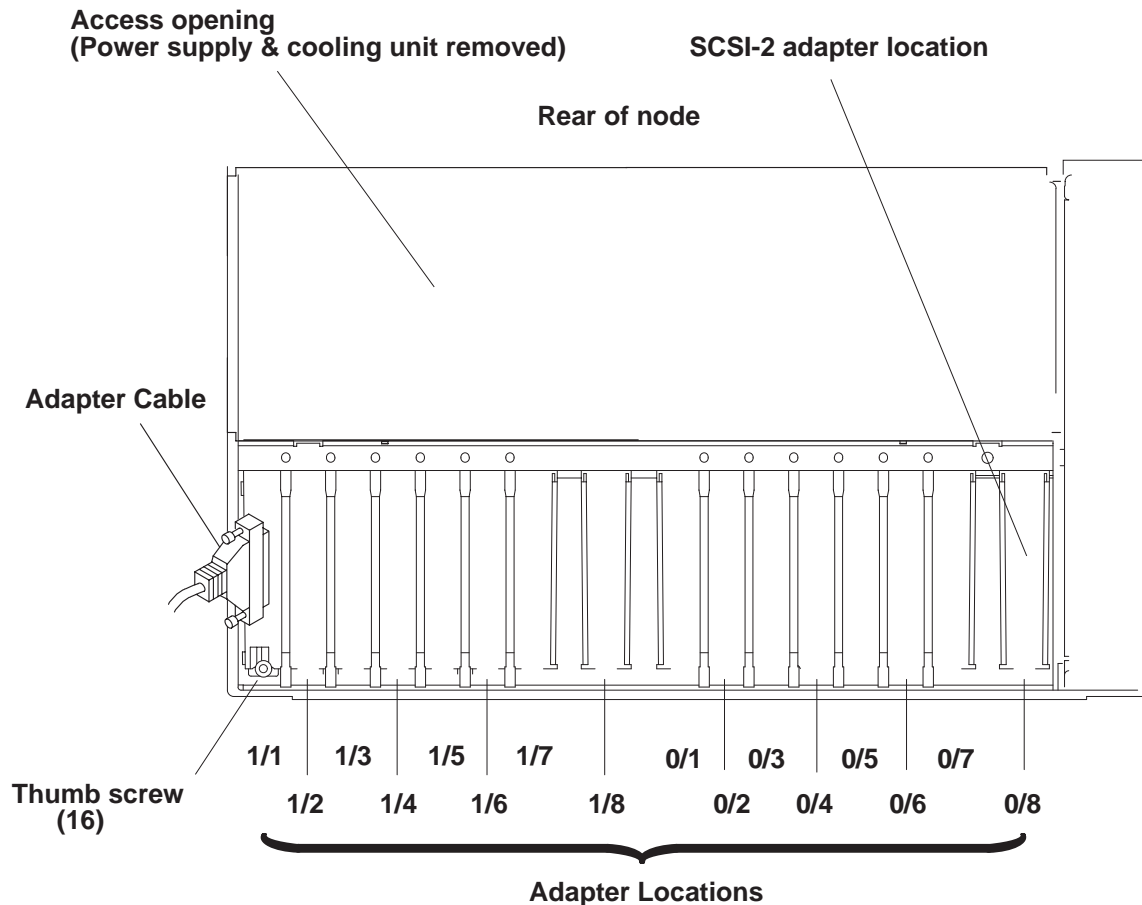6. Remove the adapter from the I/O module.

Figure 3-66. Removing the 604 or 604e High Node Adapter

Replacing an Adapter

1. Ensure ESD antistatic wrist device is attached.
2. Insert the adapter in the I/O module slot and push down evenly on the adapter until it is securely engaged.
3. Tighten the thumbscrew on the adapter you are replacing.

   Note: If you are replacing the SCSI-2 adapter, connect the SCSI-2 cable on the top center of the SCSI-2 adapter.

4. Perform "Replacing Adapter Cables" on page 3-74 for the adapter you are replacing.
5. Replace the power supply or cooling unit above the adapter (see "Power Supplies or Cooling Units" on page 3-63).

Removing I/O Module Flex Cables

1. Perform "Removing the I/O Module" on page 3-67.
2. If any adapters are located over the flex cables, perform "Removing an Adapter" on page 3-74.
3. Flex cables:

   • If you are removing the flex cable attached to the I/O planar 0, remove the two guide pins.

   Attention: To prevent damage to the guide pins, do not use pliers to remove them. Use an open-end wrench in the slots in the pins.

   • If you are removing the flex cable attached to the I/O planar 1, then remove the two large, slot-head mounting screws.

4. Disconnect the flex cable from the I/O planar, and then remove the flex cable.
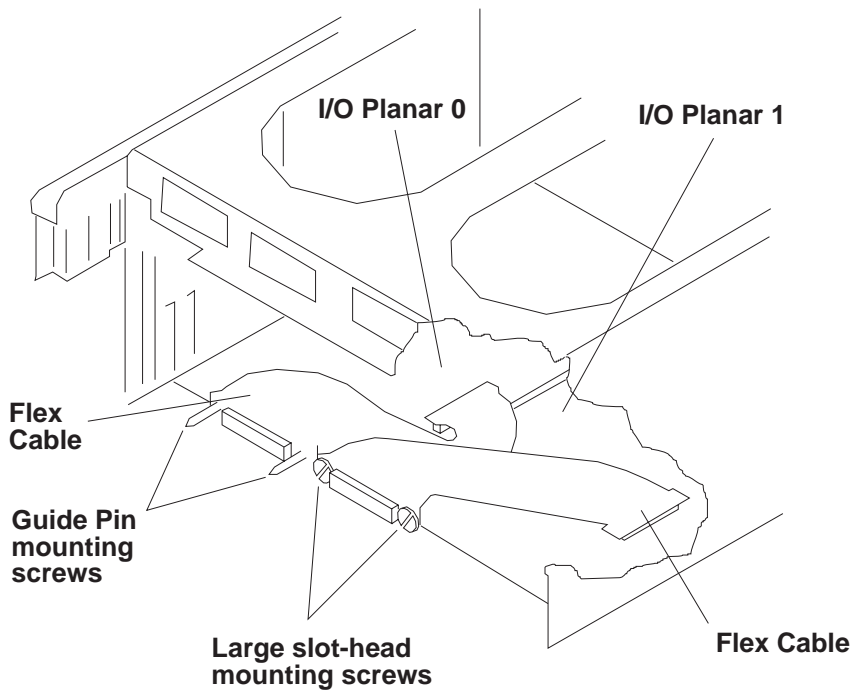

Figure 3-67. Removing the 604 or 604e High Node I/O Module Flex Cables

Replacing I/O Module Flex Cables

1. Connect the flex cable to the I/O planar.
2. If you removed the flex cable from I/O planar 0, then replace the two guide pin mounting screws.

   If you removed the flex cable from I/O planar 1, then replace the two large slotted-head mounting screws.
3. Perform "Replacing an Adapter" on page 3-75 to replace all adapters that were previously removed.
4. Perform "Replacing the I/O Module" on page 3-70.

Removing I/O Planar Power Cables

1. Perform "Removing the I/O Module" on page 3-67.
2. If any adapters are located over the I/O planar power cables, perform "Removing an Adapter" on page 3-74.

   Attention: To prevent damage to the flex cables it is important to remove the I/O module flex cables before removing or replacing the I/O planar power cables.
3. Perform "Removing I/O Module Flex Cables" on page 3-75 to access the connectors for the I/O planar power cables.
4. Remove the mounting nut on each of the cable retainers.

   Note: If you are removing both power cables, record the location of the connectors and note how the cables are positioned.

5. Remove the shipping tape from the top of the I/O planar power cable you are removing.
6. Disconnect the I/O planar power cable connector on the I/O planar.
7. Depending on the I/O planar power cable connector you are removing, disconnect either P13 or P14 on the lateral planar 2 card, then remove the I/O planar power cable.
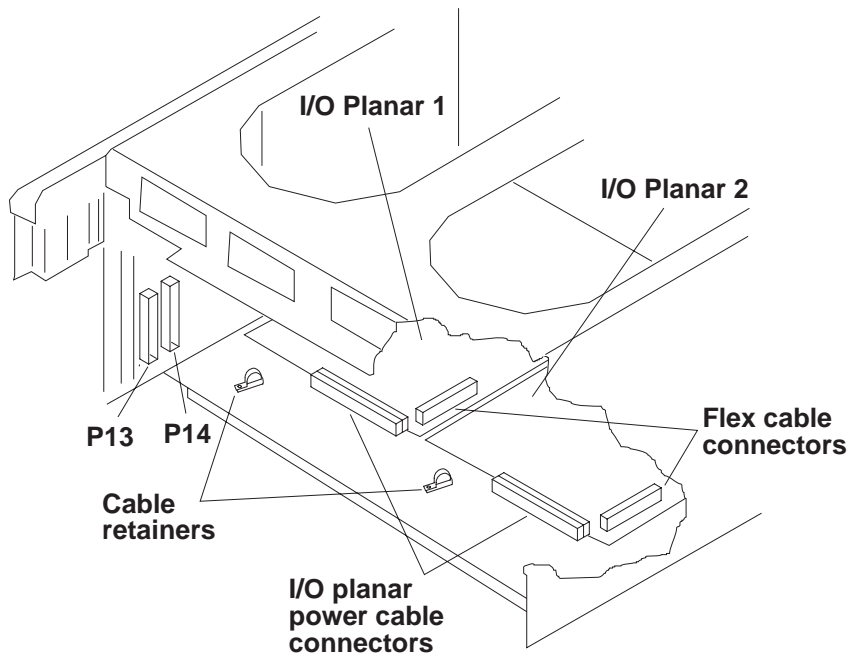
Figure 3-68. Removing the 604 or 604e High Node I/O Planar Power Cables

Replacing I/O Planar Power Cables

1. Depending on the I/O planar power cable connector you removed, connect either P13 or P14 on the lateral planar 2 card.
2. Connect the I/O planar power cable connector to the I/O planar.
3. Replace the mounting nut on each of the cable retainers.
4. Perform "Replacing I/O Module Flex Cables" on page 3-76.
5. Perform "Replacing an Adapter" on page 3-75 to replace all adapters that were previously removed.
6. Perform "Replacing the I/O Module" on page 3-70.

Removing I/O Planars

1. Ensure ESD antistatic wrist device is attached.
2. Perform "Removing the I/O Module" on page 3-67.
3. Remove all adapters installed on the I/O planar you are removing, see "Removing an Adapter" on page 3-74.
4. To access the mounting screws on the I/O planars, disconnect both flex cable connectors, see "Removing I/O Module Flex Cables" on page 3-75.
5. Disconnect the power cable connector from the rear of the I/O planar you are removing.
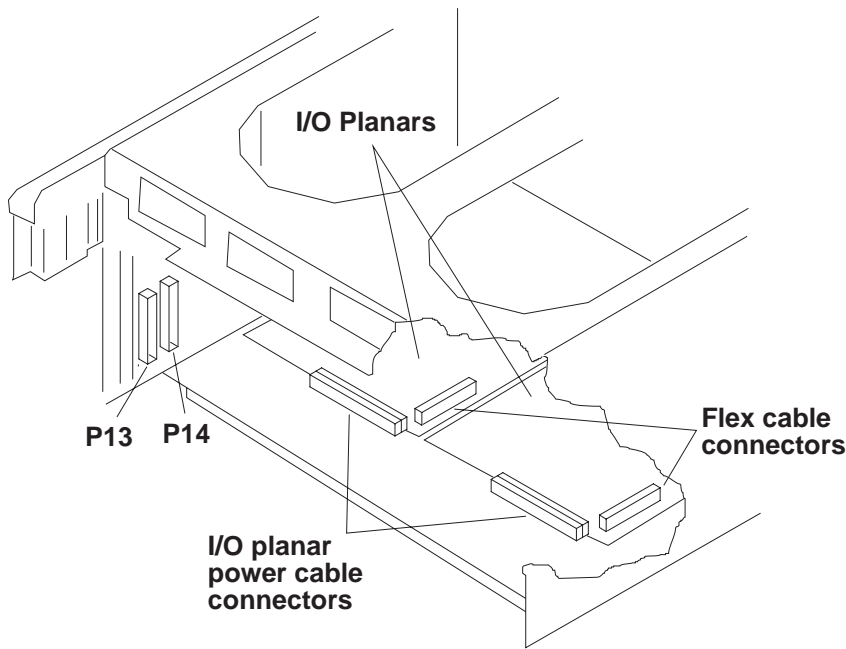
Figure   3-69. Removing the 604 or 604e High Node I/O Planars

Note: Before removing the mounting screws, record the screw types and locations of all of the mounting screws.

6. Remove the seven mounting screws on the I/O planar you are removing, and then remove the I/O planar from the I/O module.
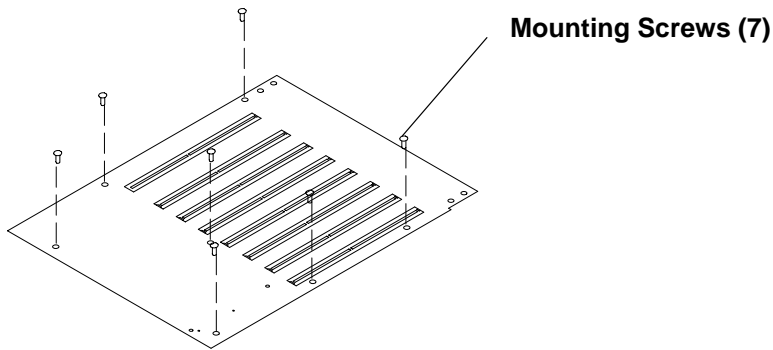
Figure   3-70. Removing the 604 or 604e High Node I/O Planars

Replacing I/O Planars

1. Ensure ESD antistatic wrist device is attached.
2. Replace the I/O planar in the I/O module, then secure with seven mounting screws, installing the screw types and locations as recorded in the removal procedure.
3. Connect the power cable connector in the rear of the I/O planar.
4. Connect both flex cable connectors, see "Replacing I/O Module Flex Cables" on page 3-76.
5. Replace all adapters on the I/O planar that you removed, see "Replacing an Adapter" on page 3-75.
6. Perform "Replacing the I/O Module" on page 3-70.

Removing Power Distribution Cables

1. Remove the power supply and either the cooling unit or optional power supply, see "Power Supplies or Cooling Units" on page 3-63.
2. Perform "Removing the I/O Module" on page 3-67.
3. Carefully cut the cable restraint strap for the power distribution cable.
4. Disconnect connectors P10, P11, P12, and P12A located on the lateral planar 2 card.
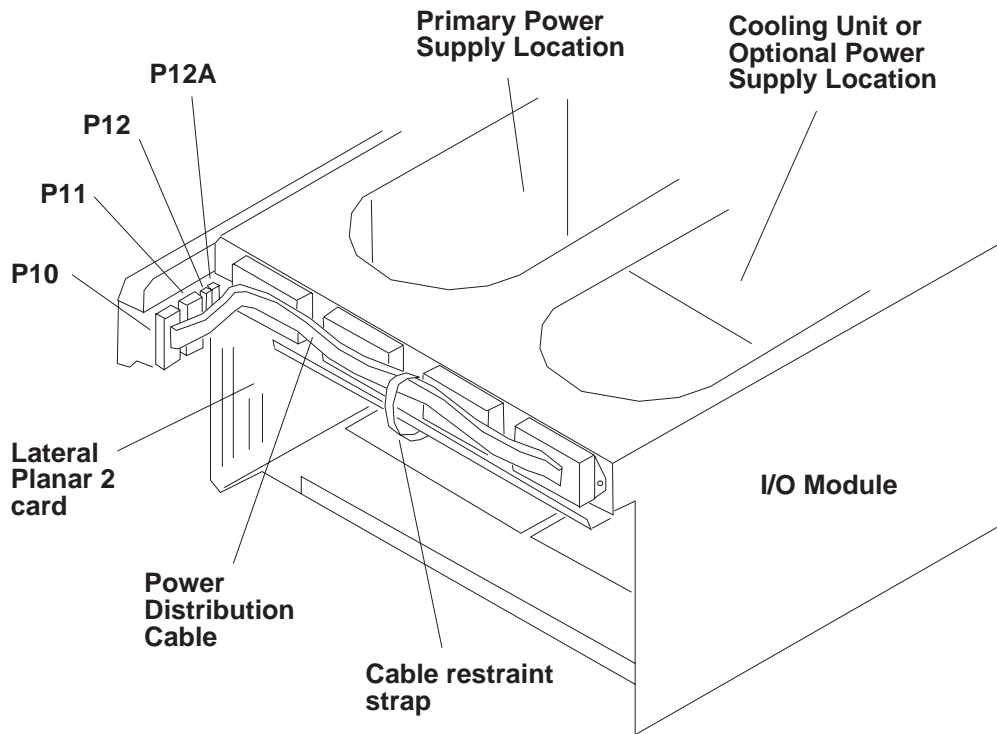
Figure   3-71. Removing the 604 or 604e High Node Power Distribution Cables

Note: The docking connector mounting screws for the primary power supply, cooling unit, and optional power supply are located inside the I/O module

5. Remove the power distribution cable:

   - If you are removing the power distribution cable for the optional power supply, remove the two mounting screws on the two optional power supply docking connectors, then remove the power distribution cable.

   - If you are removing the power distribution cable for the primary power supply, remove the two mounting screws on the two power supply docking connectors, and then remove the power distribution cable.

Power Distribution Cable

Primary Power Supply Location

Cooling Unit or Optional Power Supply Location

I/O Module

Docking Connectors for Primary Power Supply

Docking Connector for Optional Power Supply or Cooling Unit

Mounting screws (two per connector - located inside I/O module)
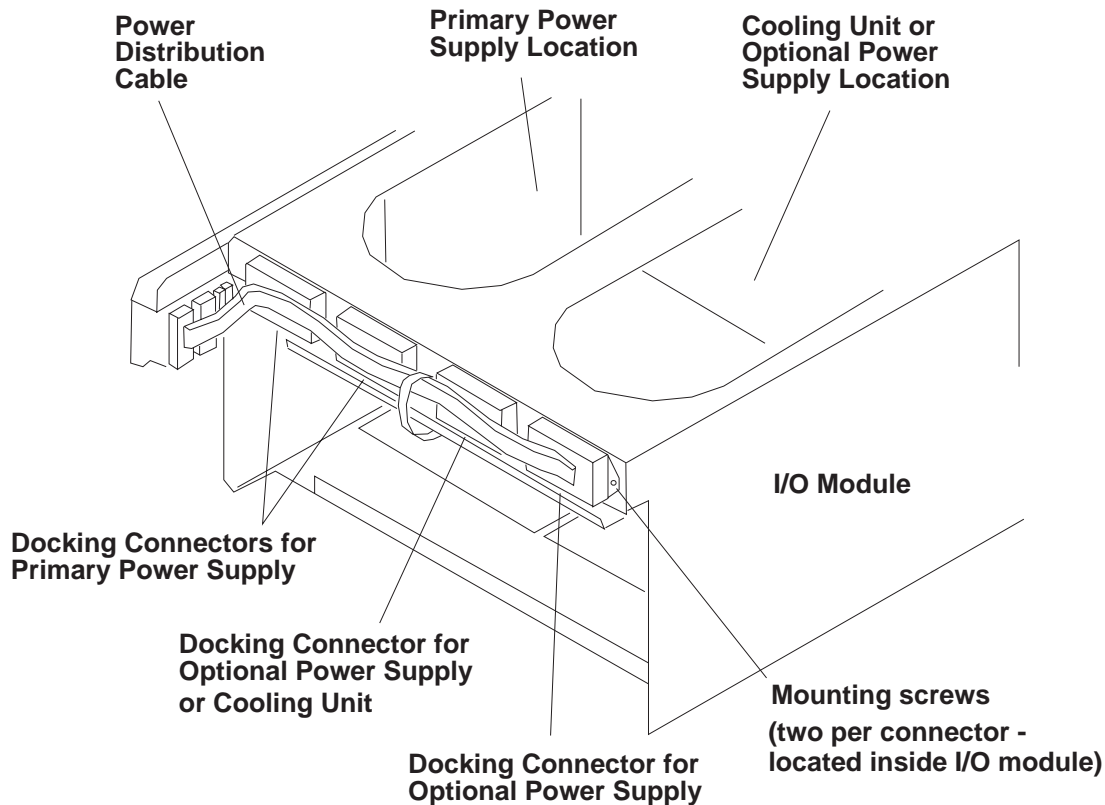
Docking Connector for Optional Power Supply

Figure   3-72. Removing the 604 or 604e High Node Power Distribution Cables

Replacing Power Distribution Cables

Note: Ensure that a new cable restraint strap is installed around the power distribution cables before replacing the I/O module into the CPU enclosure.

 1. Replace the power distribution cable:

   - If you are removed the power distribution cable for the optional power supply, replace the two mounting screws on the two optional power supply docking connectors.

   - If you are removed the power distribution cable for the primary power supply, replace the two mounting screws on the two power supply docking connectors.

Note: The docking connector mounting screws for the primary power supply, cooling unit, and optional power supply are located inside the I/O module

 2. Install connectors P10, P11, P12, and P12A on the lateral planar 2 card.
 3. Install a new cable restraint strap for the power distribution cable.
 4. Perform "Replacing the I/O Module" on page 3-70.
 5. Replace the power supply and either the cooling unit or optional power supply, see "Power Supplies or Cooling Units" on page 3-63.

Removing the Node Supervisor Card

 1. Ensure ESD antistatic wrist device is attached.
 2. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
 3. Place both circuit breaker assembly switches in the Off ('0') position.
 4. Disconnect the serial adapter cable from the supervisor card.
 5. Remove the two screws that secure the card to the bracket assembly and remove the card.

Replacing the Node Supervisor Card

1. Ensure ESD antistatic wrist device is attached.
2. Slide card into bracket assembly and secure with two screws.
3. Reinstall the serial adapter cable to the supervisor card.
4. Place both circuit breaker assembly switches in the On ('1') position.
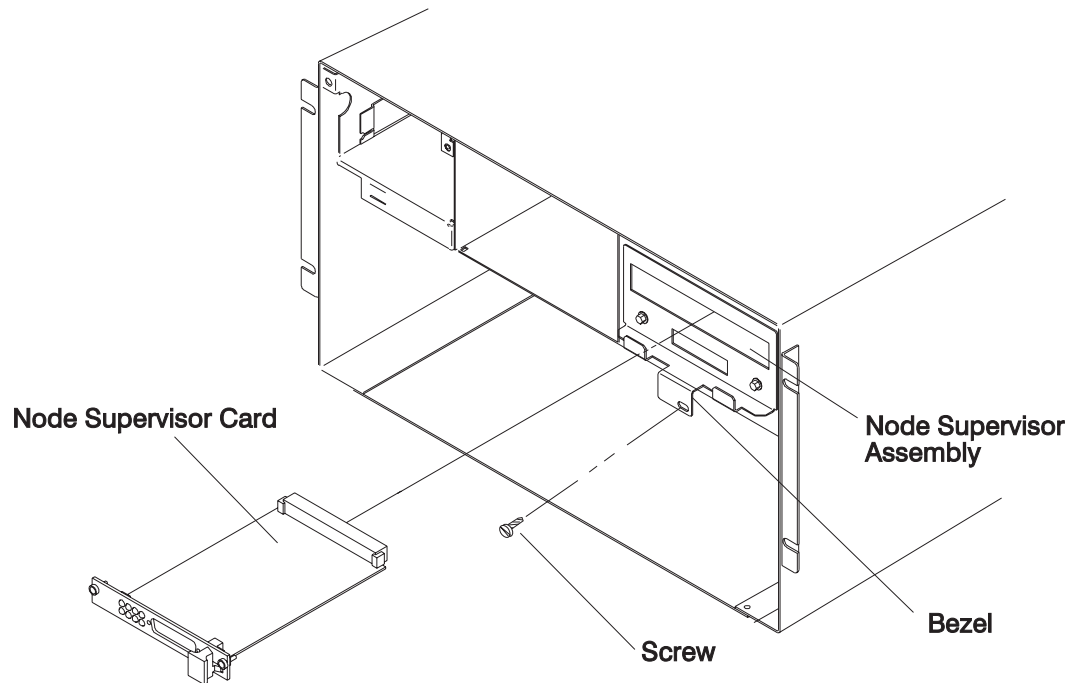5. Perform "Updating the Node Supervisor Code" on page 2-21.

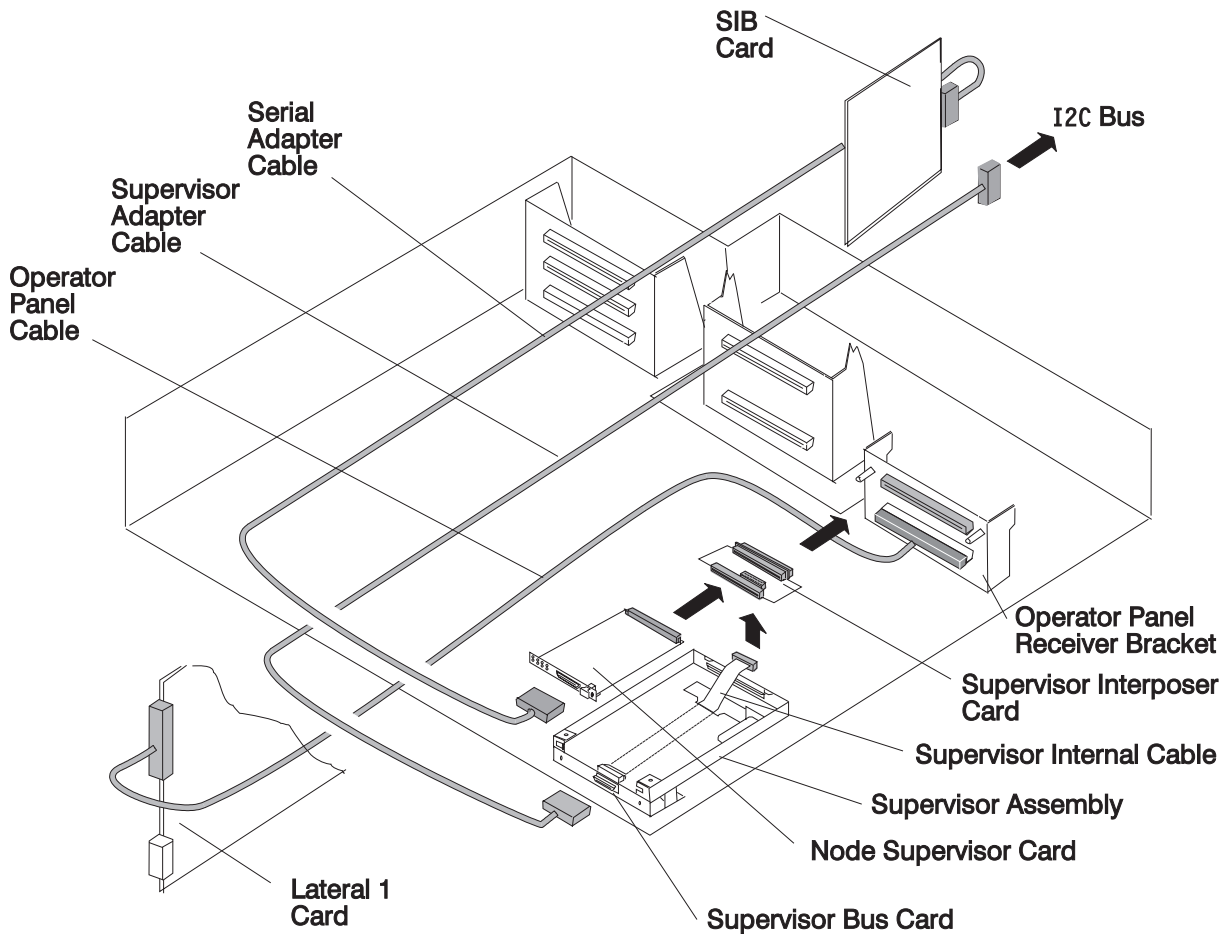*Figure   3-73. Removing the 604 or 604e High Node Supervisor Card*

Figure 3-74. 604 or 604e High Node Supervisor Data Flow

Removing the Node Supervisor Assembly

Note: This procedure will drop power to the NVRAM.

1. Ensure ESD antistatic wrist device is attached.
2. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e High Node.
3. Place both circuit breaker assembly switches in the Off ('0') position.
4. Disconnect the supervisor adapter cable from the bottom of the assembly.
5. Disconnect the serial adapter cable from the supervisor card.
6. Remove the screw from the front of the supervisor assembly bezel (see Figure 3-73 on page 3-81).
7. Remove the assembly by pulling on the bezel.

Replacing the Node Supervisor Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Slide the supervisor assembly into the bracket assembly.
3. Replace the screw in the front of the supervisor assembly bezel.
4. Reinstall the serial adapter cable to the supervisor card.
5. Reinstall the supervisor adapter cable to the bottom of the assembly.
6. Place both circuit breaker assembly switches in the On ('1') position.
7. Perform "Updating the Node Supervisor Code" on page 2-21.

Removing the DASD

1. At the front of the frame, locate the circuit breaker assembly below the 604 or 604e high node.
2. Set both circuit breakers in the Off ('0') position.
3. Remove the power cables plugged into power supplies in the rear of the 604 or 604e high node.
4. Remove the serial adapter cable from the supervisor card, and the node supervisor adapter cable from the bracket below it.
5. Remove tie wraps that secure cables to front cover panel (if necessary).
6. Remove the four screws that secure the front cover and remove cover.
7. Disconnect the SCSI cable:

   604   From the bulkhead connector.

   604e   From beneath the media module.

8. Remove the screw and retaining bracket from DASD module. Save for reinstallation.
9. Grasp the front of the DASD bracket and remove from the DASD module.
10. Check jumper position on DASD (if any) for address, and record for proper setting on replacement DASD (see Figure 3-12 on page 3-20).
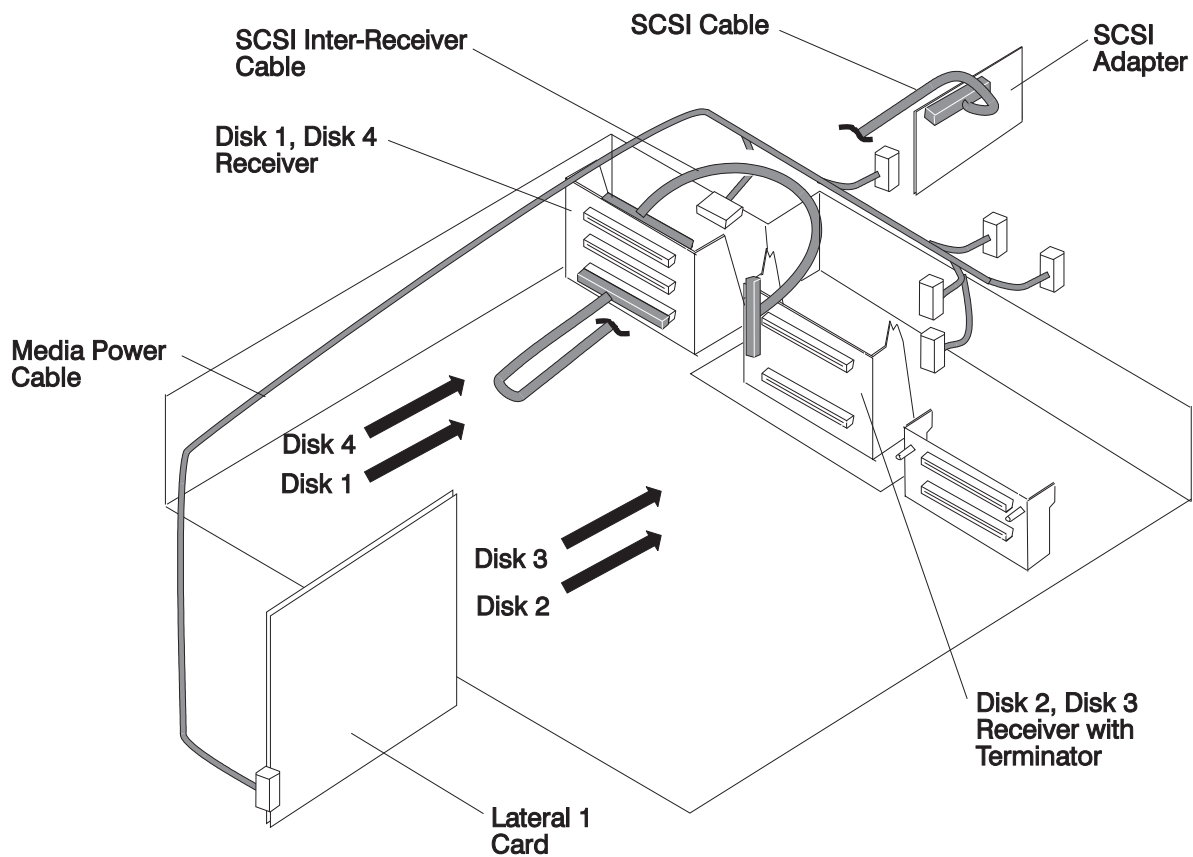

Figure   3-75. 604 or 604e High Node Media Drawer - SCSI Path and Power Cable

Attention: Use care when removing or replacing the media module in a 604e high node to prevent damage to the SCSI cable.
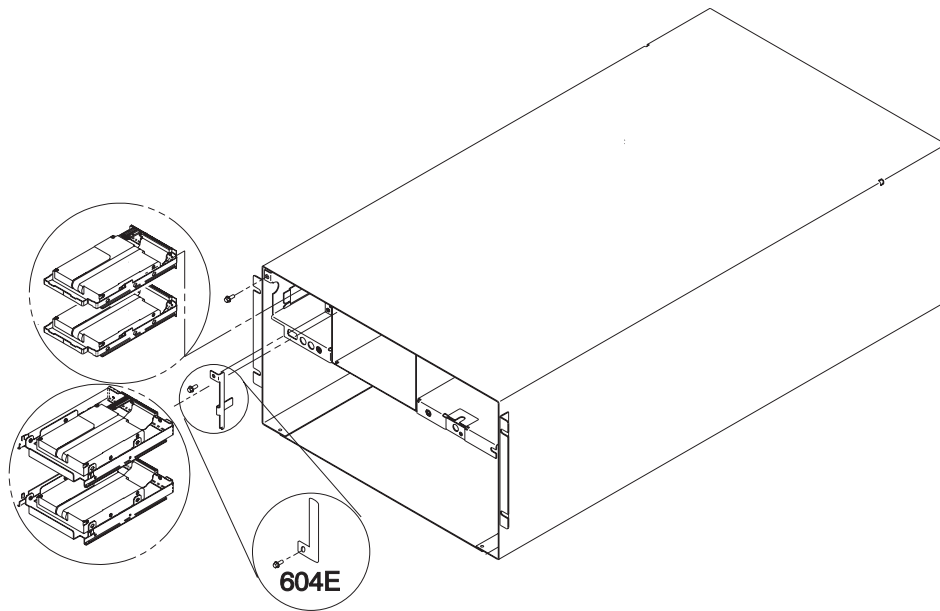
604E

Figure 3-76. Removing the 604 or 604e High Node DASD, Diagram 1

DASD 2 or 3

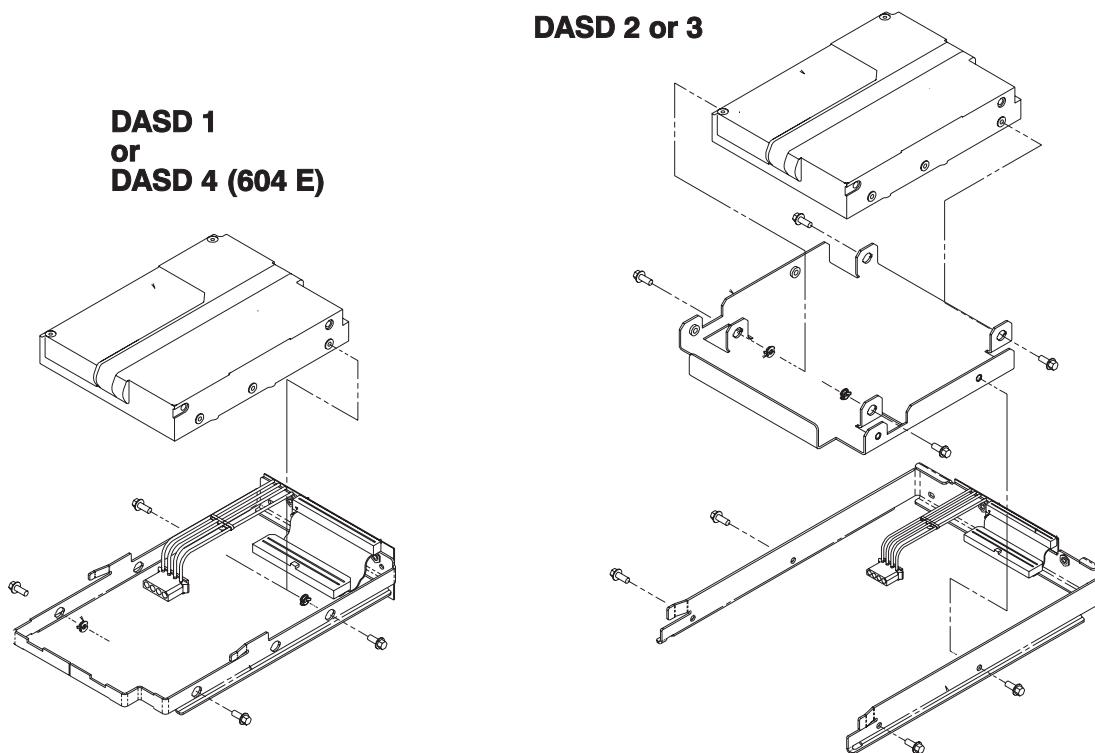**DASD 1
or
DASD 4 (604 E)**

Figure 3-77. Removing the 604 or 604e High Node DASD, Diagram 2

Replacing the DASD

1. Set jumper position on DASD (if any) for proper setting, as recorded in removal procedure.

   Note: If the replacement DASD is the same part number as the original, install jumpers in the original positions; otherwise, use Figure 3-12 on page 3-20.

2. Ensure all required DASD jumpers are installed. Refer to *Adapters, Devices, and Cable Information for Micro Channel Bus Systems*, SA38-0533, for the required jumper information.
3. Slide DASD bracket assembly into DASD module until fully seated.
4. Reinstall the retaining bracket and secure with screw.
5. Reinstall SCSI cable. (604 only)
6. Install front cover panel of the 604 or 604e high node, using the four screws removed previously.
7. Connect the serial adapter cable to the supervisor card, and the node supervisor adapter cable to the bracket below it.
8. Connect the power cables to power supplies in the rear of the 604 or 604e high node.
9. Set both switches on the circuit breaker assembly into the On ('1') position.

Removing the Circuit Breaker

Note: If you have in-line connectors, you will need EC EZ95930 to ECA020.

1. Carefully disconnect the 48-volt 604 or 604e high node power cable from the SEPBU.
2. Loosen the four screws holding the plate housing the circuit breaker assembly to the front of the frame and remove the plate. Retain screws for later installation.
3. Remove the power supply cables connected to CBJ2 at the rear of the circuit breaker assembly.
4. Remove the 604 or 604e high node power cables connected to CBJ1 at the rear of the circuit breaker assembly.
5. Remove the two screws holding the circuit breaker housing cover and remove the housing cover. Retain screws for later installation.
6. Remove the circuit breaker(s) retaining screws, nuts and washers for later installation
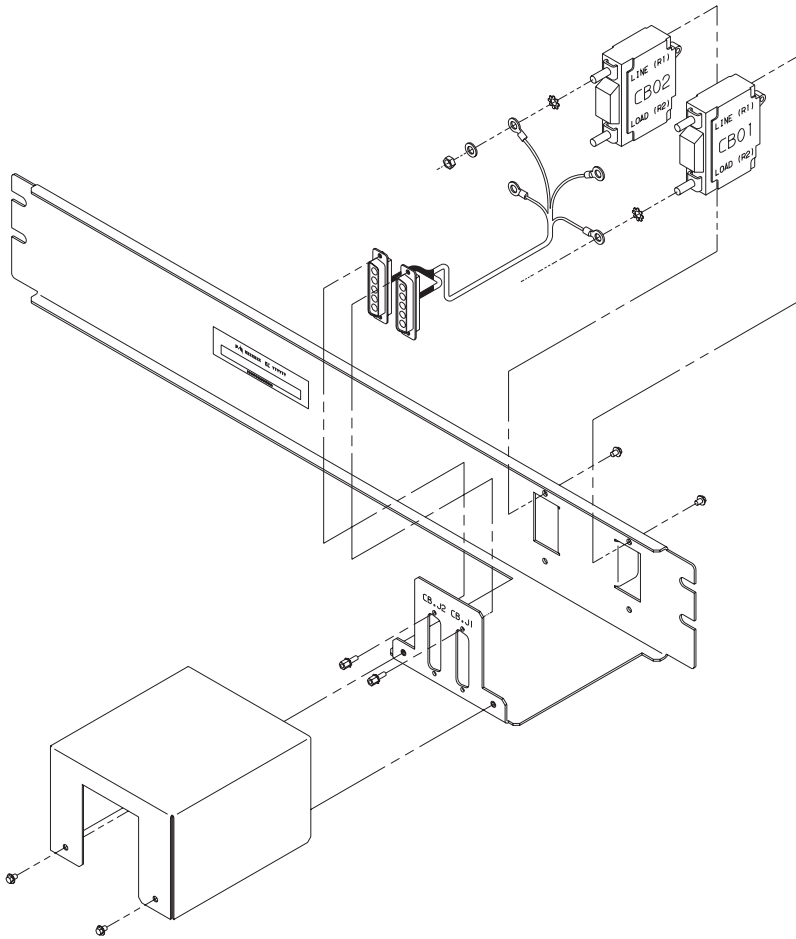
Figure 3-78. Removing the 604 or 604e High Node Circuit Breaker

Replacing the Circuit Breaker

1. Install the circuit breaker(s) using screws, nuts and washers retained from removal task.
2. Install the circuit breaker housing cover and tighten the screws retained from removal task.
3. Connect the 604 or 604e high node power cables to CBJ1 at the rear of the circuit breaker assembly.
4. Connect the power supply cables to CBJ2 at the rear of the circuit breaker assembly.
5. Install the plate housing the circuit breaker assembly to the front of the frame and tighten screws retained from removal task.
6. Set the circuit breakers in the Off ('0') position.

Removing the Power Cable (at CBJ1)

1. Carefully disconnect the 48- volt 604 or 604e high node power cable from the SEPBU.
2. Loosen the four screws holding the plate housing the circuit breaker assembly to the front of the frame and remove the plate. Retain screws for later installation.
3. Remove the 604 or 604e high node power cables connected to CBJ1 at the rear of the circuit breaker assembly.

Replacing the Power Cable (at CBJ1)

1. Connect the 604 or 604e high node power cables to CBJ1 at the rear of the circuit breaker assembly.
2. Install the plate housing the circuit breaker assembly to the front of the frame and tighten screws retained from removal task.
3. Set the circuit breakers in the Off ('0') position.
4. Carefully connect the 48-volt 604 or 604e high node power cable to the SEPBU. (Line up the arrows at the tops of the connectors.)

Removing the Power Supply Cable (at CBJ2)

1. Loosen the four screws holding the plate housing the circuit breaker assembly to the front of the frame and remove the plate. Retain screws for later installation.
2. Remove the power supply cables connected to CBJ2 at the rear of the circuit breaker assembly.
3. Remove the power supply cables from the power supplies at the rear of the 604 or 604e high node.
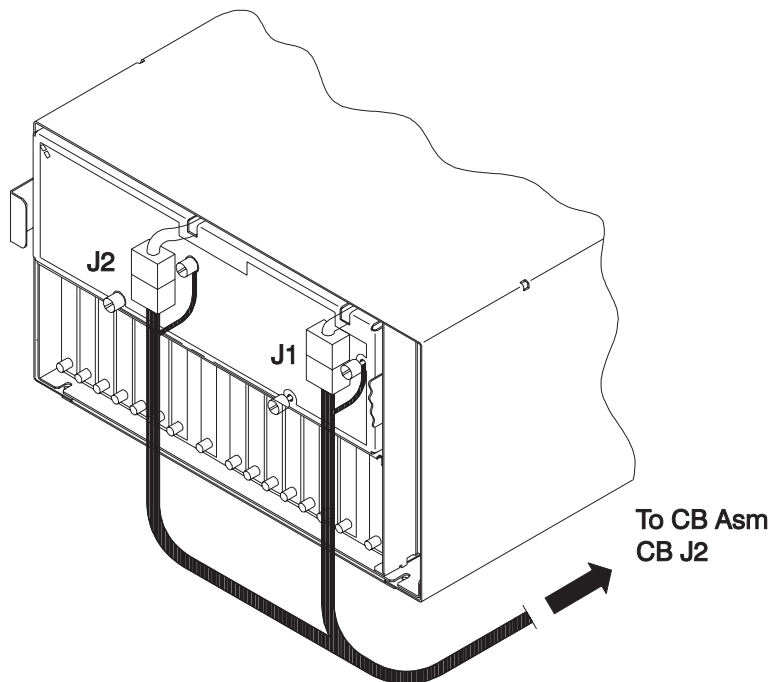
Figure   3-79. Removing the 604 or 604e High Node Power Supply Cable

Replacing the Power Supply Cable (at CBJ2)

1. Connect the power supply cables to the power supplies at the rear of the 604 or 604e high node.
2. Connect the power supply cables to CBJ2 at the rear of the circuit breaker assembly.
3. Install the plate housing the circuit breaker assembly to the front of the frame and tighten screws retained from removal task.
4. Set the circuit breakers in the Off ('0') position.

Procedures for 332 MHz SMP Processor Nodes

These procedures cover the removal and replacement of the 332 MHz SMP wide and thin node components.

Note: A 5.5 mm socket is required to perform some of the following service procedures.

Figure 3-80. 332 MHz SMP Node High Level Component Diagram

Figure 3-81. 332 MHz SMP Processor Node (Top View)

Removing a 332 MHz SMP Thin Node

1. Ensure that the thin node is offline (shutdown) from the control workstation and powered off from the control workstation.
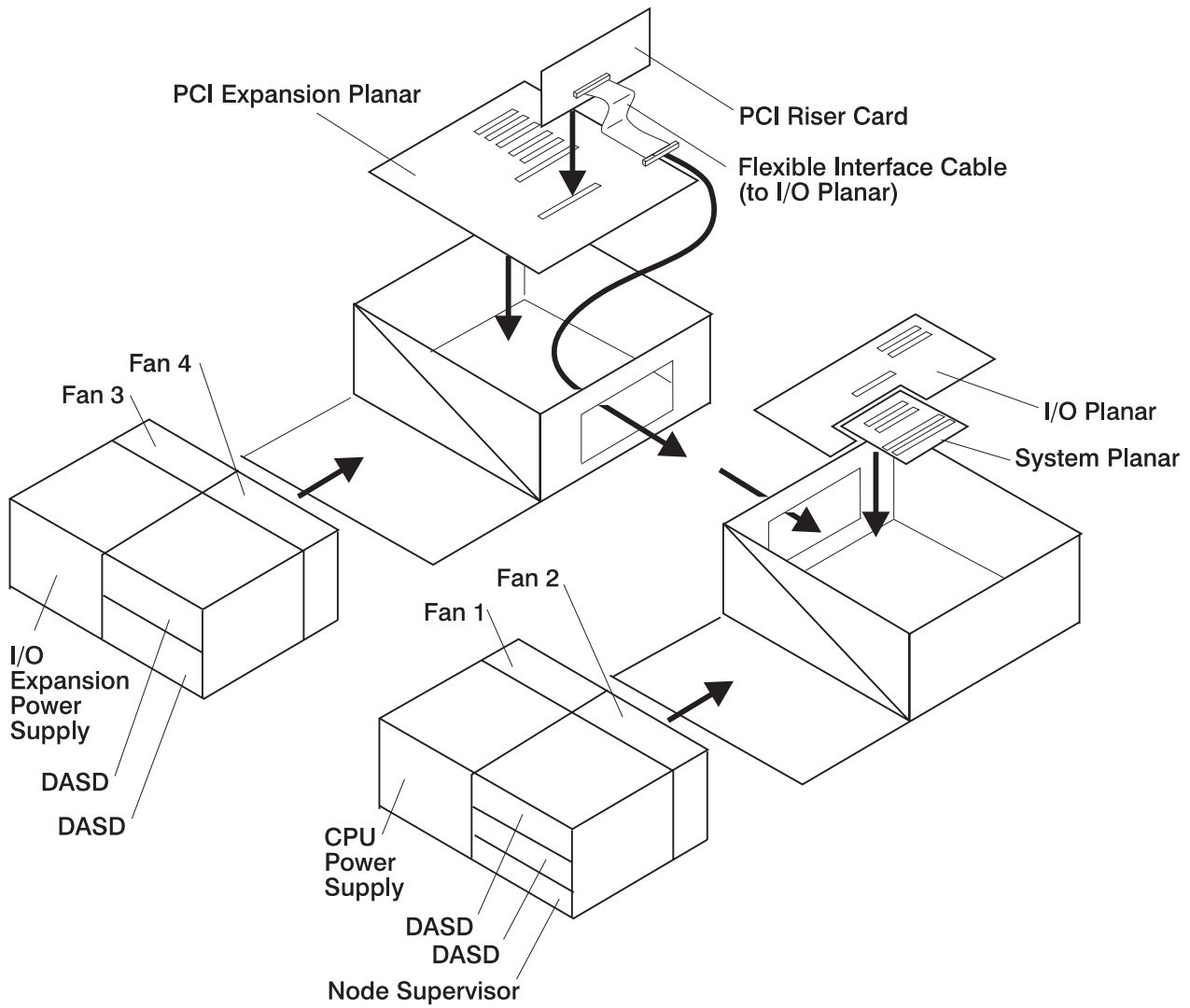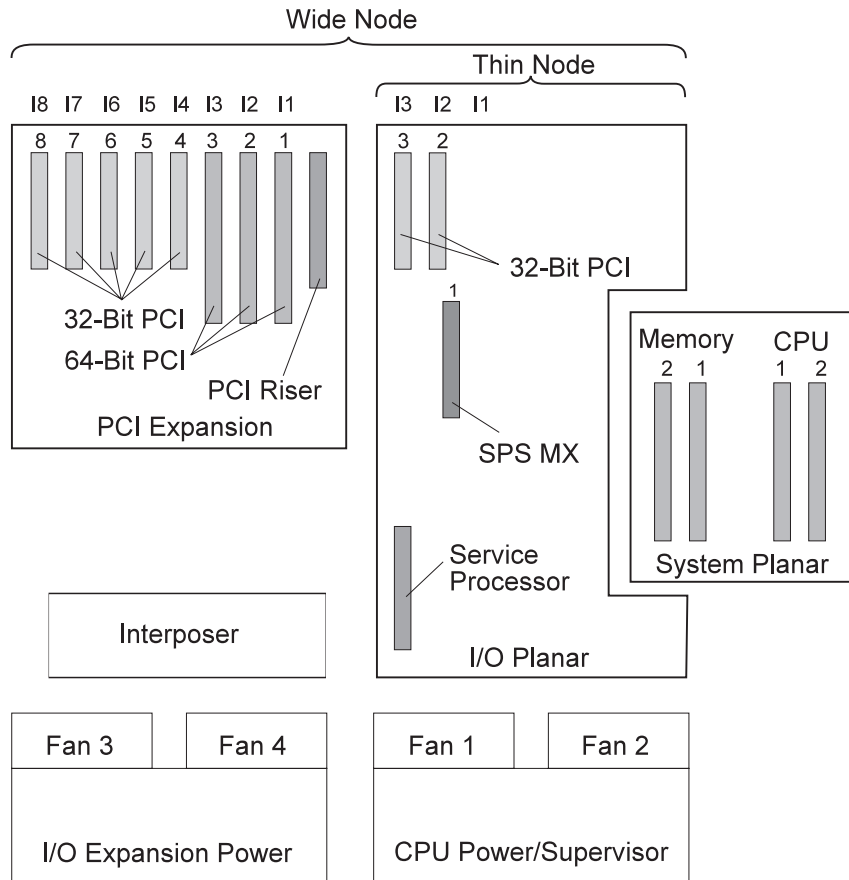2. Ensure the thin node power supply switch is in the Off ('0') position.
3. Ensure the 48-volt input cable switch is in the Off ('0') position.
4. Remove all attached cables from the rear of the thin node.
5. After removing the 48-volt input cable, place a protective cover (p/n 48G3055) over the plug end. The cover is supplied with the ship group.
6. Remove the CPU power assembly using the steps in "Removing the CPU and I/O Expansion Power Assemblies" on page 3-91.
7. Remove the hold-down screws located at the rear of the thin node.
8. Remove the thin node from the front of the frame.
9. Return to the procedure that directed you here.

Replacing a 332 MHz SMP Thin Node

1. Reinstall the thin node in the front of the frame.
2. Reinstall the hold-down screws located at the rear of the thin node.
3. Reinstall the CPU power assembly using the steps in "Replacing the CPU and I/O Expansion Power Assemblies" on page 3-91.
4. Remove the protective cover (p/n 48G3055) from the 48-volt input cable in J8. Ensure the alignment arrow is pointing to the bottom of the connector. Store the protective cover with the ship group tools.
5. Reattach all cables that were removed from the rear of the thin node.
6. Ensure the 48-volt input cable switch is in the On ('1') position.

7. Ensure the thin node power supply switch is in the On ('1') position.
8. Return to the procedure that directed you here.

Figure 3-82. 332 MHz SMP Thin and Wide Nodes

Removing a 332 MHz SMP Wide Node

1. Ensure that the node is offline (shutdown) from the control workstation and powered off from the control workstation.
2. Ensure the wide node power supply switches are in the Off ('0') position.
3. Ensure the 48-volt input cable switches are in the Off ('0') position.
4. Remove all attached cables from the rear of the node.
5. After removing the 48-volt input cables, place protective covers (p/n 48G3055) over the plug ends. The covers are supplied with the ship group.
6. Remove the CPU power assembly and the I/O expansion power assembly using the steps in "Removing the CPU and I/O Expansion Power Assemblies" on page 3-91.
7. Remove the hold-down screws located at the rear of the node.
8. Remove the wide node from the front of the frame.
9. Return to the procedure that directed you here.

Replacing a 332 MHz SMP Wide Processor Node

1. Reinstall the wide node in the front of the frame.
2. Reinstall the hold-down screws located at the rear of the node.
3. Reinstall the CPU power assembly and the I/O expansion power assembly using the steps in "Replacing the CPU and I/O Expansion Power Assemblies" on page 3-91.
4. Remove the protective covers (p/n 48G3055) from the 48-volt input cables. Store the protective covers with the ship group tools.
5. Connect the cable to both J8 connectors. Ensure the alignment arrows are pointing to the bottom of the connectors.
6. Reattach all of the cables that were removed from the rear of the node.
7. Ensure the 48-volt input cable switches are in the On ('1') position.
8. Ensure the wide node power supply switches are in the On ('1') position.
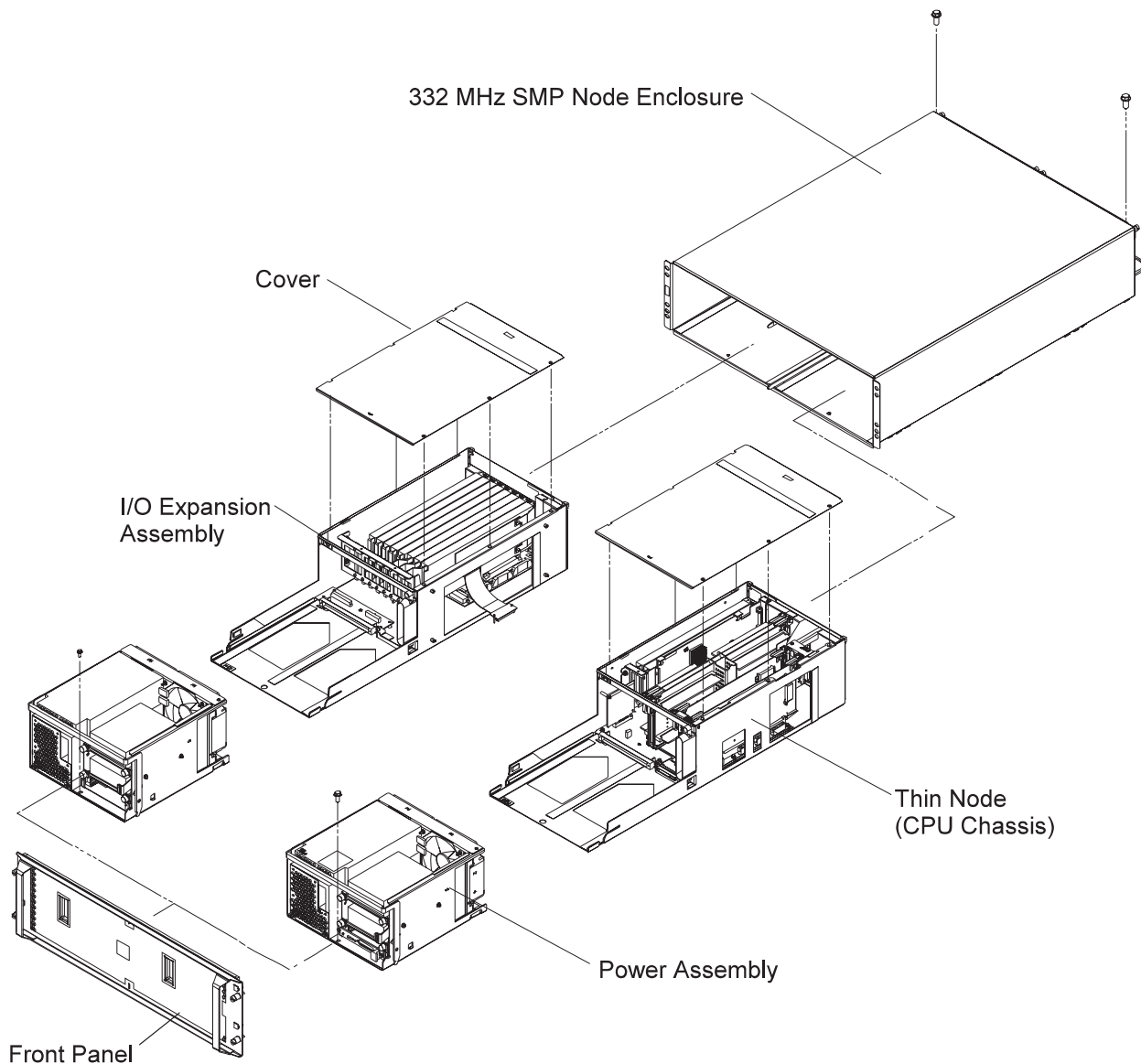9. Return to the procedure that directed you here.

Removing the CPU and I/O Expansion Power Assemblies

1. Ensure that the processor node is offline (shutdown) from the control workstation and powered off from the control workstation.
2. Ensure the node power supply circuit breakers in the Off ('0') position.
3. Ensure the 48-volt input cable inline circuit breakers are in the Off ('0') position.
4. Remove the front cover panel by removing the screws. Retain the screws for later installation.
5. If necessary, unplug the 4-drop DASD cable from the I/O expansion assembly.
6. Remove the retaining screw at the front of the power assembly and retain for later use.
7. Pull forward and down on the power interlock bar to unlatch and remove the power assembly.
8. If you are replacing the power assembly with a new assembly, continue with 9. Otherwise, return to the procedure that directed you here.
9. Remove the supervisor card using the steps in "Removing the Node Supervisor Card" on page 3-94.
10. Record the current DASD locations, then remove the DASD using the steps in "Removing the DASD" on page 3-94.
11. Return to the procedure that directed you here.

Replacing the CPU and I/O Expansion Power Assemblies

1. If you are replacing the power assembly with a new assembly, continue with 2, otherwise go to 4.
2. Install the supervisor card, removed from the old power assembly, using the steps in "Replacing the Node Supervisor Card" on page 3-94.
3. Install the DASD (removed from the old power assembly) in the locations recorded in the removal procedure, using the steps in "Replacing the DASD" on page 3-94.
4. Install and latch the power assemblies by lifting and pushing forward on the power interlock bar.
5. Ensure the power interlock tab is engaged by pushing in on the tab.
6. Secure the front of the power assemblies with the retaining screw that was previously removed.
7. If necessary, plug the 4-drop DASD cable in the I/O expansion assembly.
8. Install the front cover panel using the screws that were previously removed.
9. Push up and back on the power interlock bar until the power assembly is engaged and locked.
10. Push the power interlock tab marked 'PUSH' at the right side front of the power assembly to engage the power connections.
11. Ensure the 48-volt input cable in-line circuit breakers are in the On ('1') position.
12. Ensure the node power supply circuit breakers are in the On ('1') position.
13. Return to the procedure that directed you here.

Figure   3-83. 332 MHz SMP Node Power Assemblies
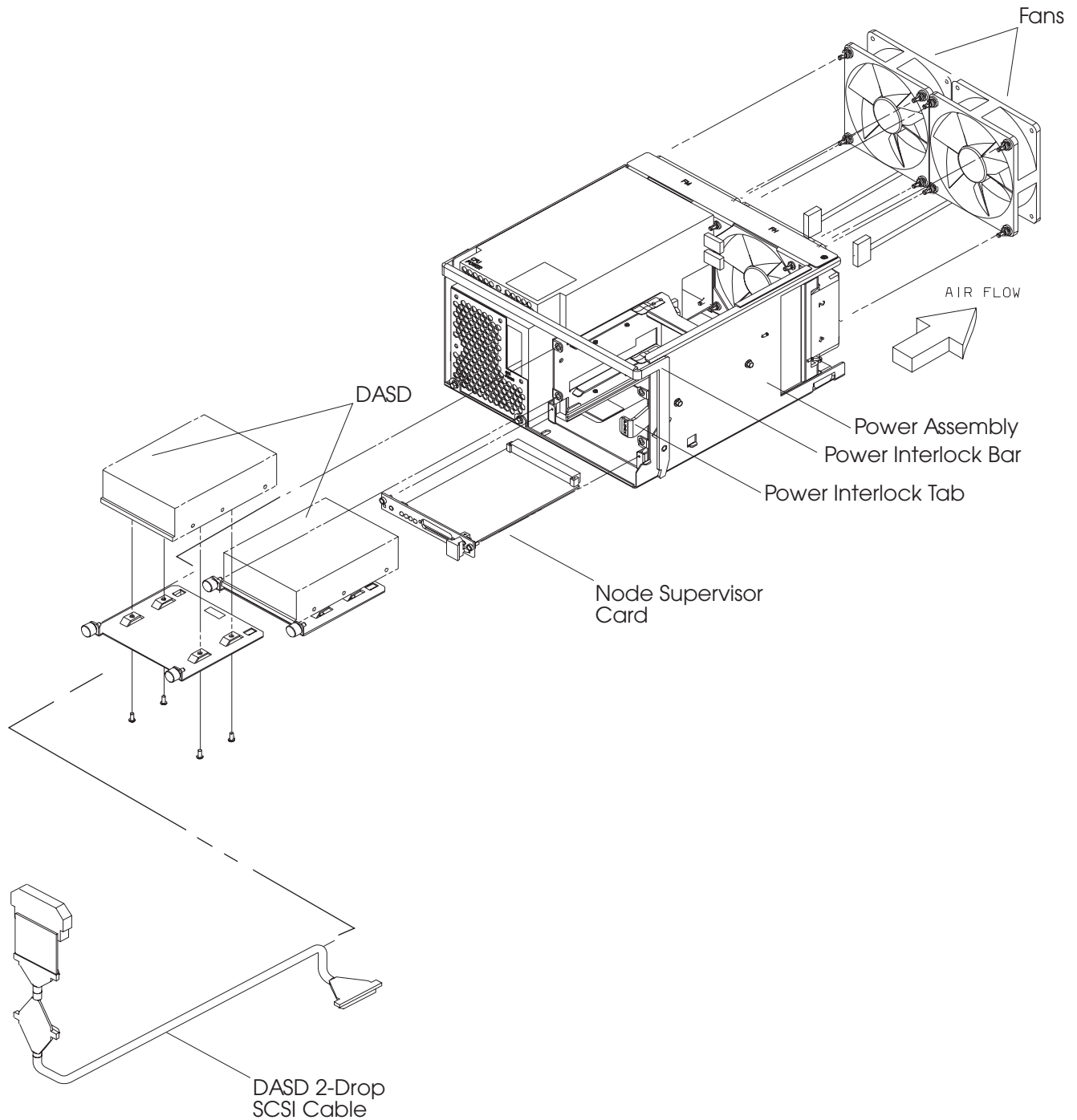
Figure   3-84. 332 MHz SMP Node Power Assembly Components

Removing the Fan(s)

1. Ensure ESD antistatic wrist device is attached.
2. Remove the power assembly using the steps in "Removing the CPU and I/O Expansion Power Assemblies" on page 3-91.
3. Remove the screw from the top of the fan bracket.
4. Loosen the screw on the side of the fan bracket.
5. Lift the fan bracket from the power assembly.
6. Locate and disconnect the fan plug.
7. Remove the shock mounts from the bracket and retain for later installation.

Replacing the Fan(s)

1. Install the shock mounts, removed from the old fan, to the replacement fan.
2. Install the fan with the wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect the fan plug.
4. Reinstall the fan bracket.
5. Install 1 screw on the top and 1 screw on the side of the fan bracket.
6. Check that no cable touches the fan.
7. Reinstall the power assembly using the steps in "Replacing the CPU and I/O Expansion Power Assemblies" on page 3-91.
8. Return to the procedure that directed you here.

Removing the Node Supervisor Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the front cover panel by removing the screws. Retain the screws for later installation.
3. Remove the screws holding the node supervisor card to the mounting bracket. Retain the screws for later installation.
4. Remove the node supervisor card.

Replacing the Node Supervisor Card

Note: Inform the customer that the clocks will need to be reset. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Firmly seat the node supervisor card in the mounting bracket and secure with the screws that were previously removed.
3. Install the front cover panel using the screws that were previously removed.
4. Perform "Updating the Node Supervisor Code" on page 2-21.
5. Return to the procedure that directed you here.

Removing the DASD

1. Ensure ESD antistatic wrist device is attached.
2. Remove the front cover panel by removing the screws. Retain the screws for later installation.
3. Disconnect the SCSI cable and the power cable.
4. Remove the screws that secure the DASD tray to the power assembly. Retain the screws for later installation.
5. Slide the DASD tray from the front of the power assembly.
6. Remove the screws that secure the DASD to the DASD tray. Retain the screws for later installation.
7. Remove the DASD from the DASD tray.
8. Check the jumper position(s) on the DASD, if any. Record the settings for the replacement DASD.

   Note: Ensure the grounding strips located around the edges are firmly in place.

Replacing the DASD

1. Ensure ESD antistatic wrist device is attached.
2. Set the jumper position(s) on the new DASD, if any, using the settings you recorded in the removal procedure.
3. Ensure all required DASD jumpers are installed. Refer to *Adapters, Devices, and Cable Information for Micro-Channel Bus Systems*, SA38-0533, for the required jumper information.
4. Install the DASD in the DASD tray using the screws that were previously removed.

5. Reinstall the DASD tray into the front of the power assembly and secure with the screws that were previously removed.
6. Connect the SCSI cable and power cable to the DASD.
7. Install the front cover panel using the screws that were previously removed.
8. Return to the procedure that directed you here.

Removing the SPS MX Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89 or "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the thin node cover by loosening the screws on top of the cover.
4. Loosen the screw at the top of the rear card guide and remove the SPS MX adapter card from the thin node system planar slot J9.
5. Remove the protective cover from port P1 and retain for later use.

Replacing the SPS MX Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Install the protective cover, that was previously removed, on port P1, if necessary.
3. Install the SPS MX adapter card in the thin node system planar slot J9 and tighten the screw at the top of the rear card guide.
4. Reinstall the thin node cover by tightening the screws on top of the cover.
5. Reinstall the 332 MHz SMP node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89 or "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Removing the PCI Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89 or "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover or the thin node cover (depending on the location of the PCI adapter card) by loosening the screws on top of the assembly.
4. Loosen the knurled knob, for this adapter, at the rear of the assembly.
5. Check for (and record) internal connections to other adapter cards or cables before removing them.
6. If the adapter card has a card extender, holding the front end of the adapter, release the extender by pressing the locking tab to the side.
7. Grasp the adapter by the pull tabs and pull it out of the slot.

Replacing the PCI Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Check for any jumpers or switches to be set on this card, then set as appropriate.
3. If the adapter card requires a card extender, attach the extender to the front end of the adapter and lock in place with locking tab.
4. Align the adapter in the slot, then push the card into the slot.
5. Tighten the knurled knob, for this adapter, at the rear of the assembly.
6. If this card has any internal connections to other adapter(s) or cables, connect them, as appropriate.
7. Reinstall the I/O expansion assembly cover or the thin node cover (depending on the location of the PCI adapter card) by tightening the screws on top of the assembly.
8. Reinstall the 332 MHz SMP node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89 or "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
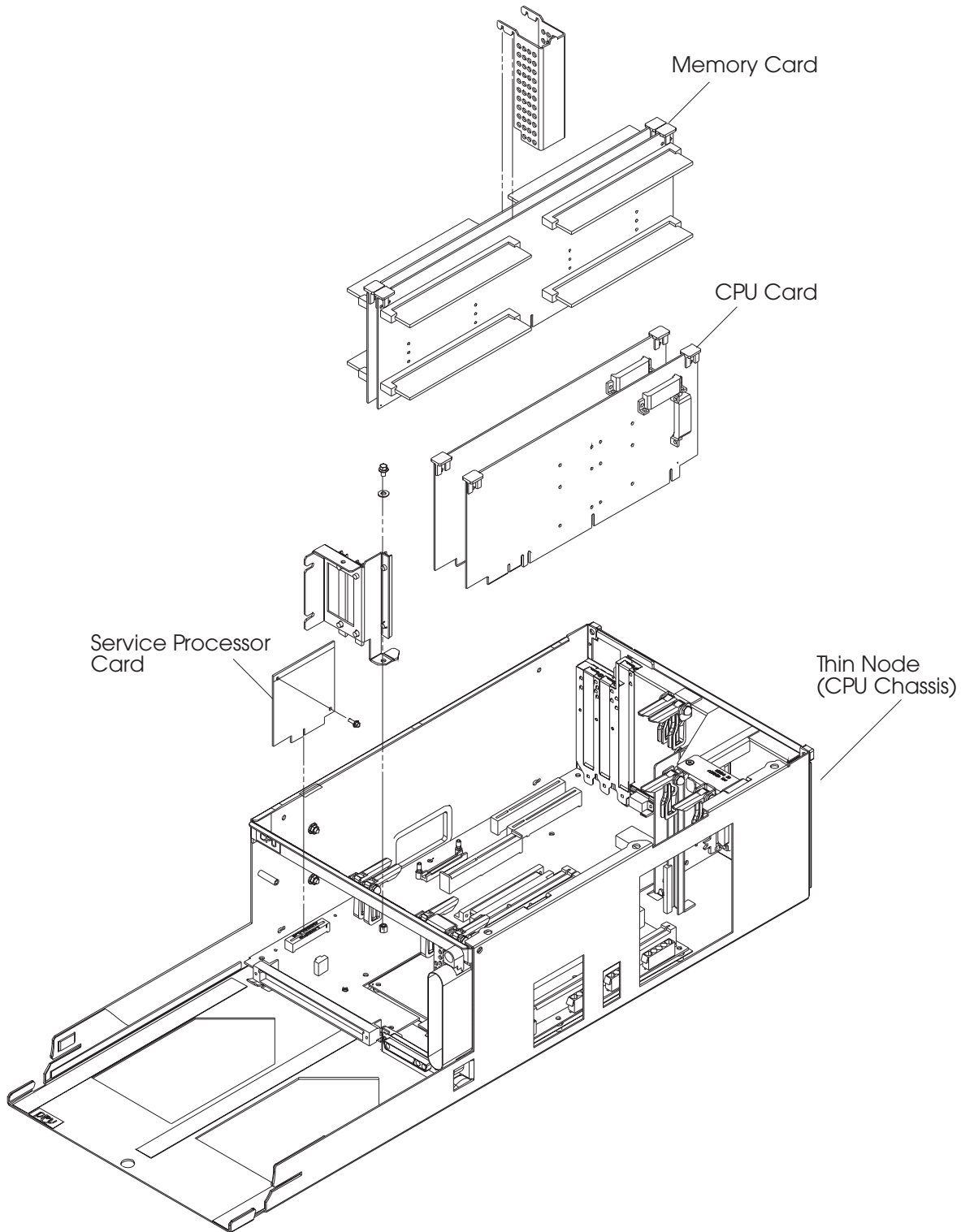9. Return to the procedure that directed you here.

Figure 3-85. 332 MHz SMP Node Thin Node Components (1 of 2)

Removing the Service Processor

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89 or "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the thin node cover by loosening the screws on top of the thin node.
4. Remove the screw securing the service processor card to the I/O planar. Retain the screw for later installation.
5. Remove the service processor card from connector J1 on the I/O planar.

Replacing the Service Processor

1. Ensure ESD antistatic wrist device is attached.
2. Install the service processor card in connector J1 on the I/O planar.
3. Install the screw (retained from the removal procedure) to secure the service processor card to the I/O planar. Retain the screw for later installation.
4. Reinstall the thin node cover by tightening the screws on top of the thin node.
5. Reinstall the 332 MHz SMP node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89 or "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. If necessary, update the service processor firmware. See "Installing Firmware Updates on SP Nodes" on page 2-34.
7. Return to the procedure that directed you here.

Removing the Memory Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89 or "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the cover by loosening the screws on top of the assembly.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

4. Pull up on the thumb locks to disengage the memory card.
5. Remove the memory card.

Replacing the Memory Card

1. Ensure ESD antistatic wrist device is attached.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

2. Align the memory card with the slot.
3. Push down on the thumb locks to engage the memory card.
4. Reinstall the cover by tightening the screws on top of the assembly.
5. Reinstall the 332 MHz SMP node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89 or "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Removing the CPU Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89 or "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the cover by loosening the screws on top of the assembly.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

4. Pull up on the thumb locks to disengage the CPU card.

Attention: *Do not* grasp the card by the heat sink when plugging or unplugging. This will damage the processor chip.

5. Remove the CPU card.

Replacing the CPU Card

1. Ensure ESD antistatic wrist device is attached.

Attention: *Do not* grasp the card by the heat sink when plugging or unplugging. This will damage the processor chip.

2. Align the CPU card with the slot.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

3. Push down on the thumb locks to engage the CPU card.
4. Reinstall the cover by tightening the screws on top of the assembly.
5. Reinstall the 332 MHz SMP node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89 or "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Removing a Thin Node I/O Planar

Attention: Licensed programs frequently rely on network configuration and system information stored on the VPD on the I/O planar (see Figure 1-32 on page 1-37). If the MAPs indicate that the I/O planar should be replaced, swap the VPD from the old I/O planar to the new one. If the old VPD module has to be replaced, call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys from licensed programs may be required.

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP thin node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89.
3. Remove the thin node cover by loosening the screws on top of the node.
4. Remove the PCI card(s) using the steps in "Removing the PCI Adapter Card" on page 3-95.
5. Remove the SPS MX adapter card, if present, using the steps in "Removing the SPS MX Adapter Card" on page 3-95.
6. Remove the PCI card guide rail.
7. Remove the service processor card using the steps in "Removing the Service Processor" on page 3-97.
8. Remove the memory card(s) using the steps in "Removing the Memory Card" on page 3-97.
9. Remove the CPU card(s) using the steps in "Removing the CPU Card."

10. Remove the plastic insulator.
11. Remove the I/O expansion control cable using the steps in "Removing the I/O Expansion Control Cable" on page 3-107.
12. Remove the Ethernet BNC nut and washer.
13. Remove the 9 screws securing the I/O planar.
14. Remove the 8 screws securing the system planar.
15. Unseat the I/O planar from the locator pin.

Attention: Components on the underside of the I/O planar can be damaged by the chassis standoffs. Keep the planar elevated, at an angle, when servicing the planar.

16. Separate the I/O planar and the system planar.
17. Slide the I/O planar out from the chassis through the power side.

Replacing a Thin Node I/O Planar

Attention: Licensed programs frequently rely on network configuration and system information stored on the VPD on the I/O planar (see Figure 1-32 on page 1-37). If the MAPs indicate that the I/O planar should be replaced, swap the VPD from the old I/O planar to the new one. If the old VPD module has to be replaced, call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys from licensed programs may be required.

Attention: The system ID will change when replacing a thin node I/O planar if keeping the VPD module supplied with the FRU. Inform the Customer, **before** removing and replacing the I/O planar, that some software applications that use the system ID number for licensing purposes may be impacted by this change.

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Slide the I/O planar into the chassis.

Attention: Install the I/O planar at an angle. Insert the BNC connector through the back wall first. Then set the planar in position with the holes aligned with the standoffs. **Setting the planar flat on the standoffs, then sliding it to the rear to access the BNC will damage the components on the underside of the planar.**

3. Attach the I/O planar to the system planar.
4. Seat the I/O planar at the locator pin.
5. Reinstall the 8 screws to secure the system planar.
6. Reinstall the 9 screws to secure the I/O planar.
7. Reinstall the Ethernet BNC nut and washer.
8. Reinstall the I/O expansion control cable using the steps in "Replacing the I/O Expansion Control Cable" on page 3-107.
9. Reinstall the plastic insulator.
10. Install the PCI card guide rail.
11. Replace the PCI card(s) using the steps in "Replacing the PCI Adapter Card" on page 3-95.
12. Reinstall the SPS MX adapter card, if present. using the steps in "Replacing the SPS MX Adapter Card" on page 3-95.

13. Replace the service processor card using the steps in "Replacing the Service Processor" on page 3-97.
14. Replace the memory card(s) using the steps in "Replacing the Memory Card" on page 3-97.
15. Replace the CPU card(s) using the steps in "Replacing the CPU Card" on page 3-98.
16. Reinstall the thin node cover by tightening the screws on top of the node.
17. Reinstall the 332 MHz SMP thin node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89.
18. If necessary, update the service processor firmware. See "Installing Firmware Updates on SP Nodes" on page 2-34.
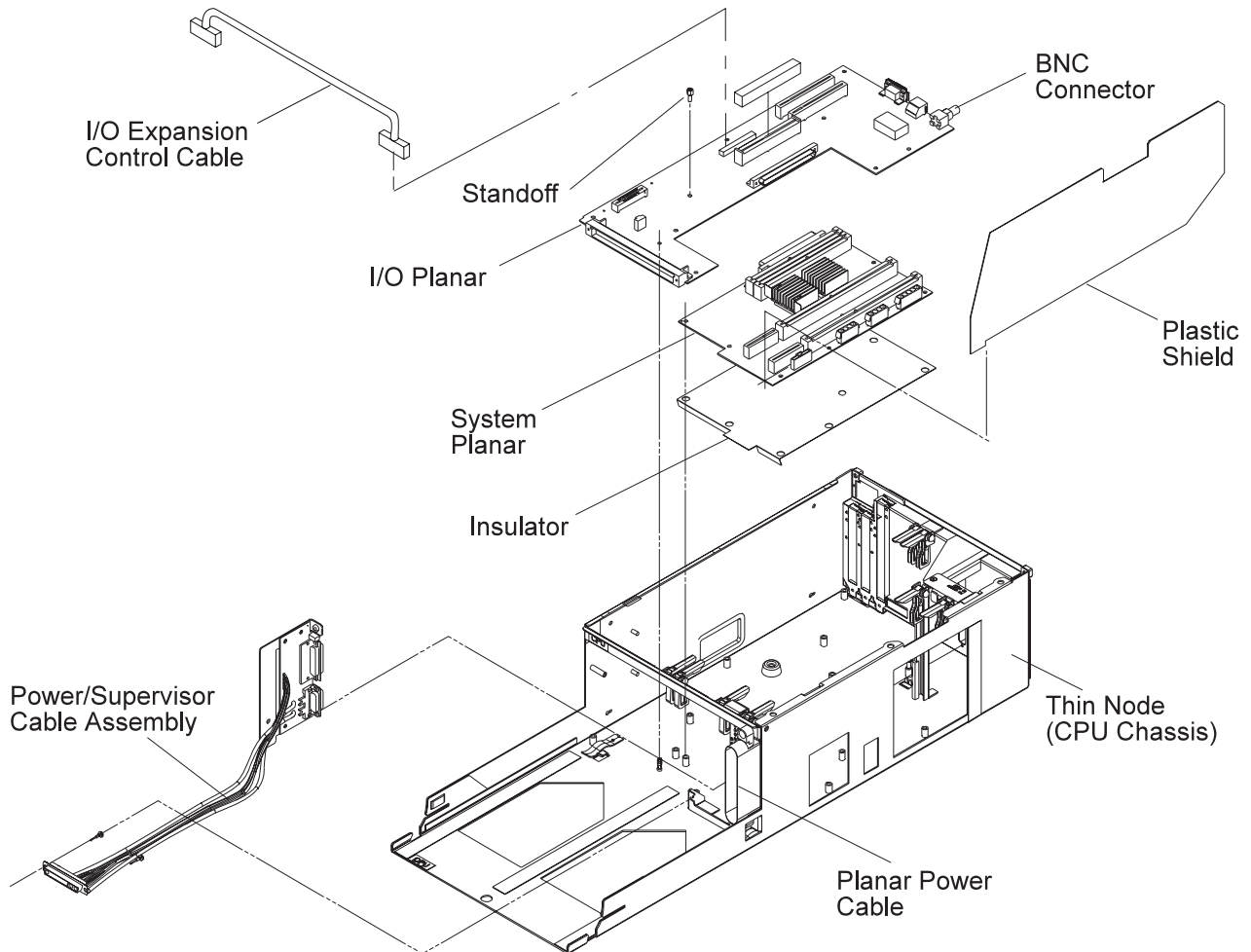19. Return to the procedure that directed you here.

Figure   3-86. 332 MHz SMP Node Thin Node Components (2 of 2)

Removing a Thin Node System Planar

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP thin node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89.
3. Remove the thin node cover by loosening the screws on top of the node.
4. Remove the PCI card(s) using the steps in "Removing the PCI Adapter Card" on page 3-95.
5. Remove the SPS MX adapter card, if present, using the steps in "Removing the SPS MX Adapter Card" on page 3-95.
6. Remove the PCI card guide rail.

7. Remove the service processor card using the steps in "Removing the Service Processor" on page 3-97.
8. Remove the memory card(s) using the steps in "Removing the Memory Card" on page 3-97.
9. Remove the CPU card(s) using the steps in "Removing the CPU Card" on page 3-98.
10. Remove the plastic insulator.
11. Remove the Ethernet BNC nut and washer.
12. Remove the 3 power plugs from the chassis side of the system planar.
13. Remove the 9 screws securing the I/O planar.
14. Remove the 8 screws securing the system planar.
15. Unseat the I/O planar from the locator pin.

Attention: Components on the underside of the I/O planar can be damaged by the chassis standoffs. Keep the planar elevated, at an angle, when servicing the planar.

16. Separate the I/O planar and the system planar.
17. Remove the system planar from the chassis.

Replacing a Thin Node System Planar

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Reinstall the system planar into the chassis.
3. Attach the I/O planar to the system planar.
4. Seat the I/O planar at the locator pin.

Attention: Install the I/O planar at an angle. Insert the BNC connector through the back wall first. Then set the planar in position with the holes aligned with the standoffs. **Setting the planar flat on the standoffs, then sliding it to the rear to access the BNC will damage the components on the underside of the planar.**

5. Reinstall the 8 screws to secure the system planar.
6. Reinstall the 9 screws to secure the I/O planar.
7. Reinstall the 3 power plugs to the chassis side of the system planar.
8. Reinstall the Ethernet BNC nut and washer.
9. Reinstall the plastic insulator.
10. Install the PCI card guide rail.
11. Replace the PCI card(s) using the steps in "Replacing the PCI Adapter Card" on page 3-95.
12. Reinstall the SPS MX adapter card, if present, using the steps in "Replacing the SPS MX Adapter Card" on page 3-95.
13. Replace the service processor card using the steps in "Replacing the Service Processor" on page 3-97.
14. Replace the memory card(s) using the steps in "Replacing the Memory Card" on page 3-97.
15. Replace the CPU card(s) using the steps in "Replacing the CPU Card" on page 3-98.
16. Reinstall the thin node cover by tightening the screws on top of the node.
17. Reinstall the 332 MHz SMP thin node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89.
18. If necessary, update the service processor firmware. See "Installing Firmware Updates on SP Nodes" on page 2-34.
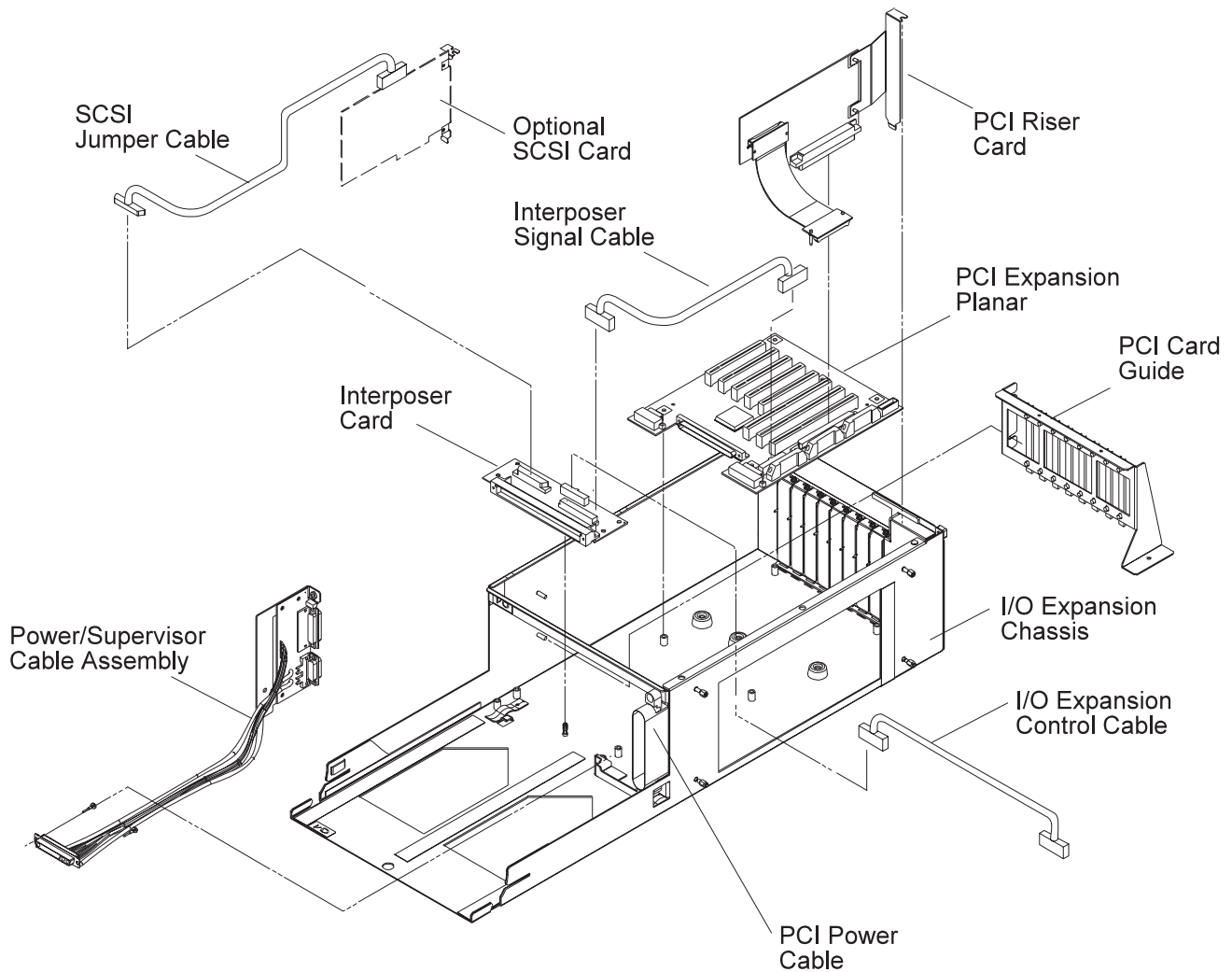19. Return to the procedure that directed you here.

Figure   3-87. 332 MHz SMP Node I/O Expansion Assembly Components

Removing the PCI Riser Card Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover by loosening the screws on top of the I/O expansion assembly.
4. Remove the thin node cover by loosening the screws on top of the thin node.
5. Remove the PCI riser cable from connector J6 on the thin node I/O planar.
6. Loosen the screw at the top of the rear card guide and remove the PCI riser card from the PCI expansion planar slot J9.
7. Return to the procedure that directed you here.

Replacing the PCI Riser Card Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Install the PCI riser card in PCI expansion planar slot J9 and tighten the screw at the top of the rear card guide.
3. Connect the PCI riser cable to connector J6 on the thin node I/O planar.
4. Reinstall the thin node cover by tightening the screws on top of the thin node.
5. Reinstall the I/O expansion assembly cover by tightening the screws on top of the I/O expansion assembly.
6. Replace the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
7. Return to the procedure that directed you here.

Removing the Optional SCSI Cable

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover by loosening the screws on top of the assembly.
4. Disconnect the SCSI cable from the top of the SCSI card.
5. Disconnect the SCSI cable from connector J2 on the interposer card.

Replacing the Optional SCSI Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the SCSI cable to connector J2 on the interposer card.
3. Connect the SCSI cable to the top of the SCSI card.
4. Reinstall the I/O expansion assembly cover by tightening the screws on the top of the assembly.
5. Reinstall the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Removing the Optional SCSI Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover by loosening the screws on top of the assembly.
4. Disconnect the SCSI cable from the top of the SCSI card.
5. Record the position of the SCSI card, then remove the card.

Replacing the Optional SCSI Card

1. Ensure ESD antistatic wrist device is attached.
2. Install the SCSI card in the position recorded in the removal procedure.
3. Connect the SCSI cable to the top of the SCSI card.
4. Reinstall the I/O expansion assembly cover by tightening the screws on the top of the assembly.
5. Reinstall the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Removing the Interposer Signal Cable

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover by loosening the screws on top of the assembly.
4. Disconnect the interposer signal cable at J1 on the interposer card.
5. Disconnect the interposer signal cable at J14 on the PCI expansion planar.

Replacing the Interposer Signal Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the interposer signal cable at J14 on the PCI expansion planar.
3. Connect the interposer signal cable at J1 on the interposer card.
4. Reinstall the I/O expansion assembly cover by tightening the screws on the top of the assembly.
5. Reinstall the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Removing the Interposer Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover by loosening the screws on top of the assembly.
4. Disconnect the interposer signal cable at J1 on the interposer card.
5. Disconnect the I/O expansion control cable at J4 on the interposer card.
6. If applicable, disconnect the SCSI cable from connector J2 on the interposer card.
7. Remove the screws securing the interposer card. Retain the screws for later installation.
8. Remove the interposer card.

Replacing the Interposer Card

1. Ensure ESD antistatic wrist device is attached.
2. Install the interposer card with the screws that were previously removed.
3. If applicable, connect the SCSI cable to connector J2 on the interposer card.
4. Connect the I/O expansion control cable at J4 on the interposer card.
5. Connect the interposer signal cable at J1 on the interposer card.
6. Reinstall the I/O expansion assembly cover by tightening the screws on the top of the assembly.
7. Reinstall the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
8. Return to the procedure that directed you here.

Removing the Power/Supervisor Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP node using the steps in "Removing a 332 MHz SMP Thin Node" on page 3-89 or "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Refer to "Removing a Thin Node System Planar" on page 3-100 to remove the 332 MHz SMP thin node system planar.
4. Remove the screws holding the power/supervisor cable assembly to the rear of the chassis. Retain the screws for later installation.
5. Remove the screws holding the power/supervisor cable assembly to the cable assembly support bracket. Retain the screws for later installation.

6. Remove the screws holding the power/supervisor cable assembly to the front of the chassis. Retain the screws for later installation.

Replacing the Power/Supervisor Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Tighten the screws holding the power/supervisor cable assembly to the front of the chassis using the screws retained from the removal procedure.
3. Tighten the screws holding the power/supervisor cable assembly to the assembly support bracket using the screws retained from the removal procedure.
4. Tighten the screws holding the power/supervisor assembly to the rear of the chassis using the screws retained from the removal procedure.
5. Refer to "Replacing a Thin Node System Planar" on page 3-101 to replace the 332 MHz SMP thin node system planar.
6. Reinstall the 332 MHz SMP node using the steps in "Replacing a 332 MHz SMP Thin Node" on page 3-89 or "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
7. Return to the procedure that directed you here.

Removing the Power Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion planar using the steps in "Removing an I/O Expansion Planar" on page 3-106.
4. Remove the screws holding the power cable assembly to the rear of the chassis. Retain the screws for later installation.
5. Remove the screws holding the power cable assembly to the cable assembly support bracket. Retain the screws for later installation.
6. Remove the screws holding the power cable assembly to the front of the chassis. Retain the screws for later installation.

Replacing the Power Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Tighten the screws holding the power cable assembly to the front of the chassis using the screws retained from the removal procedure.
3. Tighten the screws holding the power cable assembly to the assembly support bracket using the screws retained from the removal procedure.
4. Tighten the screws holding the power assembly to the rear of the chassis using the screws retained from the removal procedure.
5. Reinstall the I/O expansion planar using the steps in "Replacing an I/O Expansion Planar" on page 3-106.
6. Reinstall the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
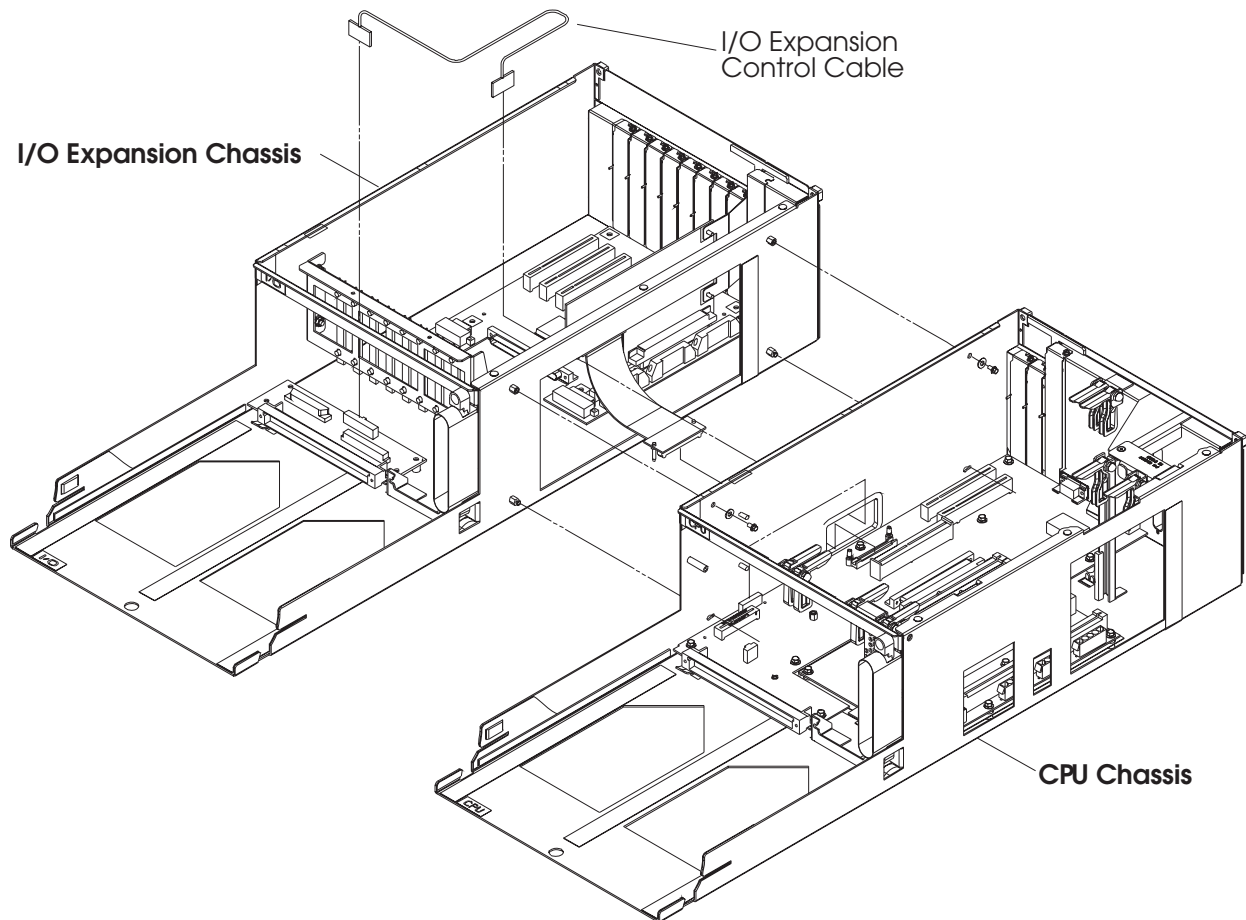7. Return to the procedure that directed you here.

Removing an I/O Expansion Planar

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the I/O expansion assembly cover by loosening the screws on top of the I/O expansion assembly.
4. Remove the PCI card(s) using the steps in "Removing the PCI Adapter Card" on page 3-95.
5. Remove the PCI riser card using the steps in "Removing the PCI Riser Card Assembly" on page 3-102.
6. Remove the PCI card guide rail.
7. Remove the remaining plugs from the I/O planar (J11, J12, J13, and J14).
8. Remove the 5 screws securing the I/O planar.
9. Remove the I/O planar from the chassis.

Replacing an I/O Expansion Planar

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Reinstall the I/O planar in the chassis.
3. Reinstall the 5 screws to secure the I/O planar.
4. Reinstall the cables into the I/O planar (J11, J12, J13, and J14).
5. Install the PCI card guide rail.
6. Replace the PCI riser card using the steps in "Replacing the PCI Riser Card Assembly" on page 3-103.
7. Replace the PCI card(s) using the steps in "Replacing the PCI Adapter Card" on page 3-95.
8. Reinstall the I/O expansion assembly cover by tightening the screws on top of the I/O expansion assembly.
9. Replace the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
10. Return to the procedure that directed you here.

Figure 3-88. 332 MHz SMP Node I/O Expansion Control Cable

Removing the I/O Expansion Control Cable

1. Ensure ESD antistatic wrist device is attached.
2. Remove the 332 MHz SMP wide node using the steps in "Removing a 332 MHz SMP Wide Node" on page 3-90.
3. Remove the covers of the I/O expansion assembly and the thin node by loosening the screws on top of the assemblies.
4. Disconnect the expansion control cable at J4 on the interposer card in the I/O expansion assembly.
5. Disconnect the expansion control cable at J2 on the I/O planar in the thin node.

Replacing the I/O Expansion Control Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the expansion control cable at J2 on the I/O planar in the thin node.
3. Connect the expansion control cable at J4 on the interposer card in the I/O expansion assembly.
4. Reinstall the covers on the I/O expansion assembly and the thin node by tightening the screws on the top of the assemblies.
5. Reinstall the 332 MHz SMP wide node using the steps in "Replacing a 332 MHz SMP Wide Processor Node" on page 3-91.
6. Return to the procedure that directed you here.

Procedures for POWER3 SMP Thin and Wide Nodes

These procedures cover the removal and replacement of the POWER3 SMP thin and wide node components.

Note: A 5.5 mm socket is required to perform some of the following service procedures.
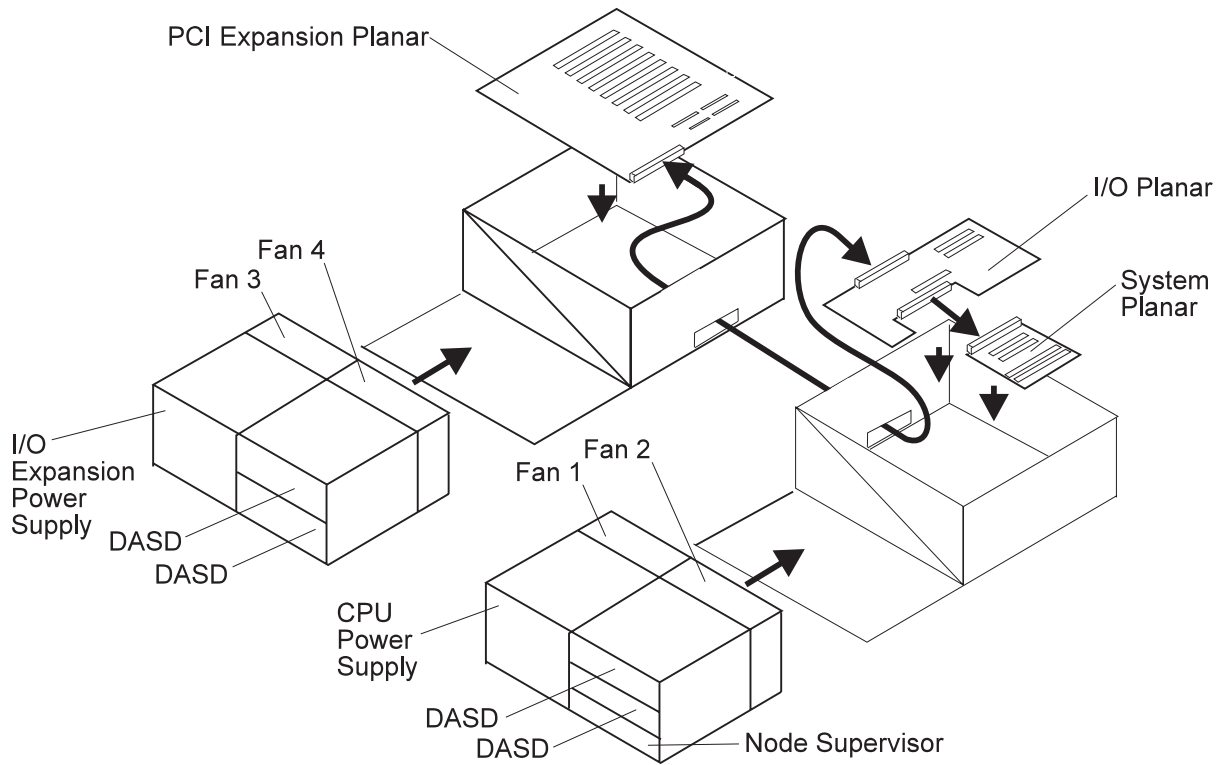
Figure 3-89. POWER3 SMP Thin and Wide Node High Level Component Diagram
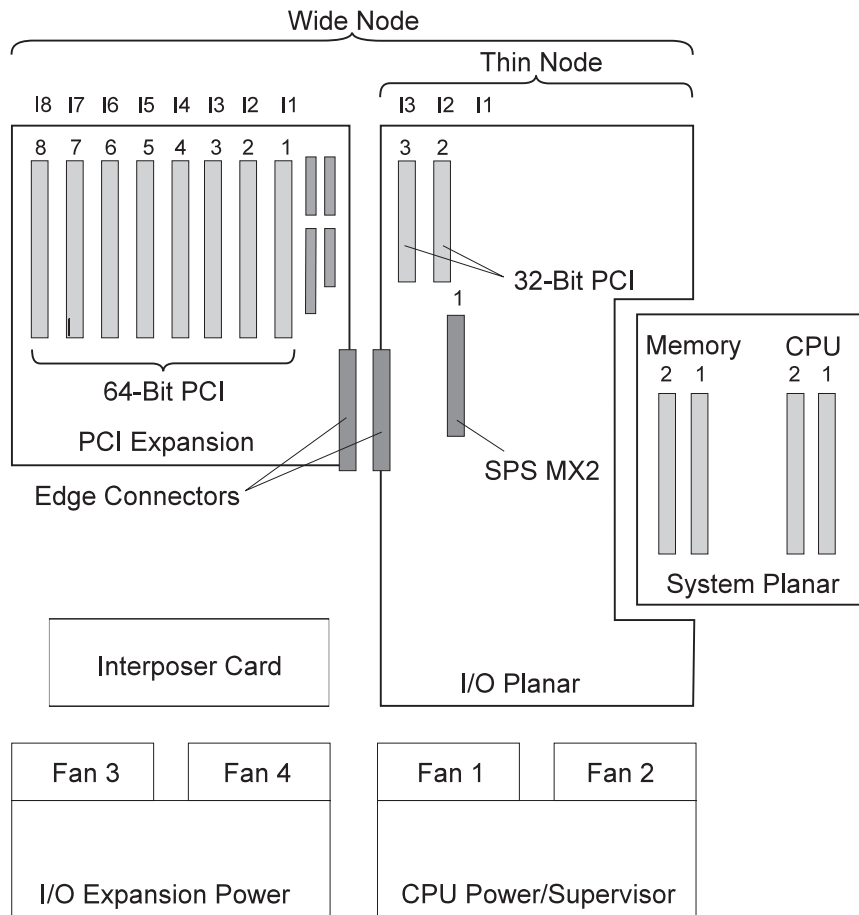
Figure 3-90. POWER3 SMP Thin and Wide Processor Node (Top View)

Removing a POWER3 SMP Thin Node

1. Ensure that the thin node is offline (shutdown) from the control workstation and powered off from the control workstation.
2. Ensure the thin node power supply switch is in the Off ('0') position.
3. Ensure the 48-volt input cable switch is in the Off ('0') position.
4. Remove all attached cables from the rear of the thin node.
5. After removing the 48-volt input cable, place a protective cover (p/n 48G3055) over the plug end. The cover is supplied with the ship group.
6. Remove the CPU power assembly using the steps in "Removing the CPU and I/O Expansion Power Assemblies" on page 3-111.
7. Remove the hold-down screws located at the rear of the thin node.
8. Remove the thin node from the front of the frame.
9. Return to the procedure that directed you here.

Replacing a POWER3 SMP Thin Node

1. Reinstall the thin node in the front of the frame.
2. Reinstall the hold-down screws located at the rear of the thin node.
3. Reinstall the CPU power assembly using the steps in "Replacing the CPU and I/O Expansion Power Assemblies" on page 3-111.
4. Remove the protective cover (p/n 48G3055) from the 48-volt input cable in J8. Ensure the alignment arrow is pointing to the bottom of the connector. Store the protective cover with the ship group tools.
5. Reattach all cables that were removed from the rear of the thin node.

6. Ensure the 48-volt input cable switch is in the On ('1') position.
7. Ensure the thin node power supply switch is in the On ('1') position.
8. Return to the procedure that directed you here.

Figure 3-91. POWER3 SMP Thin and Wide Nodes

Removing a POWER3 SMP Wide Node

1. Ensure that the node is offline (shutdown) from the control workstation and powered off from the control workstation.
2. Ensure the wide node power supply switches are in the Off ('0') position.
3. Ensure the 48-volt input cable switches are in the Off ('0') position.
4. Remove all attached cables from the rear of the node.
5. After removing the 48-volt input cables, place protective covers (p/n 48G3055) over the plug ends. The covers are supplied with the ship group.
6. Remove the CPU power assembly and the I/O expansion power assembly using the steps in "Removing the CPU and I/O Expansion Power Assemblies" on page 3-111.
7. Remove the hold-down screws located at the rear of the node.
8. Remove the wide node from the front of the frame.
9. Return to the procedure that directed you here.

Replacing a POWER3 SMP Wide Node

1. Reinstall the wide node in the front of the frame.
2. Reinstall the hold-down screws located at the rear of the node.
3. Reinstall the CPU power assembly and the I/O expansion power assembly using the steps in "Replacing the CPU and I/O Expansion Power Assemblies" on page 3-111.
4. Remove the protective covers (p/n 48G3055) from the 48-volt input cables. Store the protective covers with the ship group tools.
5. Connect the cable to both J8 connectors. Ensure the alignment arrows are pointing to the bottom of the connectors.
6. Reattach all of the cables that were removed from the rear of the node.
7. Ensure the 48-volt input cable switches are in the On ('1') position.
8. Ensure the wide node power supply switches are in the On ('1') position.
9. Return to the procedure that directed you here.

Removing the CPU and I/O Expansion Power Assemblies

1. Ensure that the processor node is offline (shutdown) from the control workstation and powered off from the control workstation.
2. Ensure the node power supply circuit breakers in the Off ('0') position.
3. Ensure the 48-volt input cable inline circuit breakers are in the Off ('0') position.
4. Remove the front cover panel by removing the screws. Retain the screws for later installation.
5. If necessary, unplug the 4-drop DASD cable from the I/O expansion assembly.
6. Remove the retaining screw at the front of the power assembly and retain for later use.
7. Pull forward and down on the power interlock bar to unlatch and remove the power assembly.
8. If you are replacing the power assembly with a new assembly, continue with 9. Otherwise, return to the procedure that directed you here.
9. Remove the supervisor card using the steps in "Removing the Node Supervisor Card" on page 3-114.
10. Record the current DASD locations, then remove the DASD using the steps in "Removing the DASD" on page 3-114.
11. Return to the procedure that directed you here.

Replacing the CPU and I/O Expansion Power Assemblies

1. If you are replacing the power assembly with a new assembly, continue with 2, otherwise go to 4.
2. Install the supervisor card, removed from the old power assembly, using the steps in "Replacing the Node Supervisor Card" on page 3-114.
3. Install the DASD (removed from the old power assembly) in the locations recorded in the removal procedure, using the steps in "Replacing the DASD" on page 3-114.
4. Install and latch the power assemblies by lifting and pushing forward on the power interlock bar.
5. Ensure the power interlock tab is engaged by pushing in on the tab.
6. Secure the front of the power assemblies with the retaining screw that was previously removed.
7. If necessary, plug the 4-drop DASD cable in the I/O expansion assembly.
8. Install the front cover panel using the screws that were previously removed.
9. Push up and back on the power interlock bar until the power assembly is engaged and locked.
10. Push the power interlock tab marked 'PUSH' at the right side front of the power assembly to engage the power connections.
11. Ensure the 48-volt input cable inline circuit breakers are in the On ('1') position.
12. Ensure the node power supply circuit breakers are in the On ('1') position.
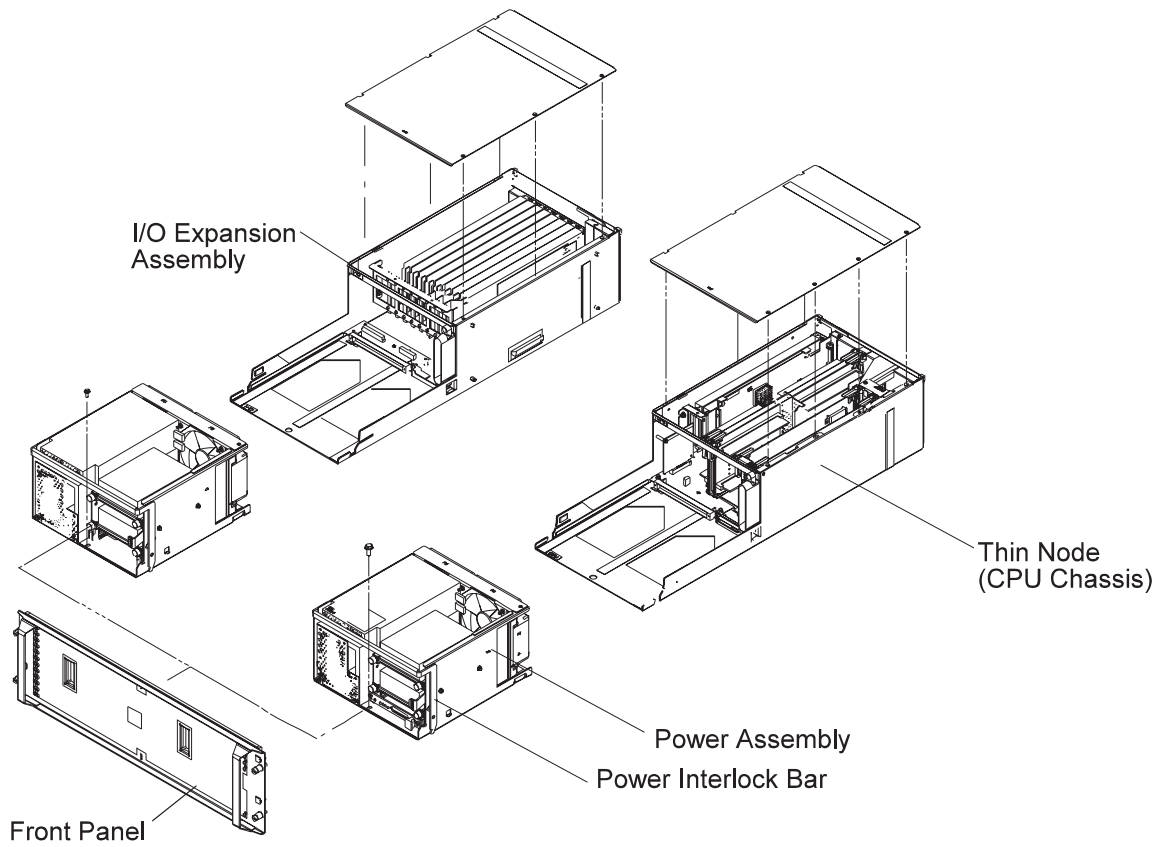13. Return to the procedure that directed you here.

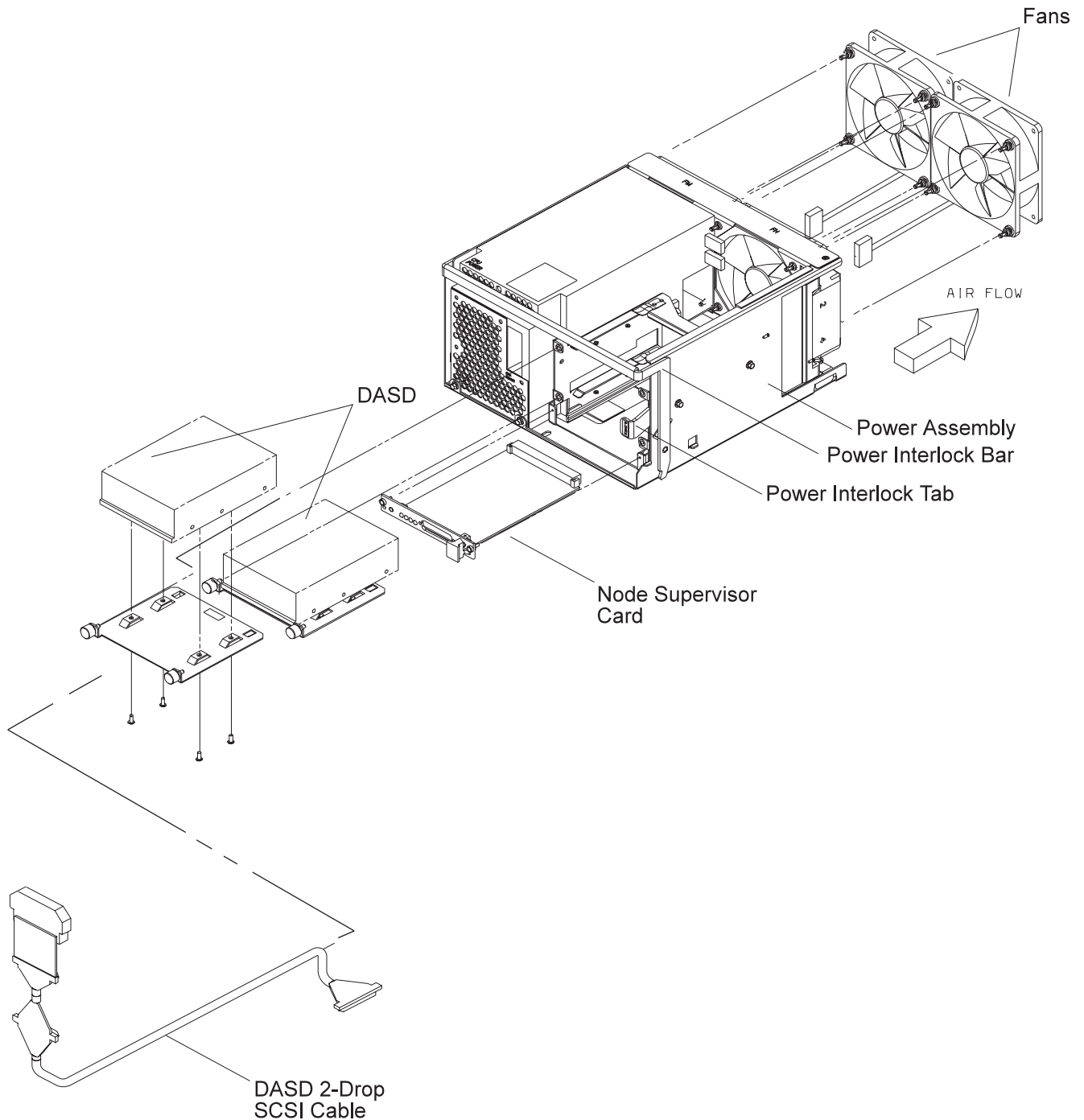*Figure 3-92. POWER3 SMP Thin and Wide Node Power Assemblies*

Figure   3-93. POWER3 SMP Thin and Wide Node Power Assembly Components

Removing the Fan(s)

1. Ensure ESD antistatic wrist device is attached.
2. Remove the power assembly using the steps in "Removing the CPU and I/O Expansion Power Assemblies" on page 3-111.
3. Remove the screw from the top of the fan bracket.
4. Loosen the screw on the side of the fan bracket.
5. Lift the fan bracket from the power assembly.
6. Locate and disconnect the fan plug.
7. Remove the shock mounts from the bracket and retain for later installation.

Replacing the Fan(s)

1. Install the shock mounts, removed from the old fan, to the replacement fan.
2. Install the fan with the wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect the fan plug.
4. Reinstall the fan bracket.
5. Install 1 screw on the top and 1 screw on the side of the fan bracket.
6. Check that no cable touches the fan.
7. Reinstall the power assembly using the steps in "Replacing the CPU and I/O Expansion Power Assemblies" on page 3-111.
8. Return to the procedure that directed you here.

Removing the Node Supervisor Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the front cover panel by removing the screws. Retain the screws for later installation.
3. Remove the screws holding the node supervisor card to the mounting bracket. Retain the screws for later installation.
4. Remove the node supervisor card.

Replacing the Node Supervisor Card

Note: Inform the customer that the clocks will need to be reset. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Firmly seat the node supervisor card in the mounting bracket and secure with the screws that were previously removed.
3. Install the front cover panel using the screws that were previously removed.
4. Perform "Updating the Node Supervisor Code" on page 2-21.
5. Return to the procedure that directed you here.

Removing the DASD

1. Ensure ESD antistatic wrist device is attached.
2. Remove the front cover panel by removing the screws. Retain the screws for later installation.
3. Disconnect the SCSI cable and the power cable.
4. Remove the screws that secure the DASD tray to the power assembly. Retain the screws for later installation.
5. Slide the DASD tray from the front of the power assembly.
6. Remove the screws that secure the DASD to the DASD tray. Retain the screws for later installation.
7. Remove the DASD from the DASD tray.
8. Check the jumper position(s) on the DASD, if any. Record the settings for the replacement DASD.

   Note: Ensure the grounding strips located around the edges are firmly in place.

Replacing the DASD

1. Ensure ESD antistatic wrist device is attached.
2. Set the jumper position(s) on the new DASD, if any, using the settings you recorded in the removal procedure.
3. Ensure all required DASD jumpers are installed. Refer to *Adapters, Devices, and Cable Information for Micro-Channel Bus Systems*, SA38-0533, for the required jumper information.
4. Install the DASD in the DASD tray using the screws that were previously removed.

5. Reinstall the DASD tray into the front of the power assembly and secure with the screws that were previously removed.
6. Connect the SCSI cable and power cable to the DASD.
7. Install the front cover panel using the screws that were previously removed.
8. Return to the procedure that directed you here.

Removing the SPS MX2 Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP thin node using the steps in "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the CPU assembly cover locking screws and remove the cover.
4. Loosen the screw at the top of the rear card guide and remove the SPS MX2 adapter card from the thin node system planar slot J9.
5. Remove the protective cover from port P1 and retain for later use.

Replacing the SPS MX2 Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Install the protective cover, that was previously removed, on port P1, if necessary.
3. Install the SPS MX2 adapter card in the thin node system planar slot J9 and tighten the screw at the top of the rear card guide.
4. Replace the CPU assembly cover. Turn the locking screws to secure the cover.
5. Reinstall the POWER3 SMP thin node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
6. Return to the procedure that directed you here.

Removing the PCI Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP node using the steps in "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the CPU assembly or I/O expansion assembly cover locking screws and remove the cover.
4. Loosen the knurled knob, for this adapter, at the rear of the assembly.
5. Check for (and record) internal connections to other adapter cards or cables before removing them.
6. If the adapter card has a card extender, holding the front end of the adapter, release the extender by pressing the locking tab to the side.
7. Grasp the adapter by the pull tabs and pull it out of the slot.

Replacing the PCI Adapter Card

1. Ensure ESD antistatic wrist device is attached.
2. Check for any jumpers or switches to be set on this card, then set as appropriate.
3. If the adapter card requires a card extender, attach the extender to the front end of the adapter and lock in place with locking tab.
4. Align the adapter in the slot, then push the card into the slot.
5. Tighten the knurled knob, for this adapter, at the rear of the assembly.
6. If this card has any internal connections to other adapter(s) or cables, connect them, as appropriate.
7. Replace the CPU assembly or I/O expansion assembly cover. Turn the locking screws to secure the cover.
8. Reinstall the POWER3 SMP node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
9. Return to the procedure that directed you here.

SP Switch MX2 Adapter

Air Baffle

Memory DIMM

Memory Card

Insulator

Processor Card

Thin Node (CPU Chassis)

Card Guide Bracket
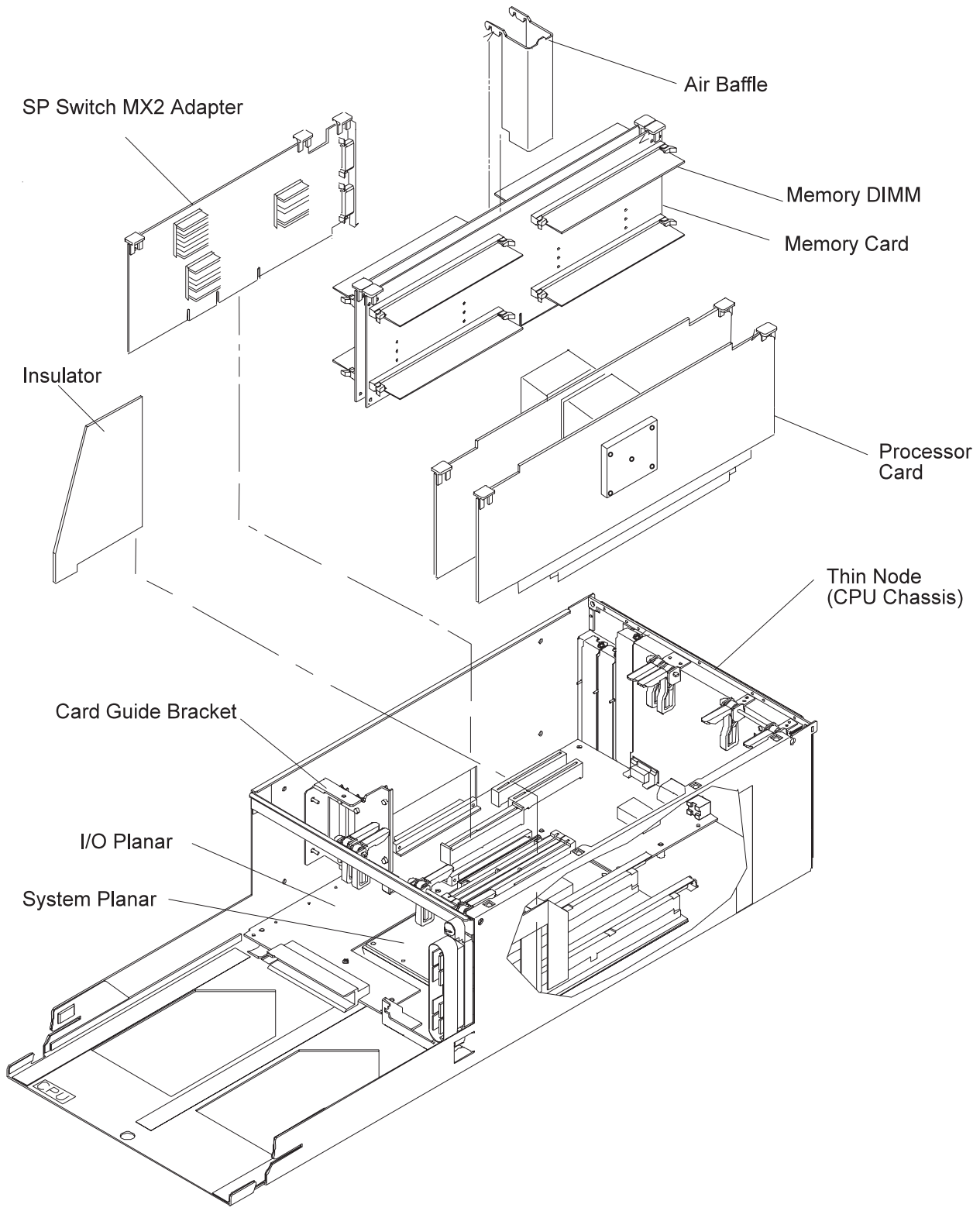
I/O Planar

System Planar

Figure   3-94. POWER3 SMP Thin Node Components (1 of 2)

Removing the Memory Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP node using the steps in "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the CPU assembly cover locking screws and remove the cover.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

4. Pull up on the thumb locks to disengage the memory card.
5. Remove the memory card.

Replacing the Memory Card

1. Ensure ESD antistatic wrist device is attached.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

2. Align the memory card with the slot.
3. Push down on the thumb locks to engage the memory card.
4. Replace the CPU assembly cover. Turn the locking screws to secure the cover.
5. Reinstall the POWER3 SMP node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
6. Return to the procedure that directed you here.

Removing the CPU Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP node using the steps in "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the CPU assembly cover locking screws and remove the cover.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

4. Pull up on the thumb locks to disengage the CPU card.

Attention: *Do not* grasp the card by the heat sink when plugging or unplugging. This will damage the processor chip.

5. Remove the CPU card.

Replacing the CPU Card

1. Ensure ESD antistatic wrist device is attached.

Attention: *Do not* grasp the card by the heat sink when plugging or unplugging. This will damage the processor chip.

2. Align the CPU card with the slot.

Attention: *Do not* rock the card from side-to-side when plugging or unplugging.

3. Push down on the thumb locks to engage the CPU card.
4. Replace the CPU assembly cover. Turn the locking screws to secure the cover.
5. Reinstall the POWER3 SMP node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
6. Return to the procedure that directed you here.

Removing a POWER3 SMP Thin Node I/O Planar

Attention: Licensed programs frequently rely on network configuration and system information stored on the VPD on the I/O planar (see Figure 1-41 on page 1-42). If the MAPs indicate that the I/O planar should be replaced, swap the VPD from the old I/O planar to the new one. If the old VPD module has to be replaced, call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys from licensed programs may be required.

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP node. Refer to "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the processor node cover locking screws and remove the cover.
4. Remove the PCI card(s) using the steps in "Removing the PCI Adapter Card" on page 3-115.
5. Remove the SPS MX2 adapter card, if present, using the steps in "Removing the SPS MX2 Adapter Card" on page 3-115.
6. Remove the memory card(s) using the steps in "Removing the Memory Card" on page 3-117.
7. Remove the CPU card(s) using the steps in "Removing the CPU Card" on page 3-117.
8. Remove the PCI card guide bracket.
9. **If this is a wide node:** Unplug the I/O expansion control cable from J2 on the I/O planar using the steps in "Removing the I/O Expansion Control Cable" on page 3-126.
10. **If this is a wide node:** Separate the CPU assembly from the I/O expansion assembly after removing the screws connecting them.
11. Remove the screws holding the system planar and separate the system planar from the I/O planar.
12. Remove the Ethernet BNC nut and washer.
13. Remove the screws holding the I/O planar.
14. Unseat the I/O planar from the locator pin.

Attention: Components on the underside of the I/O planar can be damaged by the chassis standoffs. Keep the planar elevated, at an angle, when servicing the planar.

15. Separate the I/O planar and the system planar.
16. Slide the I/O planar out from the chassis through the power side.

Replacing a POWER3 SMP Thin Node I/O Planar

Attention: Licensed programs frequently rely on network configuration and system information stored on the VPD on the I/O planar (see Figure 1-41 on page 1-42). If the MAPs indicate that the I/O planar should be replaced, swap the VPD from the old I/O planar to the new one. If the old VPD module has to be replaced, call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys from licensed programs may be required.

Attention: The system ID will change when replacing a thin node I/O planar if keeping the VPD module supplied with the FRU. Inform the Customer, **before** removing and replacing the I/O planar, that some software applications that use the system ID number for licensing purposes may be impacted by this change.

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Slide the I/O planar into the chassis.

Attention: Install the I/O planar at an angle. Insert the BNC connector through the back wall first. Then set the planar in position with the holes aligned with the standoffs. **Setting the planar flat on the standoffs, then sliding it to the rear to access the BNC will damage the components on the underside of the planar.**

3. Attach the I/O planar to the system planar.
4. Seat the I/O planar at the locator pin.
5. Reinstall the screws to secure the I/O planar.
6. Reinstall the Ethernet BNC nut and washer.
7. Connect the system planar to the I/O planar and reinstall the screws to secure the system planar.
8. **If this is a wide node:** Connect the CPU assembly to the I/O expansion assembly and secure with screws.
9. **If this is a wide node:** Reinstall the I/O expansion control cable to J2 on the I/O planar using the steps in "Replacing the I/O Expansion Control Cable" on page 3-126.
10. Install the PCI card guide bracket.
11. Replace the PCI card(s) using the steps in "Replacing the PCI Adapter Card" on page 3-115.
12. Reinstall the SPS MX2 adapter card, if present. using the steps in "Replacing the SPS MX2 Adapter Card" on page 3-115.
13. Replace the memory card(s) using the steps in "Replacing the Memory Card" on page 3-117.
14. Replace the CPU card(s) using the steps in "Replacing the CPU Card" on page 3-117.
15. Replace the processor node cover and turn the locking screws to secure the cover.
16. Reinstall the POWER3 SMP node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
17. If necessary, update the service processor firmware. See "Installing Firmware Updates on SP Nodes" on page 2-34.
18. Return to the procedure that directed you here.
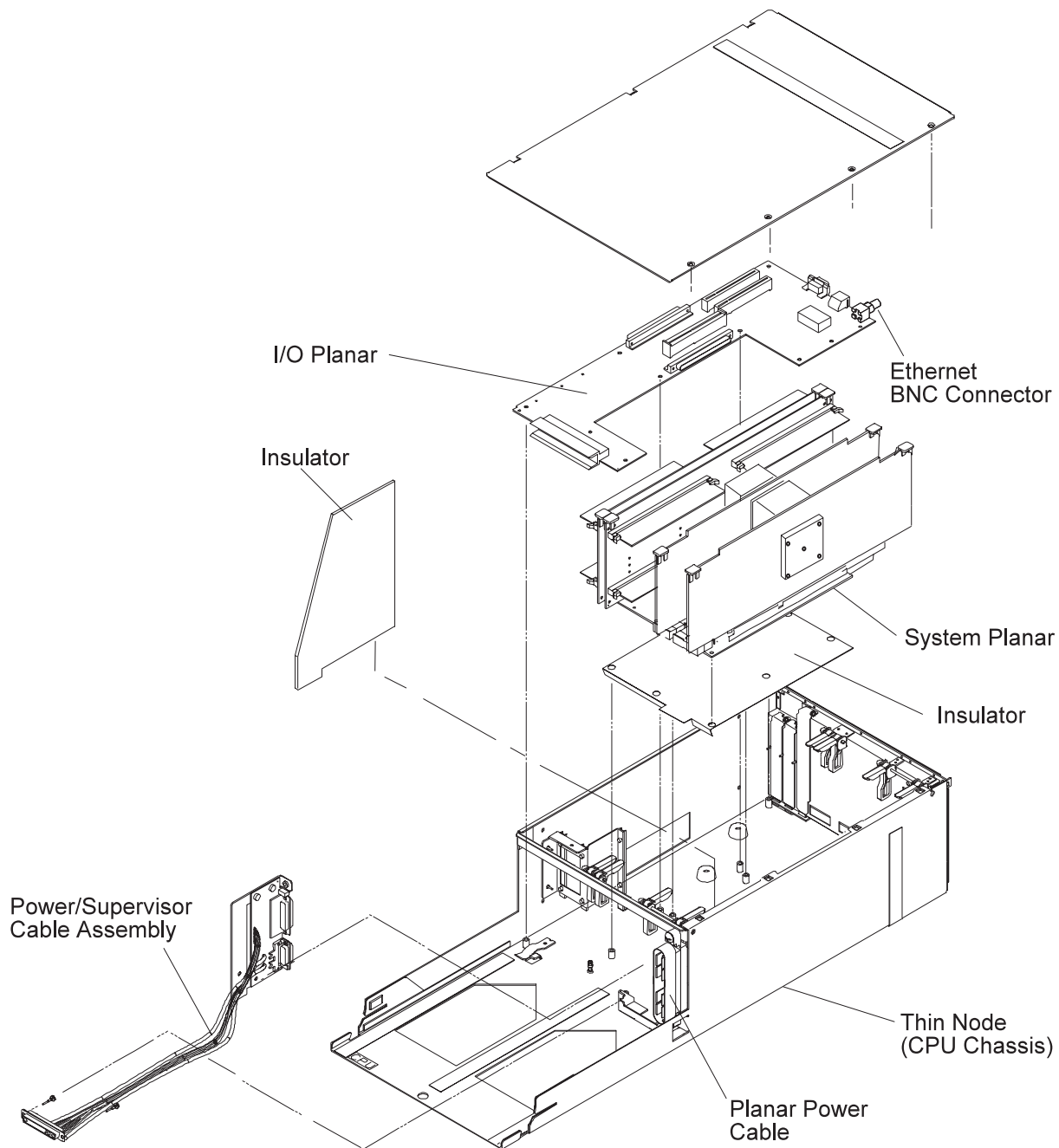
Figure   3-95. POWER3 SMP Thin Node Components (2 of 2)

Removing a POWER3 SMP Thin Node System Planar

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP node. Refer to "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the processor node cover locking screws and remove the cover.
4. Remove the memory card(s) using the steps in "Removing the Memory Card" on page 3-117.
5. Remove the CPU card(s) using the steps in "Removing the CPU Card" on page 3-117.
6. Remove the black plastic cable retainer.
7. Remove the 2 power plugs from the power supply end of the system planar.
8. Remove the screws securing the system planar.
9. Separate the I/O planar and the system planar.

10. Remove the system planar from the chassis.

   Note: Retain the insulation sheet covering the power cables for later installation.

Replacing a POWER3 SMP Thin Node System Planar

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Reset-ting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Reinstall the system planar into the chassis.

   Note: Fan out the power cable to allow the planar to install properly. Also, make sure the insulation sheet is in place.

3. Attach the I/O planar to the system planar.
4. Reinstall the screws to secure the system planar.
5. Reinstall the 2 power plugs to the power supply end of the system planar.
6. Reinstall the plastic insulator.
7. Replace the memory card(s) using the steps in "Replacing the Memory Card" on page 3-117.
8. Replace the CPU card(s) using the steps in "Replacing the CPU Card" on page 3-117.
9. Replace the processor node cover and turn the locking screws to secure the cover.
10. Reinstall the POWER3 SMP node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
11. If necessary, update the service processor firmware. See "Installing Firmware Updates on SP Nodes" on page 2-34.
12. Return to the procedure that directed you here.
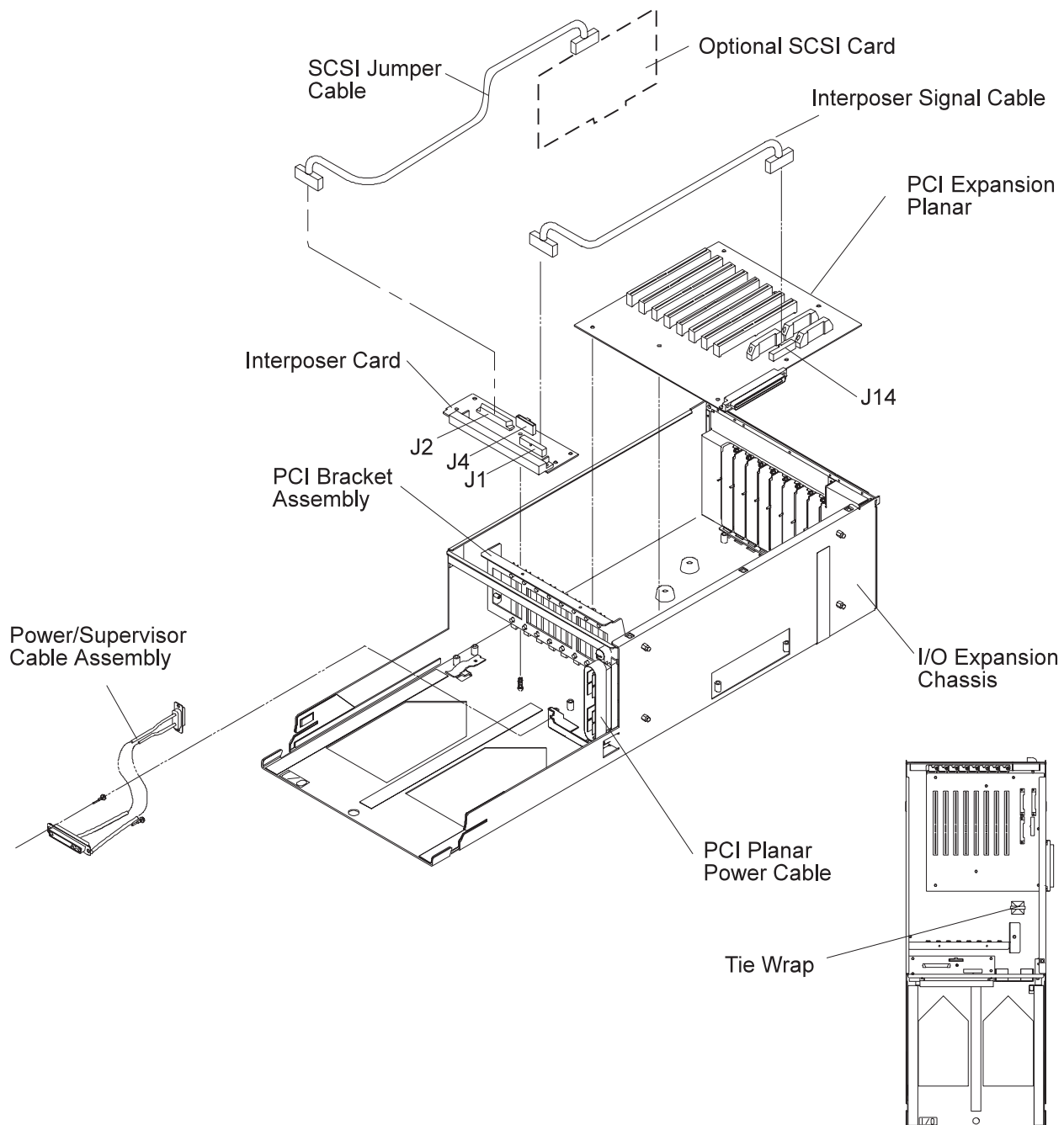
Figure 3-96. POWER3 SMP Wide Node I/O Expansion Assembly Components

Removing the Optional SCSI Cable

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the I/O expansion assembly cover locking screws and remove the cover.
4. Disconnect the SCSI cable from the top of the SCSI card.
5. Disconnect the SCSI cable from connector J2 on the interposer card.

Replacing the Optional SCSI Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the SCSI cable to connector J2 on the interposer card.
3. Connect the SCSI cable to the top of the SCSI card.
4. Replace the I/O expansion assembly cover. Turn the locking screws to secure the cover.
5. Reinstall the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
6. Return to the procedure that directed you here.

Removing the Optional SCSI Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the I/O expansion assembly cover locking screws and remove the cover.
4. Disconnect the SCSI cable from the top of the SCSI card.
5. Record the position of the SCSI card, then remove the card.

Replacing the Optional SCSI Card

1. Ensure ESD antistatic wrist device is attached.
2. Install the SCSI card in the position recorded in the removal procedure.
3. Connect the SCSI cable to the top of the SCSI card.
4. Replace the I/O expansion assembly cover. Turn the locking screws to secure the cover.
5. Reinstall the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
6. Return to the procedure that directed you here.

Removing the Interposer Signal Cable

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the I/O expansion assembly cover locking screws and remove the cover.
4. Disconnect the interposer signal cable at J1 on the interposer card.
5. Disconnect the interposer signal cable at J14 on the PCI expansion planar.
6. If necessary, cut the cable tie that secures the cable to the tie-down on the bottom of the chassis.

Replacing the Interposer Signal Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the interposer signal cable at J14 on the PCI expansion planar.
3. Connect the interposer signal cable at J1 on the interposer card.
4. Secure the cable to the tie-down on the bottom of the chassis with a cable tie.
5. Replace the I/O expansion assembly cover. Turn the locking screws to secure the cover.
6. Reinstall the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
7. Return to the procedure that directed you here.

Removing the Interposer Card

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the I/O expansion assembly cover locking screws and remove the cover.
4. Disconnect the interposer signal cable at J1 on the interposer card.
5. Disconnect the I/O expansion control cable at J4 on the interposer card.
6. If applicable, disconnect the SCSI cable from connector J2 on the interposer card.
7. Remove the screws securing the interposer card. Retain the screws for later installation.
8. Remove the interposer card.

Replacing the Interposer Card

1. Ensure ESD antistatic wrist device is attached.
2. Install the interposer card with the screws that were previously removed.
3. If applicable, connect the SCSI cable to connector J2 on the interposer card.
4. Connect the I/O expansion control cable at J4 on the interposer card.
5. Connect the interposer signal cable at J1 on the interposer card.
6. Replace the I/O expansion assembly cover. Turn the locking screws to secure the cover.
7. Reinstall the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
8. Return to the procedure that directed you here.

Removing the Power/Supervisor Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP node using the steps in "Removing a POWER3 SMP Thin Node" on page 3-109 or "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Refer to "Removing a POWER3 SMP Thin Node System Planar" on page 3-120 to remove the POWER3 SMP thin node system planar.
4. Remove the screws holding the power/supervisor cable assembly to the rear of the chassis. Retain the screws for later installation.
5. Loosen the pin guide screws that secure the cable assembly jack to the front of the chassis.

Replacing the Power/Supervisor Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Tighten the pin guide screws to secure the cable assembly jack to the front of the chassis.
3. Tighten the screws holding the power/supervisor assembly to the rear of the chassis using the screws retained from the removal procedure.
4. Refer to "Replacing a POWER3 SMP Thin Node System Planar" on page 3-121 to replace the POWER3 SMP thin node system planar.
5. Reinstall the POWER3 SMP node using the steps in "Replacing a POWER3 SMP Thin Node" on page 3-109 or "Replacing a POWER3 SMP Wide Node" on page 3-111.
6. Return to the procedure that directed you here.

Removing the Power Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the I/O expansion assembly cover locking screws and remove the cover.
4. Remove the screws holding the power cable assembly to the rear of the chassis. Retain the screws for later installation.

5. Loosen the pin guide screws holding the cable assembly jack to the front of the chassis.
6. If necessary, cut the cable tie that secures the cable to the tie-down on the bottom of the chassis.

Replacing the Power Cable Assembly

1. Ensure ESD antistatic wrist device is attached.
2. Secure the cable to the tie-down on the bottom of the chassis with a cable tie.
3. Tighten the pin guide screws to secure the cable assembly jack to the front of the chassis.
4. Tighten the screws holding the power assembly to the rear of the chassis using the screws retained from the removal procedure.
5. Replace the I/O expansion assembly cover. Turn the locking screws to secure the cover.
6. Reinstall the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
7. Return to the procedure that directed you here.

Removing an I/O Expansion Planar

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the I/O expansion assembly cover locking screws and remove the cover.
4. Remove the PCI card(s) using the steps in "Removing the PCI Adapter Card" on page 3-115.
5. Remove the PCI card guide bracket.
6. Remove the remaining plugs from the I/O planar (J11, J12, J13, and J14).
7. Remove the screws securing the I/O planar.
8. Separate the I/O expansion planar and the CPU assembly I/O planar
9. Remove the I/O planar from the chassis.

Replacing an I/O Expansion Planar

Note: Inform the customer that the boot address will need to be updated. Refer the customer to "Resetting the Clock and Bootlist After Servicing a Node" on page 2-31 or *IBM Parallel System Support Programs for AIX: Installation Guide* for this procedure.

1. Ensure ESD antistatic wrist device is attached.
2. Reinstall the I/O planar in the chassis.
3. Attach the I/O expansion planar and the CPU assembly I/O planar.
4. Reinstall the screws to secure the I/O planar.
5. Reinstall the cables into the I/O planar (J11, J12, J13, and J14).
6. Install the PCI card guide bracket.
7. Replace the PCI card(s) using the steps in "Replacing the PCI Adapter Card" on page 3-115.
8. Replace the I/O expansion assembly cover. Turn the locking screws to secure the cover.
9. Replace the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
10. Return to the procedure that directed you here.
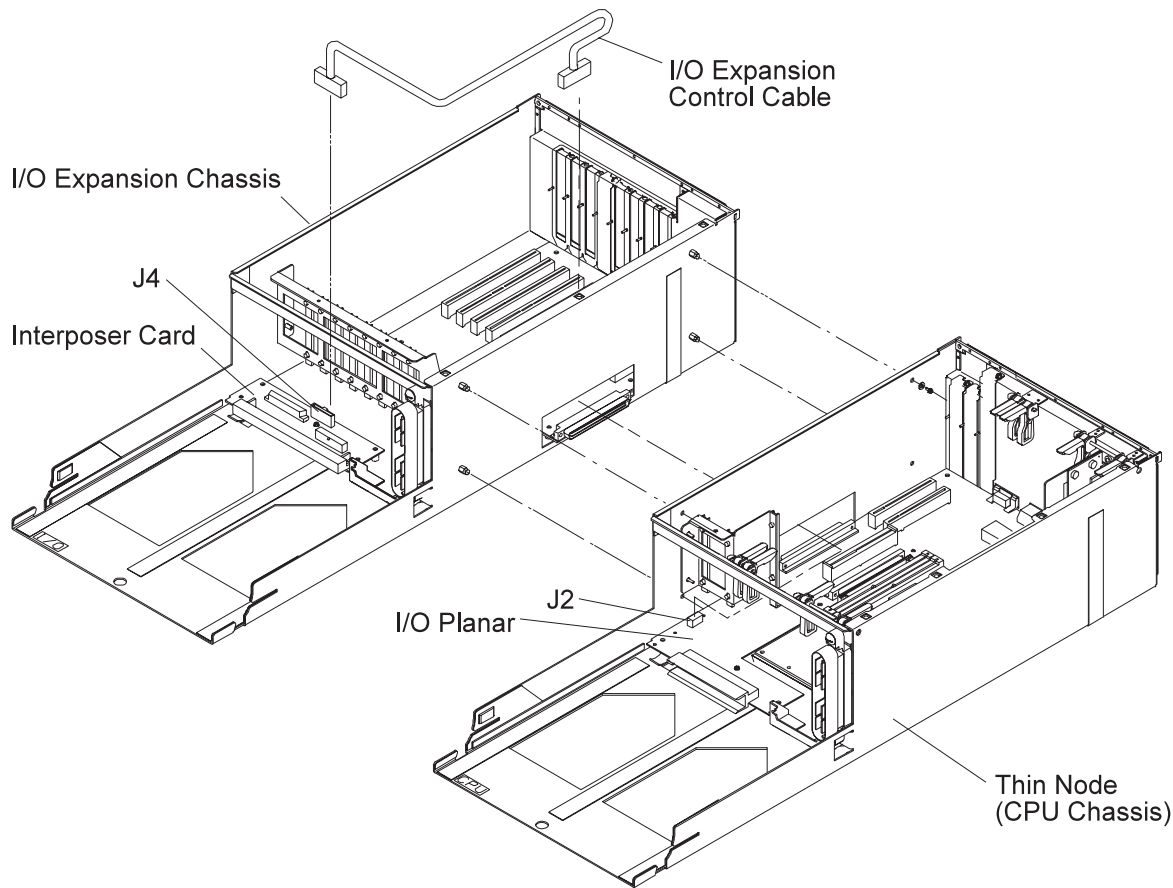
Figure 3-97. POWER3 SMP Wide Node I/O Expansion Control Cable

Removing the I/O Expansion Control Cable

1. Ensure ESD antistatic wrist device is attached.
2. Remove the POWER3 SMP wide node using the steps in "Removing a POWER3 SMP Wide Node" on page 3-110.
3. Turn the locking screws on the CPU assembly and I/O expansion covers and remove the covers.
4. Disconnect the expansion control cable at J4 on the interposer card in the I/O expansion assembly.
5. Disconnect the expansion control cable at J2 on the I/O planar in the thin node.
6. If necessary, cut the cable tie that secures the cable to the tie-down on the bottom of the chassis.

Replacing the I/O Expansion Control Cable

1. Ensure ESD antistatic wrist device is attached.
2. Connect the expansion control cable at J2 on the I/O planar in the thin node.
3. Connect the expansion control cable at J4 on the interposer card in the I/O expansion assembly.
4. Secure the cable to the tie-down on the bottom of the chassis with a cable tie.
5. Replace the CPU assembly and I/O expansion covers. Turn the locking screws to secure the covers.
6. Reinstall the POWER3 SMP wide node using the steps in "Replacing a POWER3 SMP Wide Node" on page 3-111.
7. Return to the procedure that directed you here.

Procedures for the Power Distribution Unit (PDU)

Removing PDU Components

Note: It may be necessary to remove the high-performance switch (HiPS) assembly and even the first processor node drawer to access some PDU parts and/or the PDU chassis.

CAUTION:

The unit weight exceeds 18 Kg (40 lbs) and requires two service personnel to lift.

Perform these procedures to remove power distribution components:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the file system.
2. Toggle main power switch to Off ('0') position.
3. Open back cover and toggle circuit breaker to Off position.
4. Perform the Lockout/Tagout Procedure or the Bagout/Lockout Procedure in Volume 2, to remove power.
5. Perform "Removing the Air Filter Assembly" on page 3-149 to remove the complete air filter assembly.
6. Refer to "Removing the Acoustic Skirts" on page 3-148 to access the PDU components.
7. Access the ac and dc sections of the power distribution as follows:

   - **ac Section**: Remove ac access panel screws to lift off access panel.

   - **dc Section**: Remove dc access panel screws to lift off access panel. If removing the dc access panel, first remove the cable at J9.

8. Return to the procedure that directed you here.
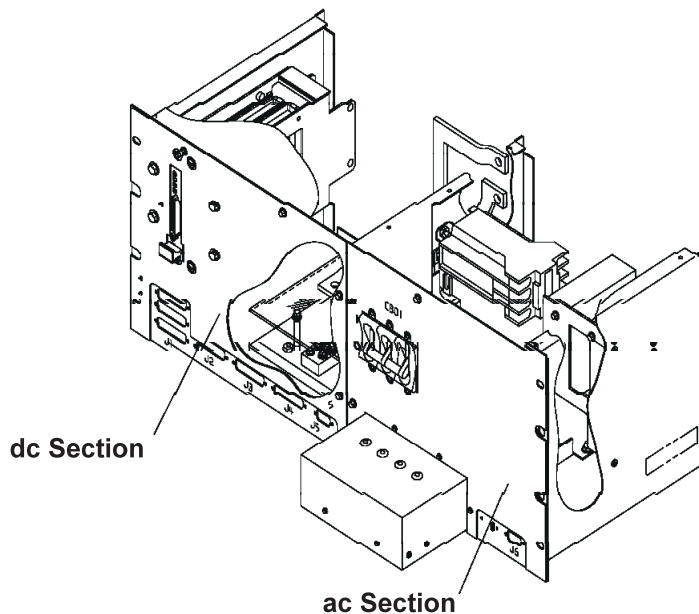
Figure 3-98. Removing PDU Components

Replacing PDU Components

Perform these procedures to replace power distribution components:

1. Reinstall ac access panel and tighten access panel screws.
2. Reinstall dc access panel and tighten access panel screws.
3. If previously removed, reinstall plug J9 at the dc section of the power distribution unit.
4. Refer to "Replacing the Acoustic Skirts" on page 3-148 to replace the acoustic skirts (except on 49-inch frames).
5. Refer to "Replacing the Air Filter Assembly" on page 3-150 to replace the air filter assembly.
6. Reapply ac voltage to ac line cord by plugging cable or toggling external circuit breaker feeding the line cord.
7. Toggle circuit breaker on the ac access panel of the Power Distribution Unit to On ('1') position.
8. Toggle main power switch to On ('1') position.
9. Return to the procedure that directed you here.

Removing the PDU Frame Supervisor Card

Note: The frame supervisor card can be removed and replaced concurrently.

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the frame supervisor card:

1. Refer to "Removing PDU Components" on page 3-127 to access the dc section of the Power Distribution Unit.
2. Disconnect J9 cable from the frame supervisor card.
3. Remove access panel screws on dc section, then remove panel.
4. Loosen captive screws in card faceplate.
5. Pull frame supervisor card out of the card cage using the plastic pull tab.
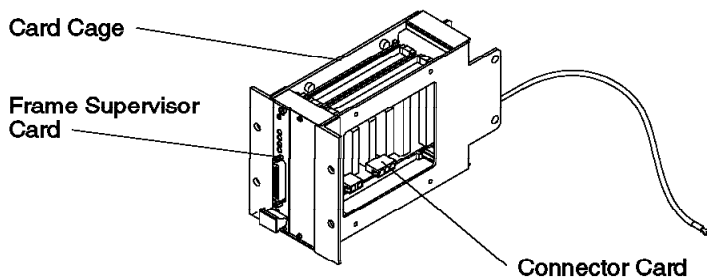
Figure   3-99. Removing the PDU Frame Supervisor Card

Replacing the PDU Frame Supervisor Card

Perform these procedures to replace the frame supervisor card:

1. Insert frame supervisor card into card cage, lining up card into card guide rails. Push card until card faceplate is even with faceplate of connector card.
2. Tighten two captive screws to hold supervisor card to cage.
3. Reinstall access panel and screws on dc section.
4. Reconnect J9 cable on the frame supervisor card.
5. Refer to "Replacing PDU Components" to reinstall dc access panel on Power Distribution Unit.
6. Perform "Verification Test for Supervisor Bus" on page 2-17.

Removing the PDU Supervisor Connector Card

Perform these procedures to remove the connector card:

1. Refer to "Removing PDU Components" on page 3-127 to access the dc section of the Power Distribution Unit.
2. Loosen captive screws in card faceplate.
3. Disconnect six cables from the connector card.
4. Carefully pull connector card out of the card cage.
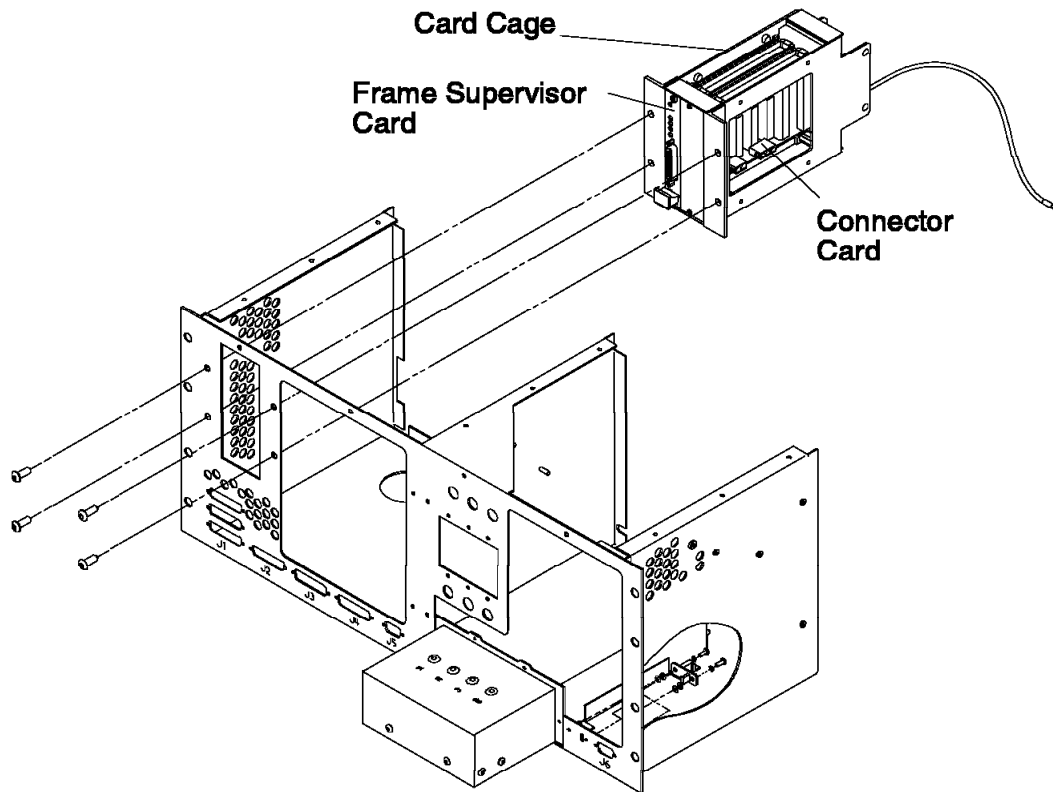
Figure   3-100. Removing Supervisor Connector Card from Card Cage

Replacing the PDU Supervisor Connector Card

Perform these procedures to replace the connector card:

1. Insert connector card into card cage, lining up card into card guide rails. Push card in until card is firmly seated.
2. Screw faceplate to card cage, using the two screws.
3. Reconnect cables on to connector card. Pay special attention to cable P403 and P404 connections.
4. Refer to "Removing PDU Components" on page 3-127 to access the dc section of the Power Distribution Unit.

Removing the PDU Supervisor Backplane Card

Perform these procedures to remove the backplane card:

1. Refer to "Removing PDU Components" on page 3-127 to access the dc section of the Power Distribution Unit.
2. Disconnect cables from the connector card.
3. Loosen two captive screws on each supervisor and connector card.
4. Remove supervisor and connector cards from cage.
5. Remove four screws holding the plastic shield over the bus bars.
6. Remove ground strap from bus bar.
7. Remove four screws retaining card cage, then remove card cage from dc section.
8. Remove four screws holding backplane card to the cage. Make note of card alignment on back of cage.
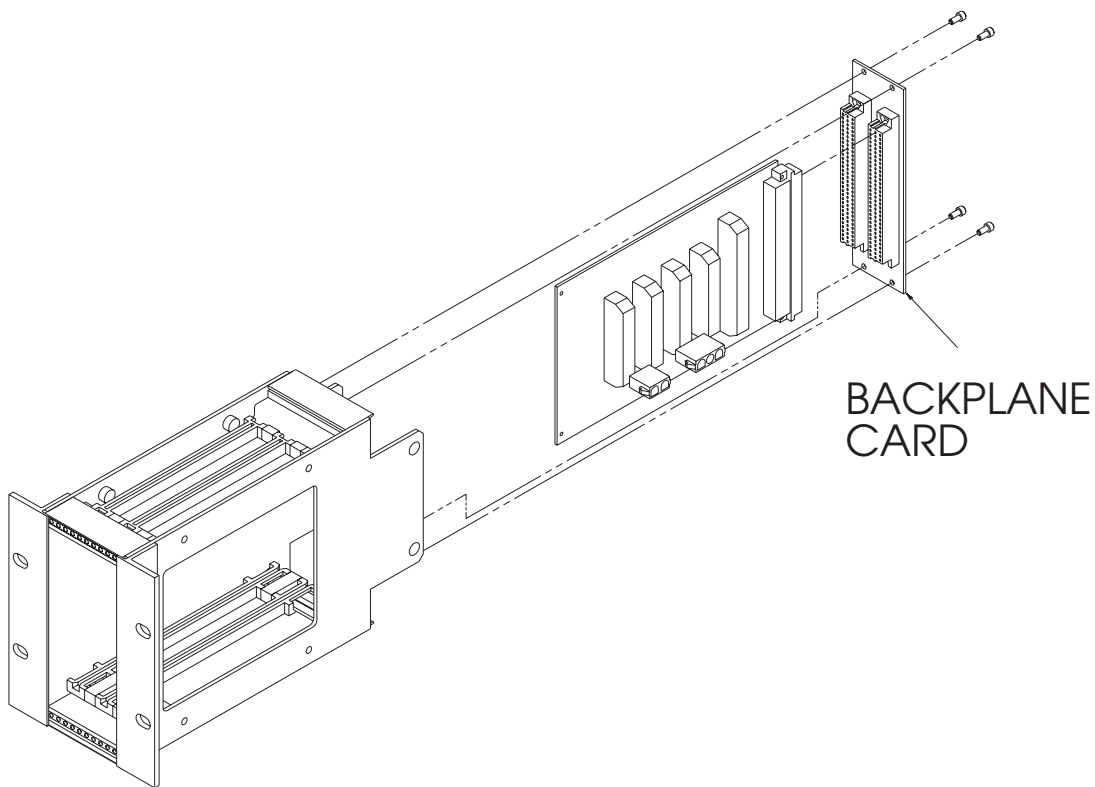
BACKPLANE
CARD

Figure 3-101. Removing Supervisor Backplane Card from Card Cage

Replacing the PDU Supervisor Backplane Card

Perform these procedures to replace the backplane card:

1. Reinstall backplane card to cage using four screws. Carefully align so that when the cards are reinstalled, they are seated correctly.
2. Reinstall supervisor and connector cards.
3. Tighten two captive screws on each supervisor and connector card.
4. Reinstall four screws to hold cage to frame.
5. Attach ground strap to bus bar.
6. Reinstall plastic shield over bus bars, using the four screws.
7. Reinstall cables to the connector card.
8. Refer to "Replacing PDU Components" on page 3-128 to reinstall dc access panel on Power Distribution Unit.

Removing the PDU ac Filter

Perform the following procedures to remove the ac filter:

1. Refer to "Removing PDU Components" on page 3-127 to power down frame and access the ac compartment.
2. Refer to "Removing the PDU ac Line Cord" on page 3-139 and follow these procedures. Return to Step 3 when completed.
3. Remove the bleeder resistor from the ac filter. Make note of its location.
4. Remove the six mounting screws from circuit breaker 1 and carefully move the circuit breaker out of the ac compartment.
5. Remove the four nuts holding the ac filter to the frame.
6. Disconnect the ground wire on the rear of the ac filter from the frame.
7. Lift the ac filter straight up and out of the ac compartment.
8. Make note of the wire locations on the rear of the ac filter and remove the wires. Save the ground wire for replacement.
9. Loosen the four nuts holding the mounting plate to the ac filter and remove the plate.
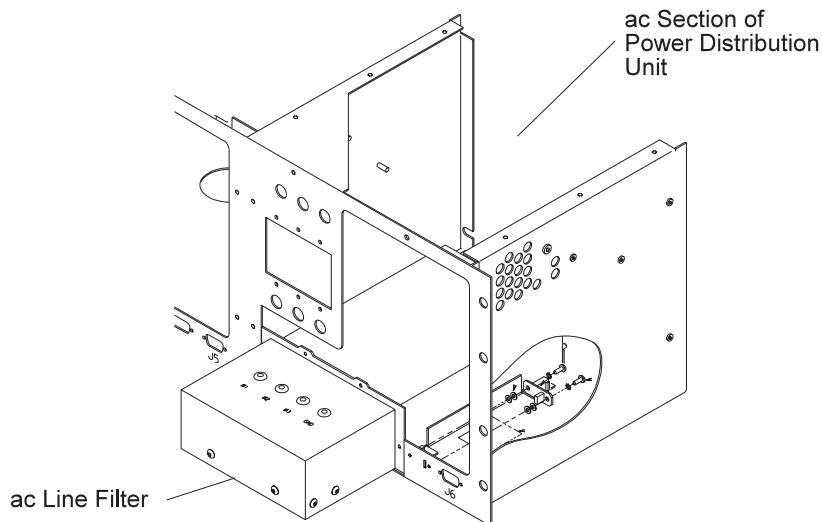
Figure   3-102. Removing the PDU ac filter

Replacing the PDU ac Filter

Perform the following procedures to replace the ac filter:

1. Place the ac filter into mounting plate and tighten the four nuts.
2. Reinstall bleeder resistor on ac filter (on previously noted location).
3. Reinstall the wires on the back of the ac filters to their previously noted locations. Reinstall the ground wire you saved during the ac filter removal.
4. Carefully reinstall the ac filter on the four mounting studs.
5. Reinstall washers and nuts on the four mounting studs and secure filter to the frame.
6. Reinstall rear ground to the frame.
7. Carefully move circuit breaker 1 back into the ac compartment and reinstall the six mounting screws.
8. Refer to "Replacing the PDU ac Line Cord" on page 3-139.
9. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac access panel and power up frame.

Removing the PDU Main Contactor

Perform these procedures to remove the main contactor:

1. Refer to "Removing PDU Components" on page 3-127 to power down frame and access the ac compartment.
2. Refer to "Removing the Power Distribution Unit (PDU)" on page 3-137 to remove the power distribution unit.
3. Remove the top plate of the power distribution unit for easier access.
4. Remove the main contactor by removing the two mounting nuts.
5. Make note of all wire positions and remove the wires from the main contactor. If the new contactor is available, install the wires directly on the new contactor as they are removed from the old contactor.
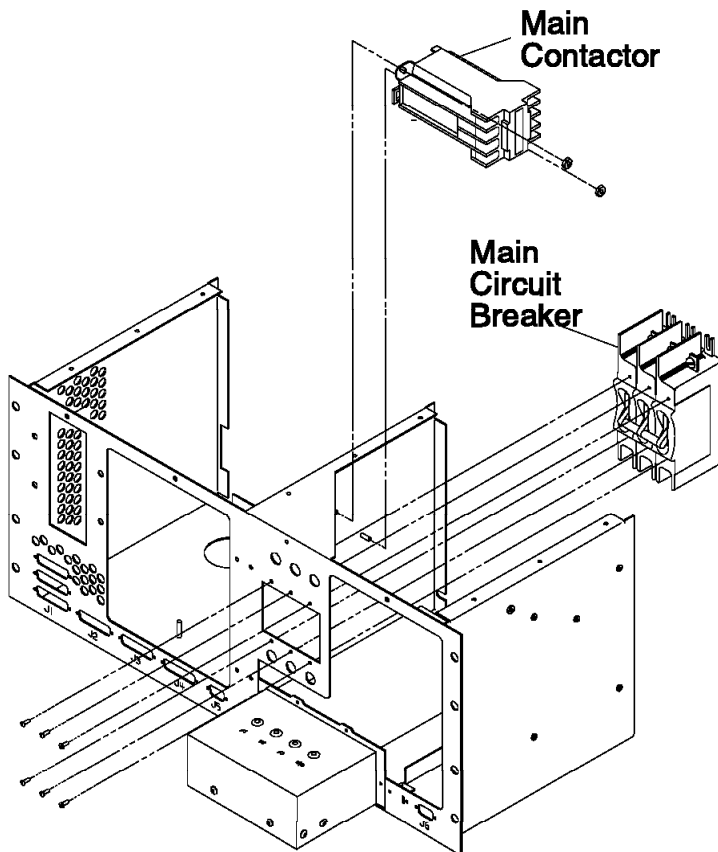
Figure   3-103. Removing the Main Contactor from the Power Distribution Unit

Replacing the PDU Main Contactor

Perform these procedures to replace the main contactor:

1. Reinstall wires on the new contactor to their previously noted positions.
2. Reinstall the contactor onto its mounting studs.
3. Reinstall the washers and nuts onto the mounting studs.
4. Reinstall top plate of the power distribution unit.
5. Refer to "Replacing the Power Distribution Unit (PDU)" on page 3-138 to reinstall the PDU.
6. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac access panel and power up frame.

Removing the PDU Main Circuit Breaker

Perform the following procedures to remove the main circuit breaker:

1. Refer to "Removing PDU Components" on page 3-127 to power down frame and access the ac compartment.
2. Refer to "Removing the Power Distribution Unit (PDU)" on page 3-137 to remove the power distribution unit.
3. Remove the top plate of the power distribution unit for easier access.
4. Remove six mounting screws from the face of circuit breaker 1.
5. Remove the circuit breaker from the ac box, being careful not to snag the wires on the back of the circuit breaker.
6. Make note of all wire locations and then remove the six wires from the circuit breaker.
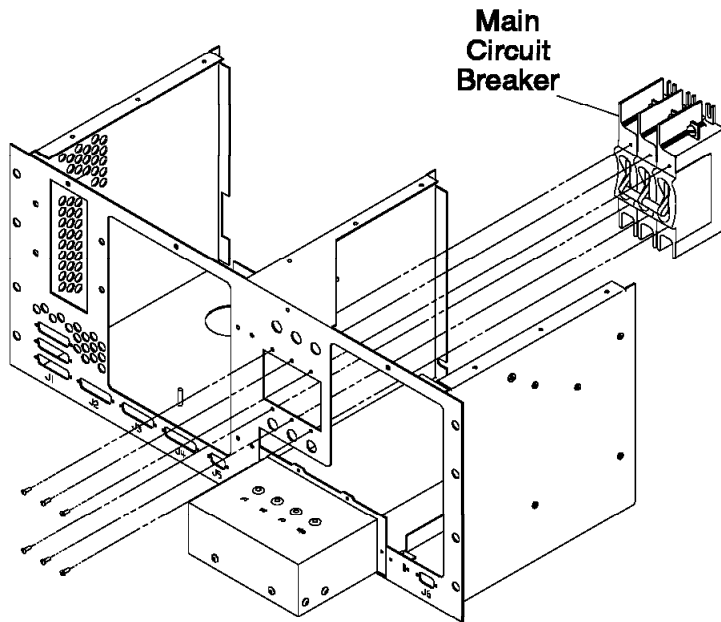
Figure 3-104. Removing the PDU Main Circuit Breaker

Replacing the PDU Main Circuit Breaker

Perform the following procedures to replace the main circuit breaker:

1. Reinstall six wires on circuit breaker 1 to the locations previously noted in the Main Circuit Breaker removal procedures.
2. Position circuit breaker 1 into the ac box.
3. Reinstall the six mounting screws in circuit breaker 1.
4. Reinstall the top plate of the power distribution unit.
5. Refer to "Replacing the Power Distribution Unit (PDU)" on page 3-138 to reinstall the PDU.
6. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac access panel and power up frame.

Removing the PDU Supervisor Power Supply

Perform these procedures to remove the supervisor power supply:

1. Refer to "Removing PDU Components" on page 3-127 to power down frame and access the ac compartment.
2. Remove the power supply ground wire mounted on the side of the power distribution unit.
3. Remove the three screws holding the power supply bracket to the ac compartment.
4. Remove the two screws holding the power supply (that is to be replaced) to the power supply bracket.
5. Remove the bottom input wires by loosening the three screws and pulling all wires out.
6. Make note of output wire locations on top of the supply and remove the four wires.
7. Remove two screws on the bottom of the power supply and four studs on top of the supply that are holding the supervisor power supply to the Plexiglass plate. Save this plate and the screws and studs for the new power supply.
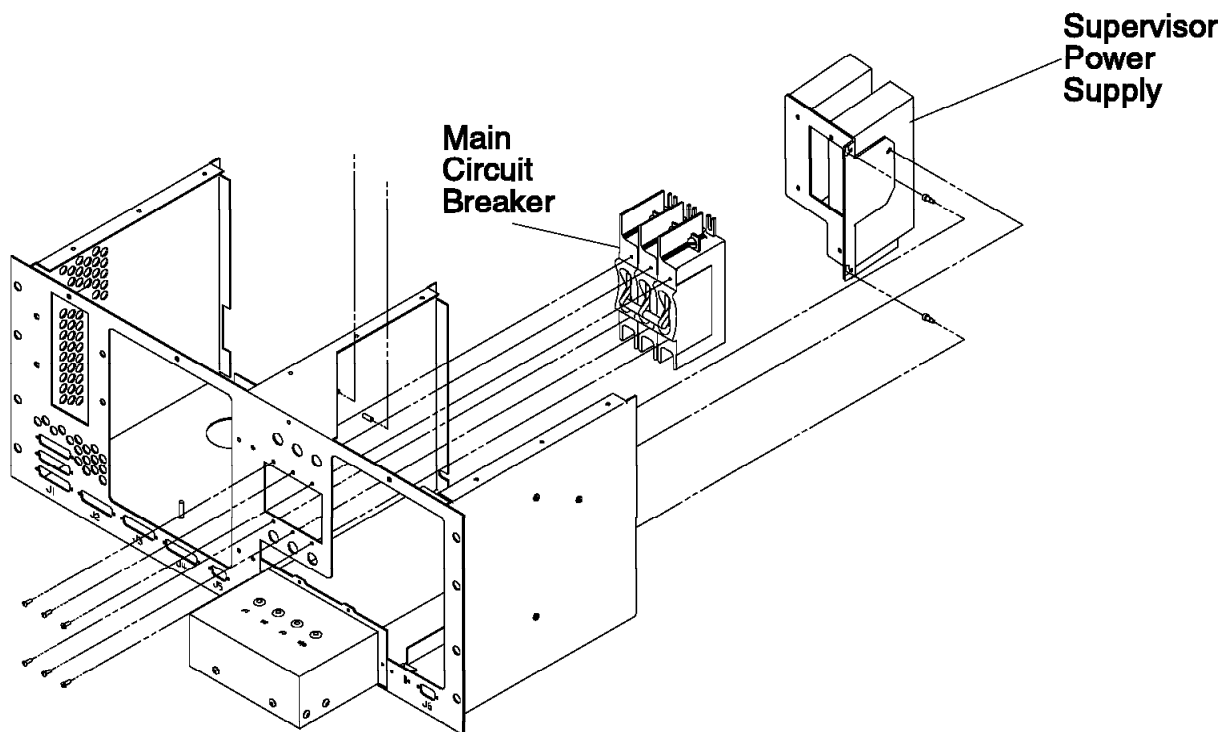
Figure   3-105. Removing the PDU Supervisor Power Supply

Replacing the PDU Supervisor Power Supply

1. Reinstall the two screws holding the power supply that was replaced to the power supply bracket.
2. Reinstall the three screws that hold the power supply bracket to the ac compartment.
3. Reinstall the input wires L1, L2, and ground wire to the bottom of the power supply.
4. Carefully move the power supply into place, aligning the slotted holes with the shoulder screws and slide down. The shoulder screws should end up in the narrow part of the slotted holes.
5. Reinstall the screw that holds the power supply to the frame.
6. Reinstall ground wire.
7. Reinstall the top plate of the power distribution unit.
8. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac access panel and power up frame.

Removing the PDU 48-Volt Power Supply

Note: The 48-volt power subsystem consists of N+1 technology to allow for concurrent maintenance. Any one supply can be removed without powering down the system.

Perform the following procedures to remove the power book:

1. Perform "Removing the Air Filter Assembly" on page 3-149 to remove the air filter assembly.
2. Remove power at supply by turning off the circuit breaker at the top of the power supply.
3. Remove the grounding screw at the front of supply, located left of the handle.
4. Locate the black handle at the bottom of the supply. Release the handle by pushing in the lever located on the left side of the handle, towards the right.
5. Pull the handle out all the way until the power supply starts to move forward. The handle should be at a right angle in comparison to the face of the power supply.
6. Pull the power supply out.
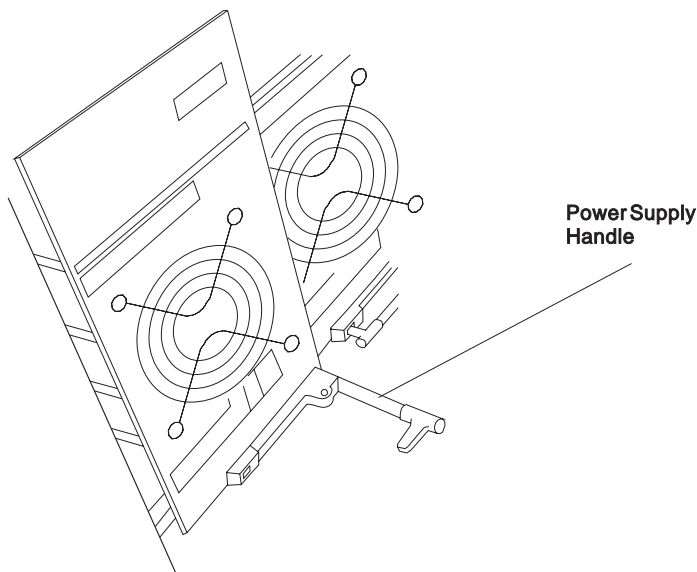
Figure   3-106. Removing the PDU 48-volt Power Supply From Frame

Replacing the PDU 48-Volt Power Supply

Perform the following procedures to replace the 48-volt power supply:

1. With the handle all the way out in the open position, slide the power supply back into position until the handle latches to the power supply frame, but do not close handle.
2. Close the handle all the way until the release lever catches.
3. Reinstall grounding screw at the front of the supply to left of the handle.
4. Power On the power supply with the circuit breaker.
5. Perform "Replacing the Air Filter Assembly" on page 3-150 to replace the air filter assembly.

Removing the PDU 48-Volt Power Chassis

CAUTION:
The unit weight exceeds 18 Kg (40 lbs) and requires two service personnel to lift.

Perform the following procedures to remove the 48-volt power chassis:

1. Refer to "Removing PDU Components" on page 3-127 to power down frame and access the ac and dc compartments.
2. Unplug J403 and J404 from the connector card in the dc power distribution unit.
3. Refer to "Removing the Air Filter Assembly" on page 3-149 to remove the air filter assembly.
4. Turn all power supply circuit breakers to the Off ('0') position.
5. Refer to "Removing the PDU 48-Volt Power Supply" on page 3-135 to remove the power supplies.
6. Remove the eight bolts securing the 48-volt power chassis to the frame.
7. In the dc power distribution compartment, remove the two nuts and washers from the V1 bus bar straps.
8. Remove the power chassis ground wire from the bottom of the frame in the ac section of the power distribution unit compartment.
9. Carefully move the chassis forward making room to access TB1 on the back of the chassis. Make note of the wire positions and then remove the wires from TB1.
10. Move the chassis forward and out of the frame.
11. If the chassis is being replaced by a new chassis, make a note of the J1 and J2 cables. Remove the cables and ground wire and save these parts for reinstallation of the new chassis.
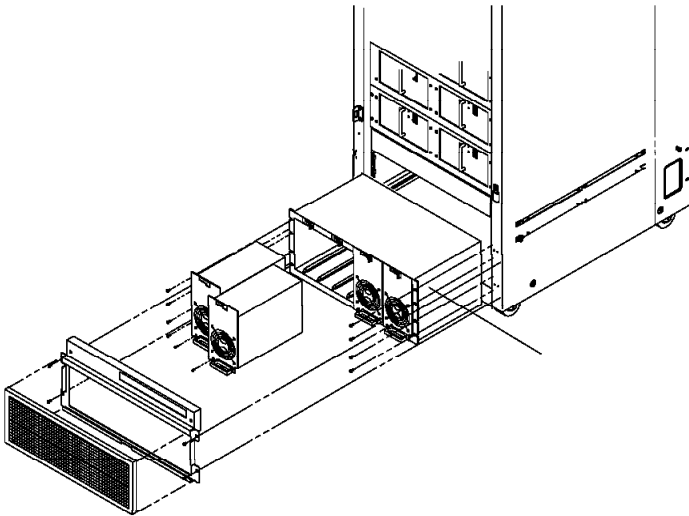
Figure   3-107. Removing the PDU 48-volt Power Chassis

Replacing the PDU 48-Volt Power Chassis

Perform the following procedures to replace the 48-volt power chassis:

1. If the 48-volt power chassis is being replaced with a new part, then:
    a. Reinstall the two cables saved from the removal into J1 and J2 locations of the replacement 48-volt power chassis.
    b. Remove and set aside the three screws from TB1.
    c. Reinstall the ground wire saved from the removal procedure to the back of the 48-volt power chassis.
2. Reinstall the chassis back into the frame, using care not to pinch the J1, J2 cables and the ground wire.
3. From the ac compartment, reinstall the wires on TB1 to the locations that you noted during the removal procedure.
4. Insert the chassis fully back into the frame, checking that the V1 bus bars line up with the studs on the back of the chassis.
5. Reinstall the eight bolts securing the chassis to the frame.
6. Reinstall V1 nuts and washers.

7. Reinstall the chassis ground wire to the frame ground on the bottom of the ac section, along with the other existing ground wires.
8. Refer to "Replacing the PDU 48-Volt Power Supply" on page 3-135 to replace the power supplies.
9. Turn the power supply circuit breakers to the On ('1') position.
10. Refer to "Replacing the Air Filter Assembly" on page 3-150 to replace the air filter assembly.
11. In the dc power distribution unit compartment, reinstall J403 and J404 into the connector card.
12. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac and dc access panels and power up frame.

Removing the Power Distribution Unit (PDU)

Perform these procedures to remove the power distribution unit:

1. Perform "Removing PDU Components" on page 3-127 to power down the system and access ac and dc compartments.

   Note: The high-performance switch, processor nodes 1, 2, 3, 4, and shelves must be removed to access inside the power distribution unit.

2. Perform "Removing the Switch Assembly" on page 3-151.
3. Perform "Removing a Thin Processor Node" on page 3-6 or "Opening a Wide Processor Node" on page 3-27 to move processor nodes out of the way. Place the processor nodes on an ESD pad.
4. Remove tie wraps from cables wire plate. Remove cables from shelf.
5. Remove cable from each adapter jack, if installed.

   Note: Ensure cables are safely out of the way before removing shelves.

6. Remove the two screws and retainers from each side of the shelf.

   Note: Two service personnel are needed to remove the shelf. One service person can stand in front holding the shelf, while the second person removes the screws and retainers from each side of the shelf bracket.

7. Push the shelf towards the back to release the studs from front bracket hole.
8. Angle shelf to remove from frame. Repeat these steps for the second shelf.
9. Remove cables J1 through J8 from the power distribution unit.
10. Refer to "Removing the PDU ac Line Cord" on page 3-139.
11. Remove the ground wires from the bottom of the frame inside the ac section of the power distribution unit.
12. Remove plastic shield over the bus bars in the dc section of the power distribution unit.
13. Remove bolt that holds ground bus bar to the frame.
14. Remove the plugs J403 and J404 from the connector card in the dc section.
15. Remove the nuts and washers from the V1 bus bar straps, located at the rear of the power distribution unit.
16. Remove the four screws holding the power distribution unit to the frame.

   Note: The other end of the V1 bus bar straps may need to be loosened to free the power distribution unit.

   At this point, the power distribution unit should be free of the frame.

17. Locate the three wires connected to the back of the power supply chassis. Slowly pull the power distribution unit out of the frame until there is enough room to access and remove the three wires from the terminal block. Make note of the wire positions on the terminal block and remove the wires.
18. The power distribution unit can now be removed from the frame.

dc Section

ac Section
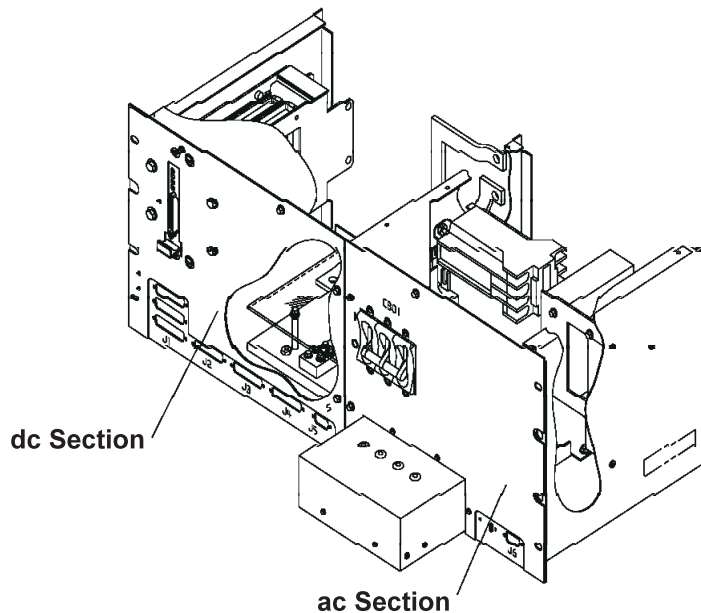
Figure   3-108. Removing the Power Distribution Unit

Replacing the Power Distribution Unit (PDU)

Perform these procedures to replace the power distribution unit:

1. Carefully slide the power distribution unit partially back into the frame. Leave enough room to replace the wires on the back of the power supply chassis terminal block.
2. Replace the three wires on the back of the power supply chassis to their previously noted positions.
3. Slide the power distribution unit back into the frame, ensuring that the V1 bus bar straps line up with the bolts, and slide into place.
4. Reinstall the ground wires to the frame in the ac section of the power distribution unit.
5. Reinstall bolt to hold the ground bus bar to the frame but do not tighten.
6. Reinstall the four screws securing the power distribution unit to the frame.
7. Reinstall the V1 bus bar strap nuts and washers. Tighten the other end of the V1 bus bar straps if they were loosened during removal.
8. Tighten bolt holding the ground bus bar to the frame.
9. Reinstall plastic shield over bus bars in dc section of the power distribution unit.
10. Reinstall plugs J403 and J404 onto the connector card.
11. Refer to "Replacing the PDU ac Line Cord" on page 3-139.
12. Reinstall J1 through J8 cables on the power distribution unit.
13. Angle shelf to replace into frame.
14. Replace the two screws and retainers on each side of the shelf.

   Notes:

   a. Two service personnel are needed to replace the shelf. One service person can stand in front holding the shelf, while the second person replaces the screws and retainers on each side of the shelf bracket.

   b. Ensure cables are safely out of the way before replacing shelves.

15. Reconnect cable from each adapter jack, if previously installed.
16. Replace tie wraps to cables wire plate. Reconnect cables to shelf.
17. Refer to "Replacing a Thin Processor Node" on page 3-8. Repeat these steps for each shelf.
18. Refer to "Replacing the Switch Assembly" on page 3-152.

19. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac and dc access panels and power up frame.

Removing the PDU ac Line Cord

Perform the following procedures to remove the ac line cord:

1. Refer to "Removing PDU Components" on page 3-127 to power down system and access the ac compartment.
2. Remove the six screws in the ac filter cover and remove the cover. Refer to "Removing the PDU ac Filter" on page 3-131 for an additional view of this component.
3. Make note of the wire locations. Remove the nuts from A, B, C, and D, and remove the wires.
4. Remove the ground wire from the frame.
5. Remove the locking ring holding the ac line cord to the frame. Push the ac line cord through the hole and free it from the frame.

Replacing the PDU ac Line Cord

Perform the following procedures to replace the ac line cord:

1. Pull the ac line cord back through the hole in the frame and tighten the lock ring to secure the line cord in place.
2. Reinstall the line cord wires to the ac filter in their previously noted locations.
3. Using torque tool P/N 2515283, tighten the nuts attaching the ac line cord to the ac filter to 16 - 24 inches/pounds (1.8 - 2.7 NM).
4. Reinstall the ac line cord ground to the frame.
5. Reinstall the ac filter cover with the six mounting screws.
6. Refer to "Replacing PDU Components" on page 3-128 to reinstall ac access panel and power up frame.

LOCKWASHER

NUT

BROWN

BLACK

BLUE OR BLACK

GREEN/YELLOW

SCREW, HEX FL

LINE CORD

WASHER, **STAR**

A
B
C
GND

ASM, CABLE
RESISTOR

ASM, PDU (REF)
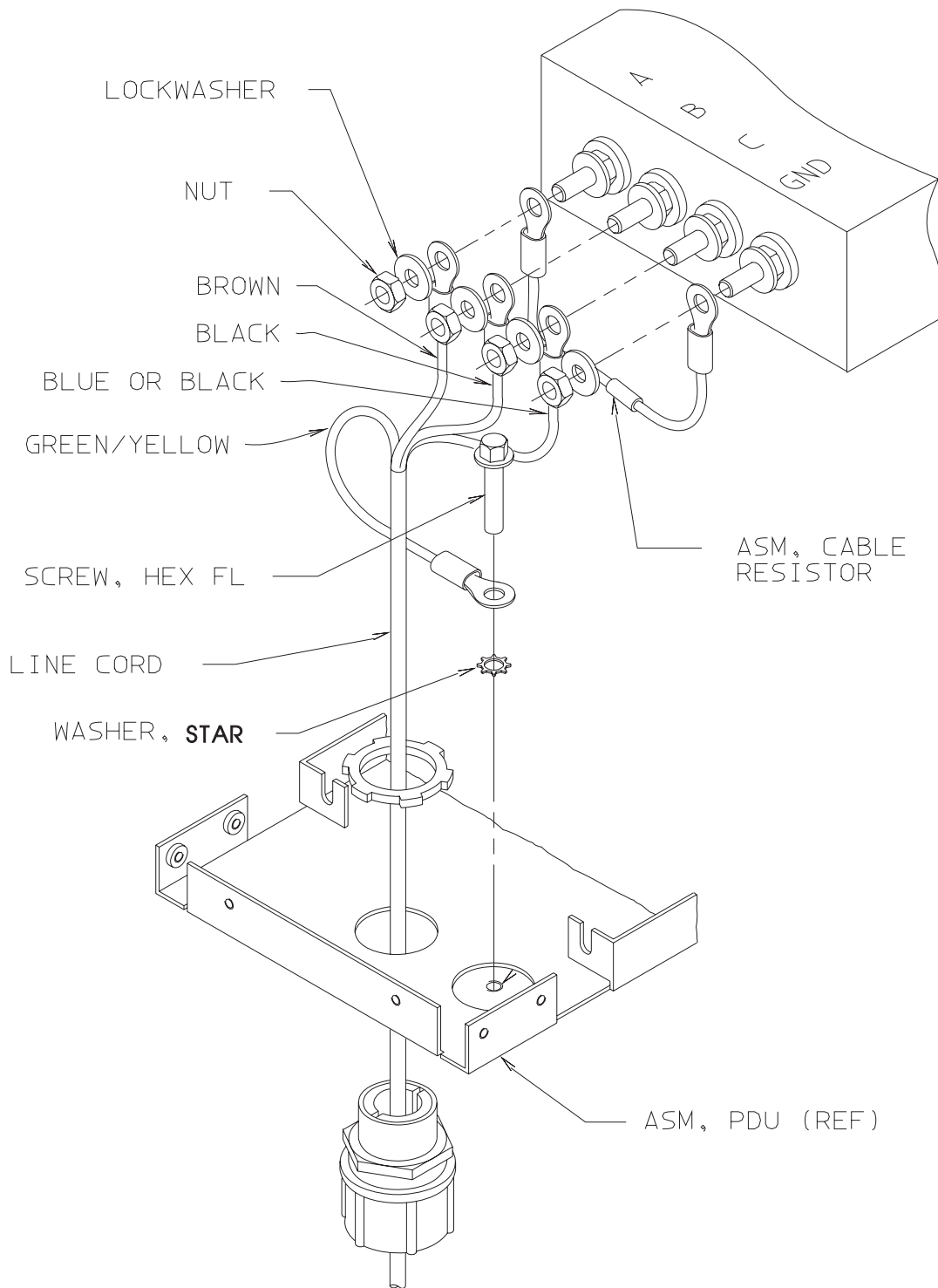
Figure 3-109. Removing the PDU ac Line Cord

Procedures for the Scalable Electrical Power Base Unit (SEPBU)

CAUTION:

The unit weight exceeds 18 Kg (40 lbs) and requires two service personnel to lift.

Removing the SEPBU Power Chassis

Perform these procedures to remove the SEPBU power chassis:

1. Refer to "Removing the Air Filter Assembly" on page 3-149 to remove the air filter assembly.
2. Put the circuit breaker at the front of each power module in the Off ('0') position.
3. Perform "Lockout Procedure for SEPBU" in *RS/6000 SP: Maintenance Information, Volume 2*‖‖> to remove power to the frame.
4. Disconnect all other cables at the front and rear of the SEPBU power chassis.
5. Perform "Removing the SEPBU Frame Supervisor Card" on page 3-144.
6. Perform "Removing the SEPBU Power Control Interface (PCI) Card" on page 3-143 to remove the PCI card.
7. Perform "Removing the SEPBU Power Module" on page 3-142 to remove **all** power modules. Make note of occupied positions.
8. Remove any existing covers over the blank power module spaces, making note of their locations.
9. At the front of the SEPBU power chassis, remove all mounting screws.
10. At the rear of the SEPBU power chassis, remove all mounting screws.
11. Slide the SEPBU power chassis out the front of the frame.
12. Return to the procedure that directed you here.
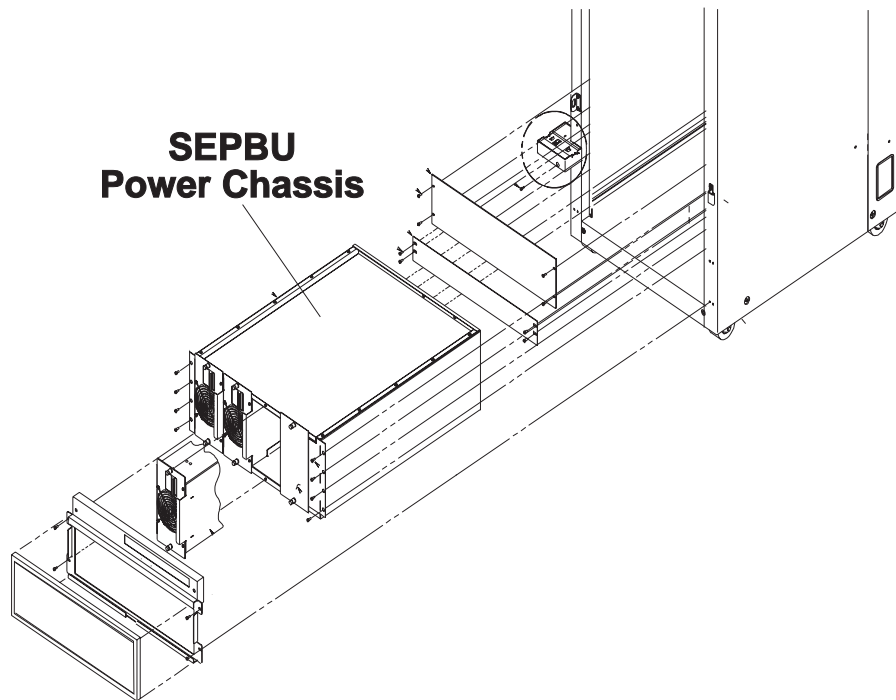
Figure 3-110. Removing the SEPBU Power Chassis

Replacing the SEPBU Power Chassis

Perform these procedures to replace the SEPBU power chassis:

1. Slide the SEPBU power chassis into the bottom front of the frame.
2. Reinstall the eight mounting screws at the front of the SEPBU power chassis.
3. Reinstall the eight mounting screws at the rear of the frame.
4. Replace any existing covers over the blank power module spaces that were noted in step 7 of "Removing the SEPBU Power Chassis."
5. Perform "Replacing the SEPBU Power Module" on page 3-143 to reinstall the power modules to originally occupied positions.

6. Perform "Replacing the SEPBU Power Control Interface (PCI) Card" on page 3-144 to reinstall the PCI card.
7. Perform "Replacing the SEPBU Frame Supervisor Card" on page 3-144.
8. Reconnect all cables at the rear of the SEPBU power chassis.
9. Remove lockout bag. Insert end of ac line cord into socket of SEPBU power chassis until it locks into place.
10. Put the circuit breaker on the front of each power module in the On ('1') position.
11. Refer to "Replacing the Air Filter Assembly" on page 3-150 to replace the air filter assembly.
12. Refer to "Restoring a Switch Assembly to the Active Configuration" on page 2-26.
13. Return to the procedure that directed you here.

Removing the SEPBU Power Module

Note: The 48-volt power subsystem consists of N+1 technology to allow for concurrent maintenance. Any one supply can be removed without powering down the system.

Perform the following procedures to remove the power module:

1. Refer to "Removing the Air Filter Assembly" on page 3-149 to remove the air filter assembly.
2. Verify the correct position of the power module to be replaced. Removal of the incorrect power module could result in a system disruption.
3. Remove power at the module by putting the circuit breaker at the front of the power module in the Off ('0') position.
4. Loosen the two retaining screws at the front of supply.
5. Pull the handle on the power module to remove the power module from the chassis.
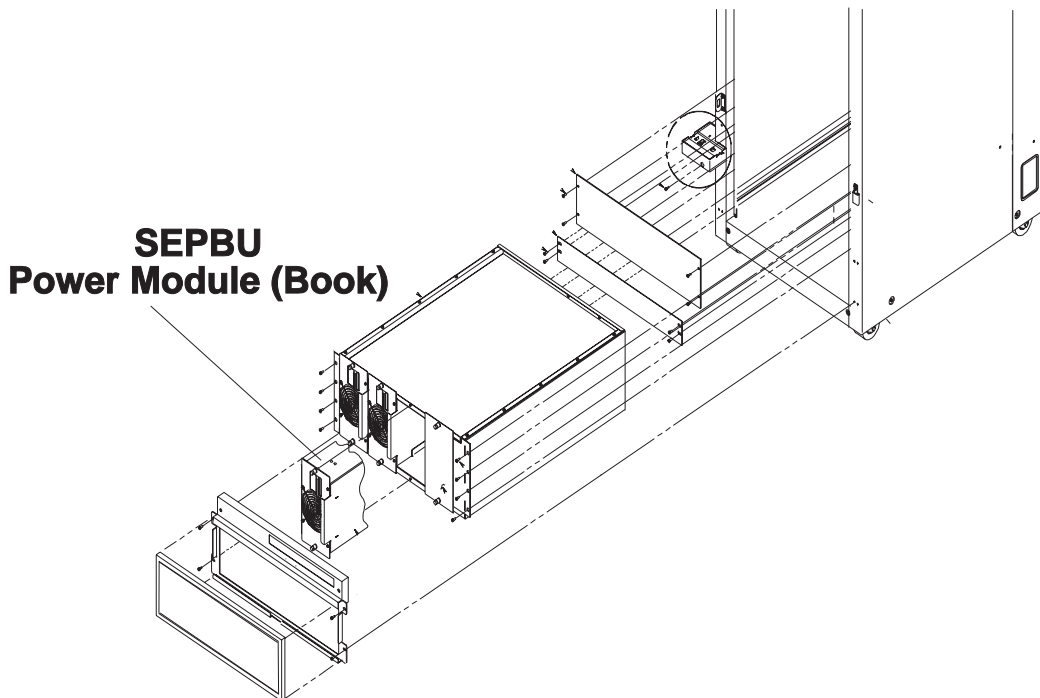
Figure 3-111. Removing the SEPBU Power Module

Replacing the SEPBU Power Module

Perform these procedures to replace the SEPBU power module:

1. Ensure that the circuit breaker on the power module is in the Off ('0') position.
2. Slide the power module gently into the SEPBU power chassis until the tabs are flush with the SEPBU frame.
3. Tighten the two retaining screws at the front of the module.
4. Put the circuit breaker at the front of the power module in the On ('1') position.
5. Refer to "Replacing the Air Filter Assembly" on page 3-150 to replace the air filter assembly.

Removing the SEPBU Power Control Interface (PCI) Card

Note: If PCI auxiliary function is used, the powering down of one frame may result in the powering down of all frames. Check for customer's remote power control cabling.

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the power control interface card:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the file system.
2. Toggle main power switch to Off ('0') position.
3. Make note of any cables connected to the power control interface card. Also, note the position of the "AUX/LOC" switch.
4. Disconnect any cables from the power control interface card.
5. Loosen captive screws in card faceplate.
6. Pull power control interface card out of the chassis using the plastic pull tab.
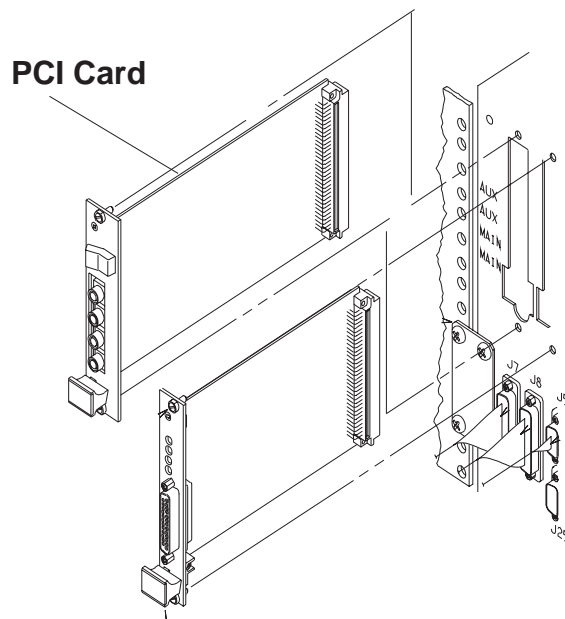
Figure 3-112. Removing the SEPBU Power Control Interface (PCI) Card

Replacing the SEPBU Power Control Interface (PCI) Card

Perform these procedures to replace the SEPBU power control interface card:

1. Insert power control interface card into chassis, lining up card into card guide rails. Push card until card faceplate is even with chassis.
2. Tighten two captive screws to hold supervisor card to cage.
3. Reconnect any cables to their original position on the power control interface card.
4. Set the "AUX/LOC" switch to the original position. (Normally, this is the "LOC" position.)
5. Toggle main power switch to On ('1') position.

Removing the SEPBU Frame Supervisor Card

Note: The frame supervisor card can be removed and replaced concurrently.

Refer to "Handling Static-Sensitive Devices" on page 3-6, then perform these procedures to remove the frame supervisor card:

1. Disconnect J9 cable from the frame supervisor card.
2. Loosen captive screws in card faceplate.
3. Pull frame supervisor card out of the chassis using the plastic pull tab.

FSV Card
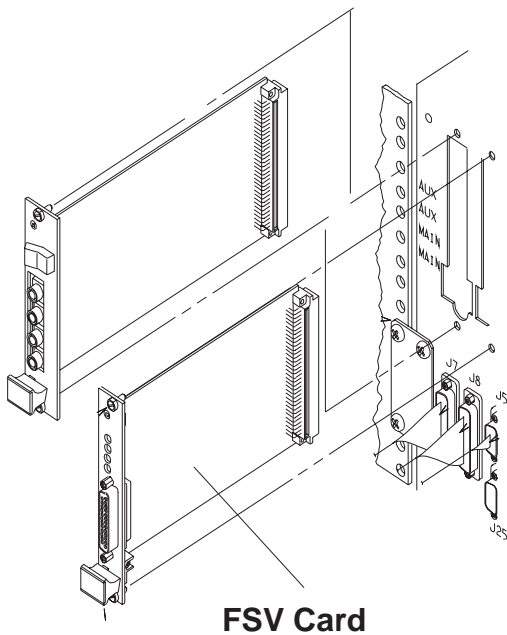
Figure   3-113. Removing the SEPBU Frame Supervisor Card

Replacing the SEPBU Frame Supervisor Card

Perform these procedures to replace the SEPBU frame supervisor card:

1. Insert frame supervisor card into chassis, lining up card into card guide rails. Push card until card faceplate is even with chassis.
2. Tighten two captive screws to hold supervisor card to cage.
3. Reconnect J9 cable on the frame supervisor card.
4. Perform "Verification Test for Supervisor Bus" on page 2-17.

Removing the SEPBU ac Line Cord

Perform the following procedures to remove the SEPBU ac line cord:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the file system.
2. Toggle main power switch to Off ('0') position.
3. Perform "Lockout Procedure for SEPBU" in *RS/6000 SP: Maintenance Information, Volume 2‖‖>* to remove power to the frame.
4. If ac line cord is hardwired to customer power, have customer remove power and disconnect ac line cord from customer power feed.
5. Disconnect the ac line cord from customer's receptacle.
6. If the SEPBU cable connector does not fit through the hole in the frame, perform "Detaching the ac Power Connector."
7. Push the ac line cord through the hole and free it from the frame.
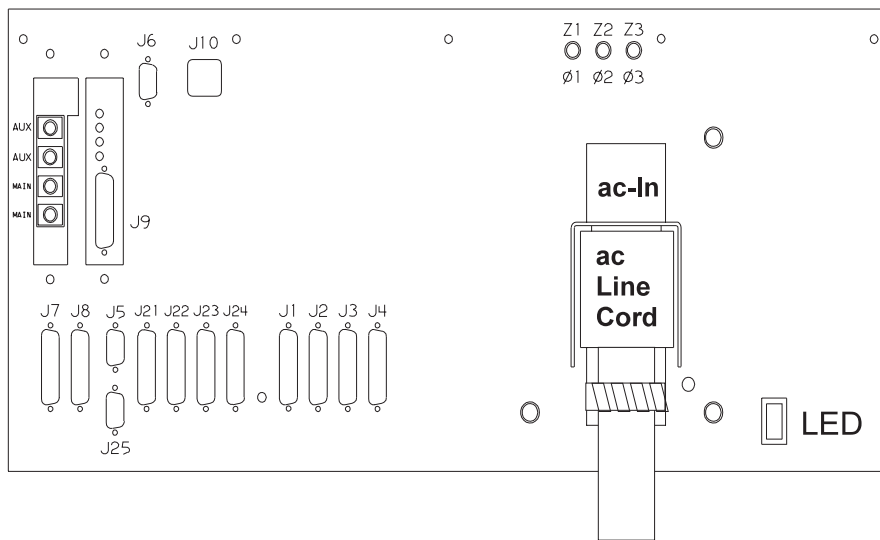
Figure   3-114. Removing the SEPBU ac Line Cord

Detaching the ac Power Connector

If necessary, perform the following procedures to remove the ac power connector (at customer power end) from the ac line cord:

1. With the ac line cord disconnected at both ends, remove the two screws inside plug.
2. Remove the two screws from cable strain relief clamps to remove both clamps.
3. Remove the two screws in cap, then pull cap away from plug.
4. With a flathead screwdriver, pry rubber gasket out of plug. Pull it at least 10 cm (4 inches) away from plug.
5. Push line cord into plug until wires are exposed.
6. Loosen retention screws until wires are loose, then pull out wires.
7. Pull plug housing, rubber gasket, and cap off of cable.

Replacing the SEPBU ac Line Cord

Perform these procedures to replace the SEPBU ac line cord:

1. If necessary, perform "Reattaching the ac Power Connector" on page 3-146.
2. Pull the ac line cord through the hole into the frame.
3. If the SEPBU cable connector does not fit through the hole in the frame, perform "Detaching the ac Power Connector."
4. Remove lockout bag. Insert end of ac line cord into socket of SEPBU power chassis until it locks into place.
5. Connect the ac line cord to customer's receptacle.
6. Remove the tagout.
7. Reapply ac voltage to ac line cord by reconnecting cable or toggling external circuit breaker feeding the line cord.
8. Toggle main power switch to On ('1') position.

Reattaching the ac Power Connector

Perform the following procedures to reattach the ac power connector on the ac line cord:

1. With the ac line cord disconnected at both ends, push cap, rubber gasket, and plug housing onto cable. Pay attention to orientation of parts.
2. Insert wires into pin assembly as indicated in Figure 3-115. Secure by tightening retention screws. Figure 3-116 on page 3-147 shows a typical pair of three-phase power connectors. Figure 3-117 on page 3-147 shows a typical pair of single-phase power connectors (used with the 49-inch frame).

Ground   (symbol)   Green/Yellow (GND), Bare Silver (Shield)

Phase 1   (L1)   Brown (PH-1)

Phase 2   (L2)   Black (PH-2)

Phase 3   (L3)   Black (PH-3)

Figure 3-115. Wire Positions in Pin Assembly

> **Note:** Symbols appear near wire insertion holes.

Plug

Connector

Receptacle
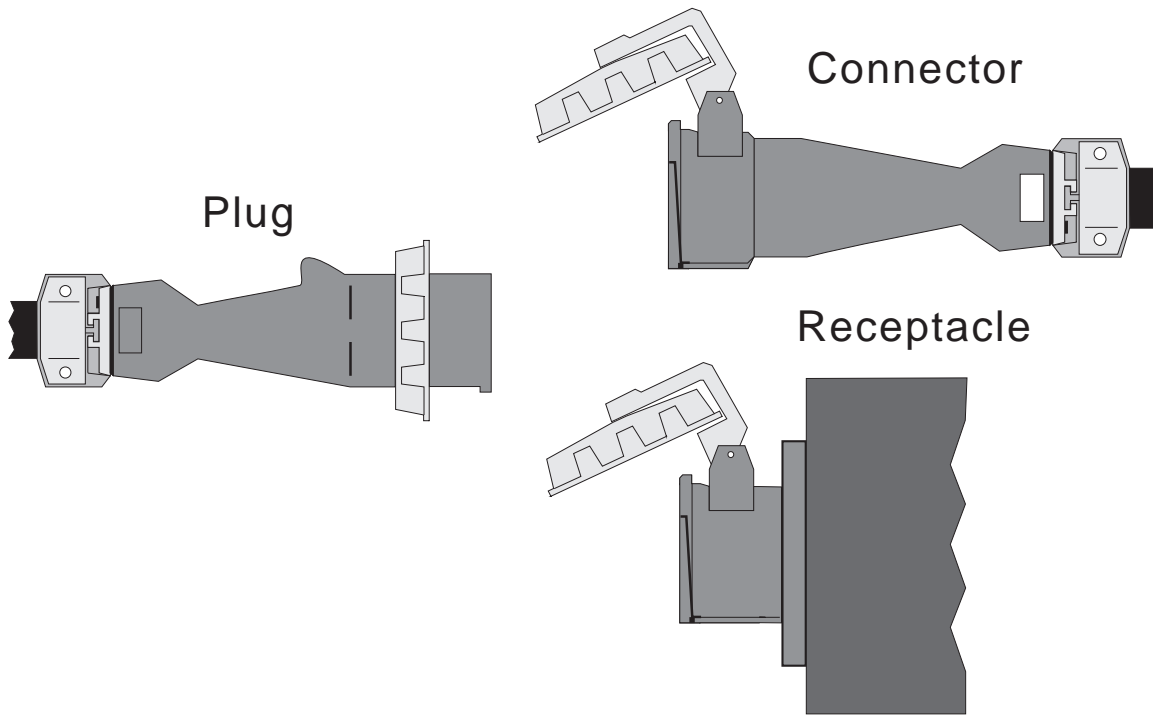
Figure 3-116. Three-Phase Power Connectors (U.S.)

Connector

Plug

Receptacle
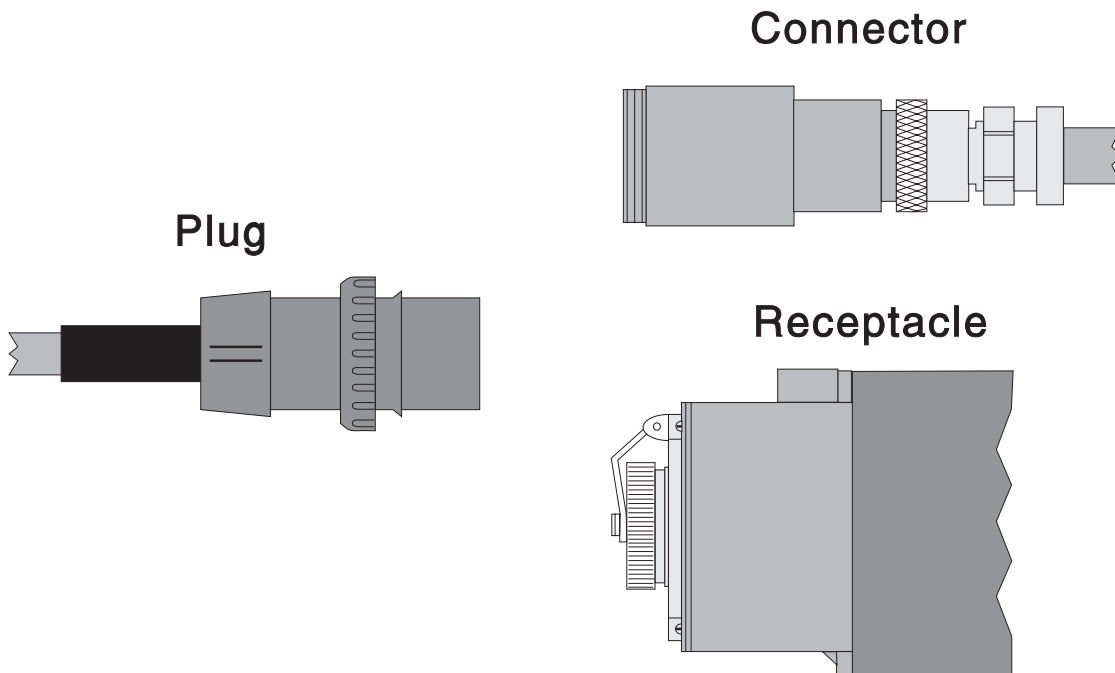
Figure 3-117. Single-Phase Power Connectors (U.S.)

3. Rotate plug housing to line up orientation slot of pin assembly with plug housing, then pull plug housing over pin assembly.
4. Install the two screws to secure pin assembly to plug housing.
5. Push rubber gasket and cap into plug housing, then install the two screws to retain cap.
6. Install cable strain relief, then install and tighten the two screws.

Procedures for Skirts and Main Power Switch

Removing the Acoustic Skirts

Perform one of the following procedures to remove the acoustic skirts (depending on the frame type):

1.93 m Frame

1. Loosen the front skirt from the filter bracket by loosening the two captive screws, on top of the front skirt, one quarter turn.
2. Remove the front skirt by pulling on the top and lifting the skirt free of the locating pins on the side skirts.
3. Remove the side skirts by moving the skirt to free the shoulder bolts from the keyhole in the skirt.
4. Lift the side skirt up and away from the frame.
5. Return to the procedure that directed you here.

2.01 m Frame

1. Open the front door of the frame.
2. Remove the front skirt by loosening the two captive screws by turning them a half turn.
3. Open the rear door of the frame.
4. Remove the two screws that secure the side skirt. These are located at the lower rear inside the frame.
5. Remove the side skirt by lifting it up and away from the frame.
6. Return to the procedure that directed you here.
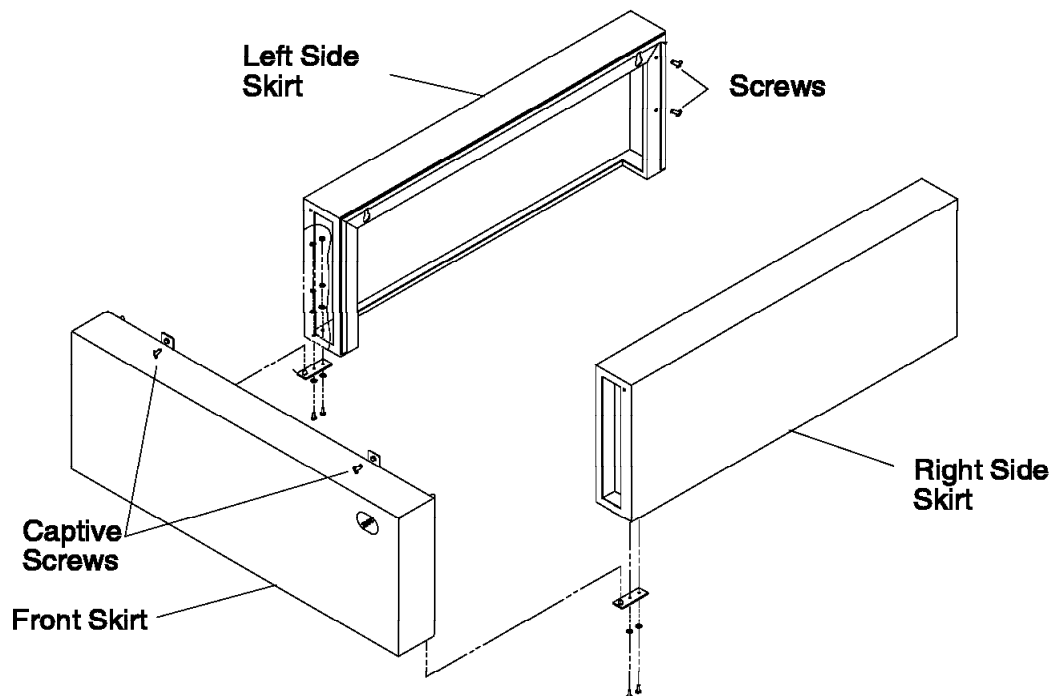
Figure 3-118. Removing the Side Skirt

Replacing the Acoustic Skirts

Perform one of the following procedures to replace the acoustic skirts (depending on the frame type):

1.93 m Frame

1. Hang the side skirt on the shoulder bolts using the keyhole in the skirt.
2. Temporarily install the front skirt near the bottom of the frame using the bottom locating pins on the side skirts.

   Note: Engage one end of the front skirt at a time by lifting from the bottom surface of the skirt at the end you are engaging.

3. Push the top of the skirt onto the upper locating pins.
4. Ensure the air filter is securely installed in the air filter bracket.
5. Tighten the 2 quarter-turn screws on the top of the front skirt, into the filter bracket.
6. Return to the procedure that directed you here.

2.01 m Frame:

1. Position the side skirt onto the two shoulder screws on the side of the frame.
2. Reinstall the two mounting screws at the lower rear inside the frame. Do not tighten.
3. Replace the front skirt assembly. Position the side skirt lower aligning pins into the front skirt alignment pin holes. Once the front skirt is aligned with the side skirt, fasten the two captive screws by turning them a half turn.

   Note: Engage one end of the front skirt at a time by lifting from the bottom surface of the skirt at the end you are engaging.

4. Tighten mounting screws at lower rear, inside the frame.
5. Close front and rear frame doors.
6. Return to the procedure that directed you here.

Removing the Air Filter Assembly

Perform the following procedures to remove the air filter assembly:

Note: Schedule periodic cleaning of the air filter screen with a soft brush to remove debris collected on the mesh. See "Preventive Maintenance" on page 2-36.

1. Refer to "Removing the Acoustic Skirts" on page 3-148 to remove the front acoustic skirt (except on 49-inch frames).
2. Remove the four frame mounting screws and then remove the air filter assembly.
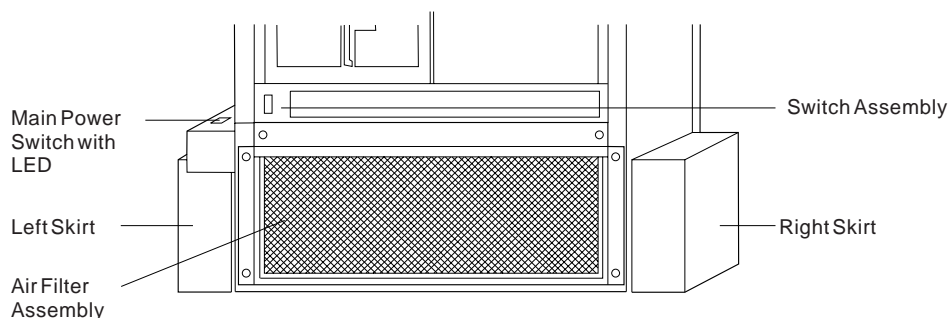
Figure 3-119. Removing the Air Filter Assembly

Replacing the Air Filter Assembly

Perform the following procedures to replace the air filter assembly:

1. Replace the air filter assembly by fastening it with frame mounting screws.
2. Refer to "Replacing the Acoustic Skirts" on page 3-148 to replace the front acoustic skirt (except on 49-inch frames).

Removing the Main Power Switch or LED

Perform the following procedures to remove the main power switch or LED:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the system.
2. Toggle main power switch to Off ('0') position.
3. Open back cover and unplug the PDU-BH-P6 cable from the rear of the frame.
4. Remove the small screw on the side of the main power switch cover, then remove the cover.
5. Remove the two screws holding the main power switch to the frame.
6. Remove the ground wire from the main power switch assembly.
7. Unplug the J1 connector in the main power switch assembly.
8. Unplug the LED connector in the main power switch assembly.
9. Remove the cables from the main power switch assembly.
10. **If removing the switch, remove the two screws holding the switch in place**.
11. **If removing the LED, remove the screws holding the LED assembly in place**.
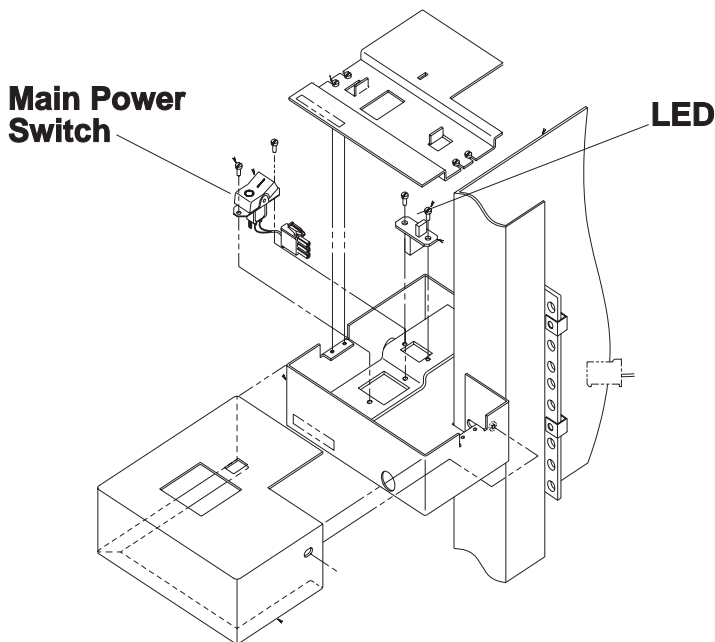
Figure   3-120. Removing the Main Power Switch or LED

Replacing the Main Power Switch or LED

Perform the following procedures to replace the main power switch or LED:

1. **If replacing the switch, reinstall the switch into the main power switch assembly. The switch should be oriented so the 1 is closest to the frame**.
2. **If replacing the LED, reinstall the LED assembly into the main power switch assembly**.
3. Reinstall power switch cable into the main power switch assembly.

4. Reinstall ground wire into the main power switch assembly.
5. Plug J1 connector into the main power switch assembly.
6. Plug LED indicator wire into the main power switch assembly.
7. Reinstall the two screws that hold the assembly to the frame (in the bottom two holes in the frame, making sure that the cable is not pinched).
8. Reinstall cover over the assembly and reinstall the screw in the side of the cover.
9. Plug the PDU-BH-P6 cable into the rear of the frame, and close the back cover.
10. Turn the main power switch to On ('1') position.

Procedures for Switch Assemblies

CAUTION:

The unit weight exceeds 18 Kg (40 lbs) and requires two service personnel to lift.

Attention: Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers. (See "Personal ESD Requirements" on page xviii for more details.) Do not touch the pins or circuitry on these components.

> **Note**
>
> There are different levels of the switch assembly hardware. The following lists indicate serviceable FRUs for each level of switch assembly:
>
> **HiPS 2.0** Fans, circuit breaker, LED card, complete assembly
>
> **HiPS 3.0** Fans, circuit breaker, LED card, switch supervisor card, switch power card, switch clock card, complete assembly
>
> **HiPS-LC8** Fans, circuit breaker, LED card, switch supervisor card, switch power card, switch planar
>
> **SPS**   Fans, circuit breaker, LED card, switch supervisor card, switch power card(s), fan assembly cable, supervisor/power cable, complete assembly.
>
> **SPS-8**   Fans, circuit breaker, LED card, switch supervisor card, switch power card(s), fan assembly cable, supervisor/power cable, complete assembly.

Removing the Switch Assembly

Perform these procedures to remove the switch assembly:

1. Ensure that the switch is offline (shutdown) from the control workstation and powered off from the control workstation.

Attention: Removing power from one switch assembly may affect other switch assemblies and processor nodes attached to it.

2. Turn the power switch on the switch assembly to Off ('0').
3. Detach all cables from rear of switch assembly noting where external frame cables are attached. If wrap plugs are installed, remove them and save for the new high-performance switch.
4. If this is a switch drawer (in multi-switch frame F/C 2030/1) and you are replacing the switch assembly, remove the two screws at the rear of the switch assembly.
5. Remove four screws from front of high-performance switch assembly and slide switch assembly out of the front of the frame.

6. If this is an SPS or SPS-8, remove the front chassis and then remove the inner chassis from the outer chassis sleeve.
7. Return to the procedure that directed you here.

Replacing the Switch Assembly

Perform these procedures to replace the switch assembly:

1. If this is an SPS or SPS-8, replace the inner chassis into the outer chassis sleeve and then replace the front chassis.
2. If wrap plugs are installed, they can be plugged on the new switch.
3. Slide switch through the front of the frame and reinstall four screws that hold the switch to the frame.
4. If this is a switch drawer (in F/C 2030/1) and you are reinstalling the switch assembly, reinstall the two screws at the rear of the switch assembly.
5. Reattach all cables to rear of switch assembly.
6. Turn the power switch on the switch assembly to On ('1').
7. Refer to "Restoring a Switch Assembly to the Active Configuration" on page 2-26.
8. Return to the procedure that directed you here.

Removing the Switch Fans

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Perform these procedures to remove a fan from an HiPS 2.0, HiPS 3.0, HiPS-LC8, SPS, or SPS-8 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the switch assembly into the service position.
2. Remove the top cover of the switch assembly by removing the screws.
3. Locate the fan.
4. Perform one of the following:

   - **HiPS 2.0:** Remove fan bracket by removing two retaining nuts at the base of the fan bracket.

   - **HiPS 3.0:** Push shock mounts toward center of fan.

   - **HiPS-LC8:** Push shock mounts toward center of fan.

   - **SPS:** Push shock mounts toward center of fan.

   - **SPS-8:** Push shock mounts toward center of fan.

5. Pull fan out of the fan bracket. Keep the shock mounts for mounting the new fan.
6. Disconnect fan cable from supervisor control cable.

Replacing the Switch Fans

Perform these procedures to replace a fan in an HiPS 2.0, HiPS 3.0, HiPS-LC8, SPS, or SPS-8 switch assembly:

1. Transfer shock mounts from the old fan to the new fan.
2. Using another fan as an example, route the fan cable and orient the fan with airflow indicator pointing toward the rear of the switch assembly.
3. Mount fan in the fan bracket by pulling the shock mounts through the holes in the fan bracket.
4. Perform one of the following:

   - **HiPS 2.0:** Reinstall fan bracket in the switch assembly using two retaining nuts at the base of the fan bracket.

- **HiPS 3.0:** Push shock mounts outward to lock in place.
- **HiPS-LC8:** Push shock mounts outward to lock in place.
- **SPS:** Push shock mounts outward to lock in place.
- **SPS-8:** Push shock mounts outward to lock in place.

5. Reconnect fan cable to the supervisor control cable.
6. Reinstall top cover of switch assembly and reinstall all screws.
7. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the switch assembly from the service position.
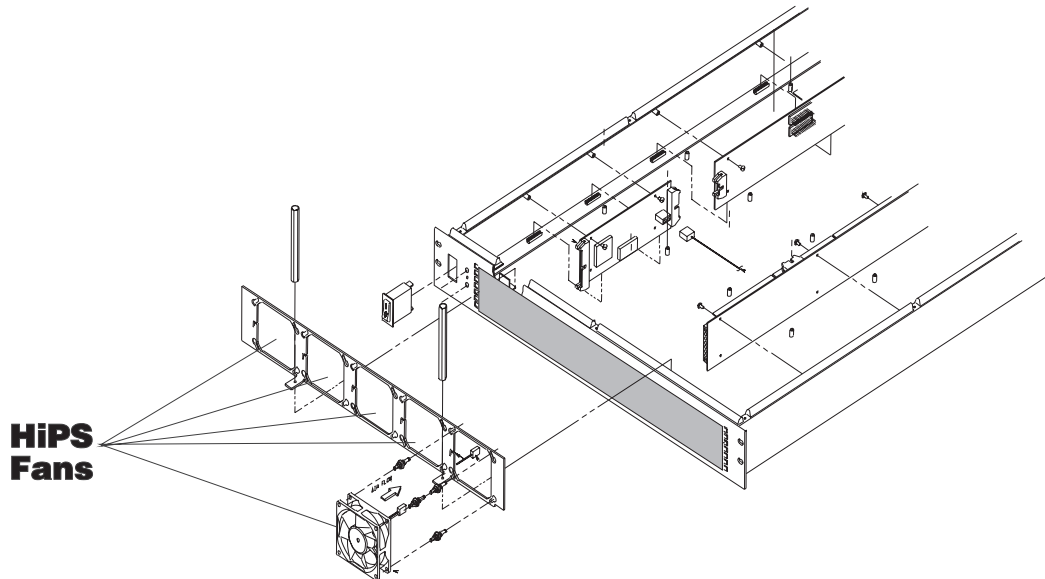
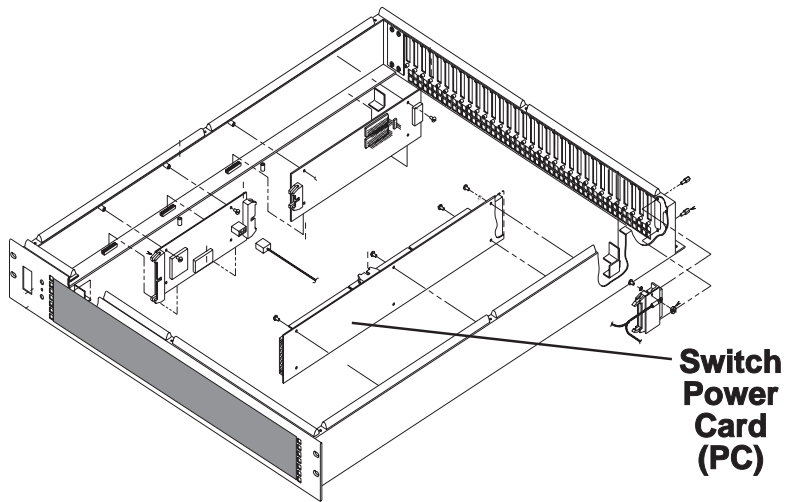*Figure   3-121. Removing the High Performance Switch (HiPS or HiPS-LC8) Fans*
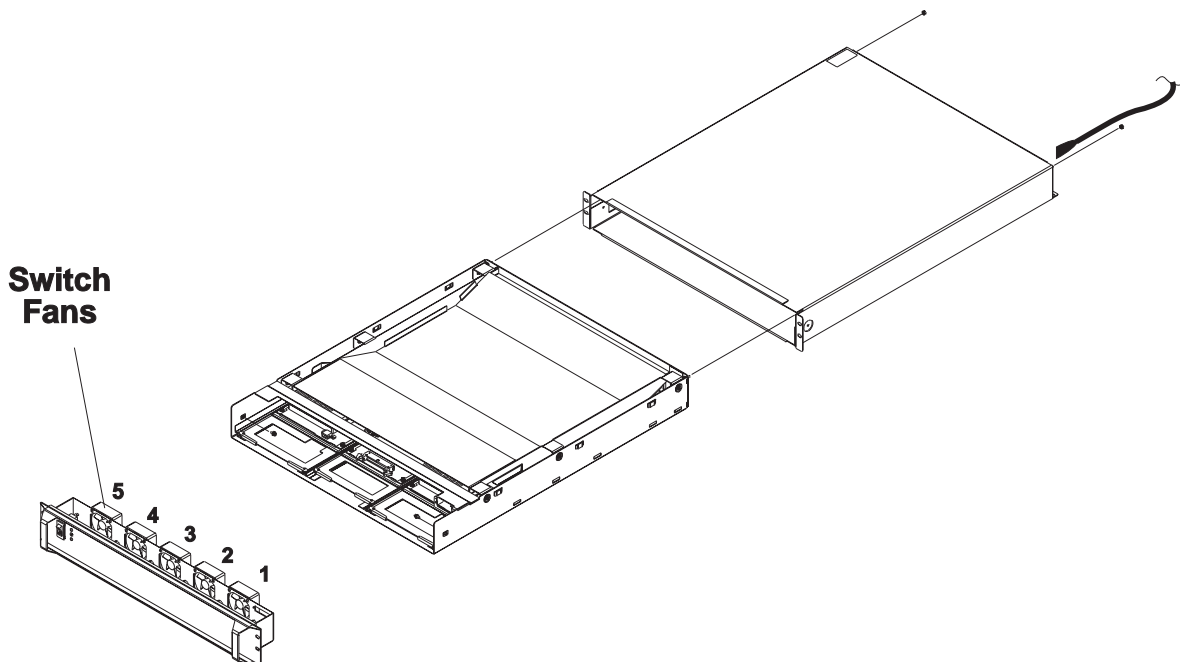
Figure   3-122. Removing the Scalable POWERparallel Switch (SPS or SPS-8) Fans

Removing the Switch Front Chassis Cable (SPS, SPS-8)

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Perform these procedures to remove the fan control cable from a SPS or SPS-8 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the switch assembly into the service position.
2. Unplug connectors P7, P8 and P9. Remove cable by unhooking retaining material along raceway, and unplugging the Fan connectors P2, P3, P4, P5 and P6. Using fingertip pressure, remove connector P1 by removing screws. Retain these screws for new cable installation.
3. Remove cable by unhooking retaining material along raceway.
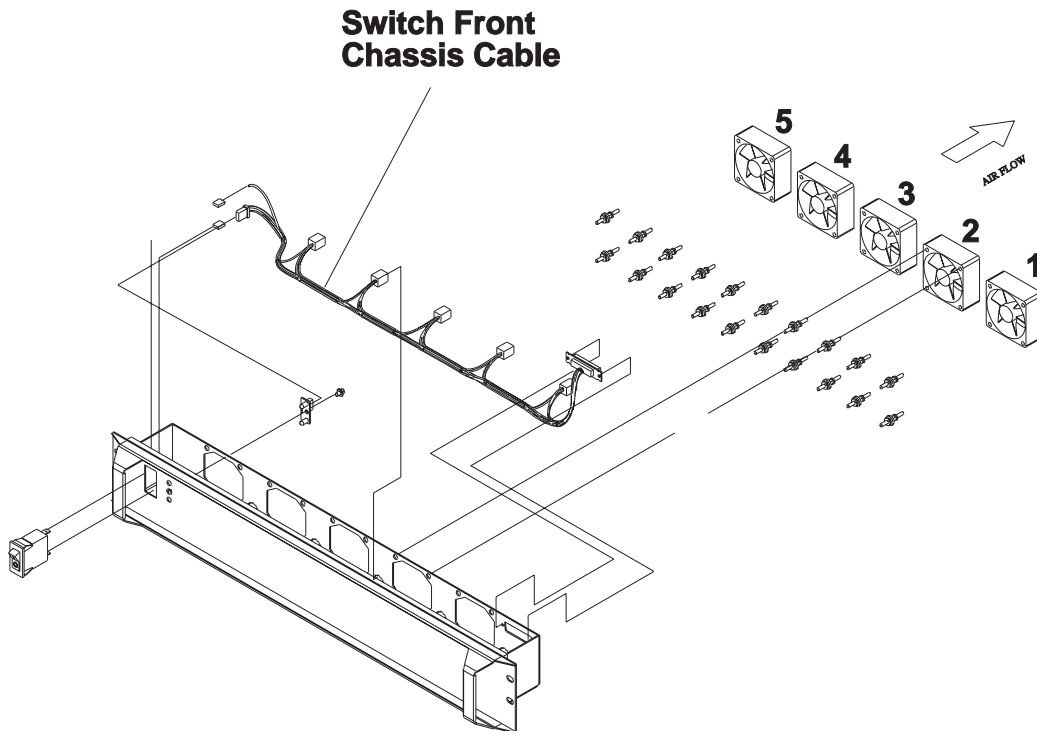
Figure   3-123. Removing the Scalable POWERparallel Switch (SPS or SPS-8) Fan Control Cable

Replacing the Switch Front Chassis Cable (SPS, SPS-8)

Perform these procedures to replace the fan control cable in a SPS or SPS-8 switch assembly:

1. Using fingertip pressure attach connector P1 with screws retained in the removal procedure. Route cable along raceway, hooking retaining material where needed and plugging Fan connectors P2, P3, P4, P5 and P6. Plug connectors P7, P8 and P9.
2. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the switch assembly from the service position.

Removing the Switch Supervisor Card (HiPS 3.0, HiPS-LC8, SPS, SPS-8)

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Attention: The hexhead retaining screws require a 4 mm socket.

Perform these procedures to remove the supervisor card from an HiPS 3.0, HiPS-LC8, SPS, or SPS-8 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the switch assembly into the service position.
2. **If this is an HiPS 3.0 or HiPS-LC8:**
   a. Remove the top cover of the switch assembly by removing the screws.
   b. Remove the two hexhead screws retaining the switch supervisor card.
   c. Disconnect cables from the switch supervisor card: J101, J102, J103.
3. **If this is a SPS or SPS-8:**
   a. Unplug connector P5.
   b. Rotate card thumb locks outward to unseat card.
   c. Remove supervisor card.

Replacing the Switch Supervisor Card (HiPS 3.0, HiPS-LC8, SPS, SPS-8)

Perform these procedures to replace the supervisor card in an HiPS 3.0, HiPS-LC8, SPS, or SPS-8 switch assembly:

1. **If this is an HiPS 3.0 or HiPS-LC8:**
   a. Connect cables at the switch supervisor card: J101, J102, J103.
   b. Line up card with mounting holes, then reinstall the two hexhead screws near the top of the card.
   c. Reinstall top cover of switch assembly and reinstall all screws.
2. **If this is a SPS or SPS-8:**
   a. Insert supervisor card.
   b. Rotate card thumb locks inward to seat card.
   c. Plug connector P5.
3. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the switch assembly from the service position.
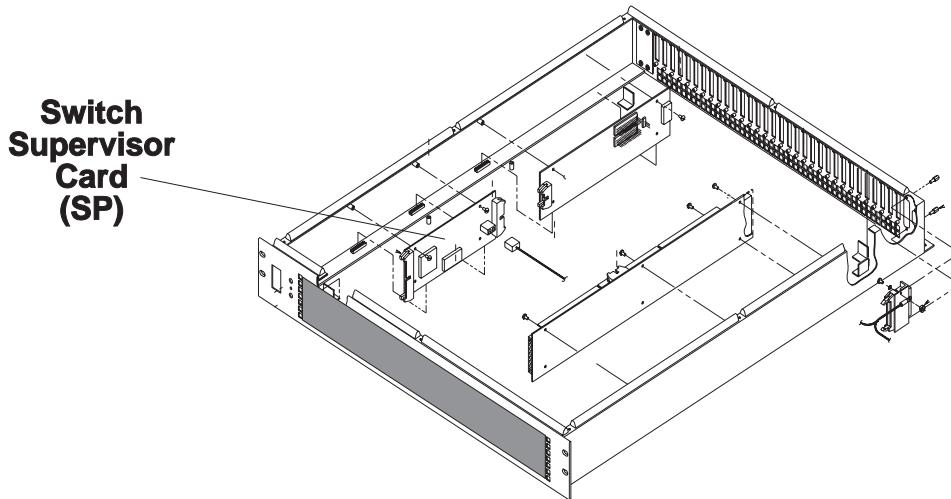
Figure 3-124. Removing the High Performance Switch (HiPS or HiPS-LC8) Supervisor Card
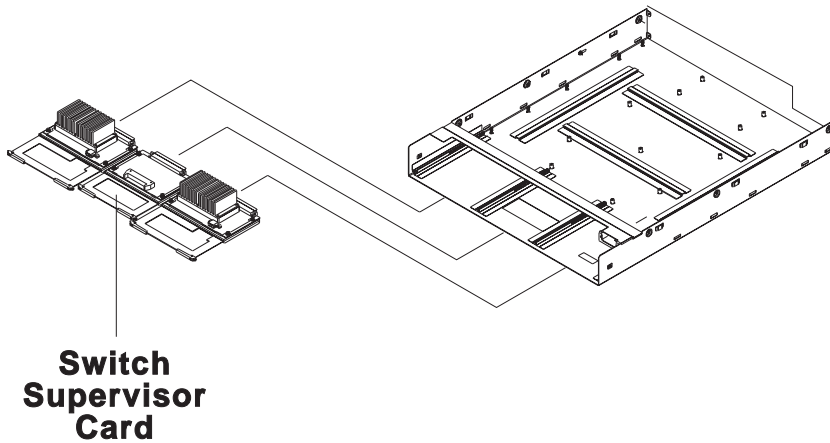
Figure 3-125. Removing the Scalable POWERparallel Switch (SPS or SPS-8) Supervisor Card

Removing the Switch Inner Chassis Cable (SPS, SPS-8)

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Perform these procedures to remove the supervisor power cable from a SPS or SPS-8 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the switch assembly into the service position.
2. Remove screws from connector P1 at the rear of the switch assembly, and retain them for new cable installation. Remove cable by unhooking retaining material along raceway. Unplug connectors P3, P4, P5 and P6.

**Inner Chassis
Cable**
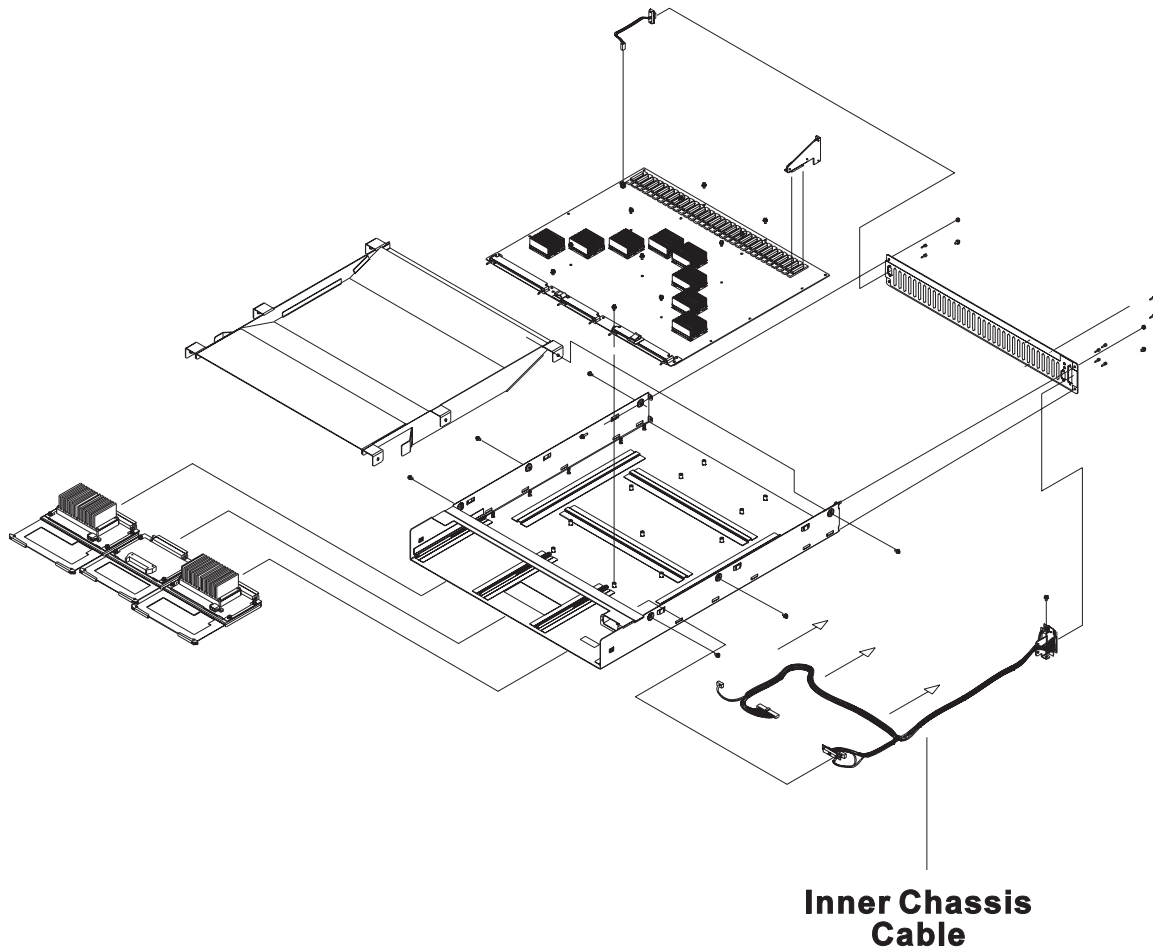
Figure 3-126. Removing the Scalable POWERparallel Switch (SPS or SPS-8) Inner Chassis Cable

Replacing the Switch Inner Chassis Cable (SPS, SPS-8)

Perform these procedures to replace the supervisor power cable from a SPS or SPS-8 switch assembly:

1. Plug connectors P3, P4, P5 and P6. Route cable along the raceway, hooking retaining material where needed. Attach P1 connector to the rear of the switch assembly with screws retained in the removal procedure.
2. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the switch assembly from the service position.

Removing the Switch Power Card(s) (HiPS 3.0, HiPS-LC8, SPS, SPS-8)

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Attention: The hexhead retaining screws require a 4 mm socket.

Perform these procedures to remove the switch power card(s) from an HiPS 3.0, HiPS-LC8, SPS, or SPS-8 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the switch assembly into the service position.
2. **If this is an HiPS 3.0 or HiPS-LC8:**
   a. Remove the top cover of the switch assembly by removing the screws.

      b. Remove the three hexhead screws retaining the switch power card. Also remove grounding screw near bottom rear of power card.

      c. Disconnect cables from the switch power card: J901, J902, J903.

  3. **If this is an SPS or SPS-8:**

      a. Unplug connector P4 (PS1) or P6 (PS2).

      b. Rotate card thumb locks outward to unseat card.

      c. Remove power supply card.

Replacing the Switch Power Card(s) (HiPS 3.0, HiPS-LC8, SPS, SPS-8)

Perform these procedures to replace the switch power card(s) in an HiPS 3.0, HiPS-LC8, SPS, or SPS-8 switch assembly:

  1. **If this is an HiPS 3.0 or HiPS-LC8:**

      a. Connect cables at the switch power card: J901, J902, J903.

      b. Line up card with mounting holes, then reinstall the three hexhead screws along the top of the card. Also reinstall grounding screw near bottom rear of power card.

      c. Reinstall top cover of switch assembly and reinstall all screws.

  2. **If this is an SPS or SPS-8:**

      a. Insert power supply card.

      b. Rotate card thumb locks inward to seat card.

      c. Plug connector P4 (PS1) or P6 (PS2).

  3. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the switch assembly from the service position.

Figure 3-127. Removing the High Performance Switch (HiPS or HiPS-LC8) Power Card
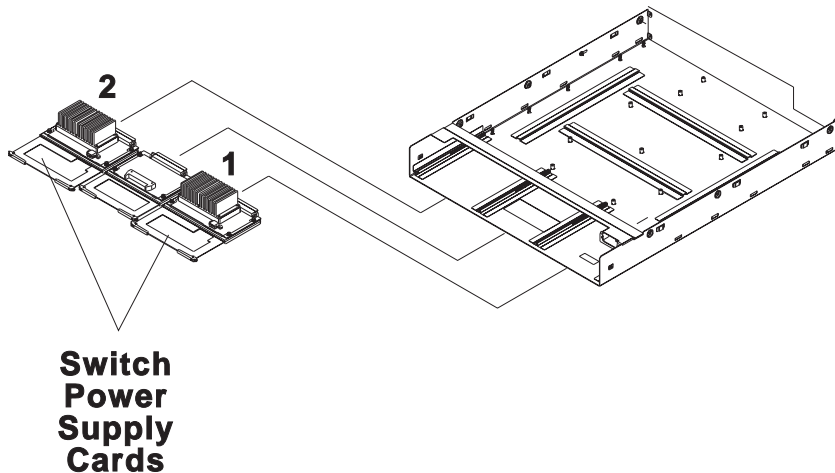
Figure 3-128. Removing the Scalable POWERparallel Switch (SPS or SPS-8) Power Supply Cards

Removing the Switch Clock Card (HiPS 3.0)

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Attention: The hexhead retaining screws require a 4 mm socket.

Perform these procedures to remove the switch clock card from an HiPS 3.0 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the HiPS assembly into the service position.
2. Remove the top cover of the switch assembly by removing the screws.
3. Disconnect cables from the switch clock card: J1, J3, J4, J5.
4. Remove the two hexhead screws retaining the switch clock card.
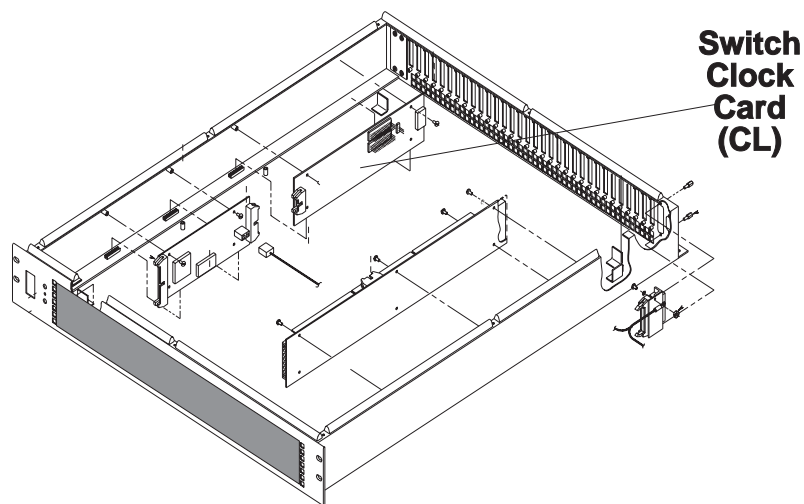
Figure 3-129. Removing the High Performance Switch (HiPS) Clock Card

Replacing the Switch Clock Card (HiPS 3.0)

Perform these procedures to replace the switch clock card in an HiPS 3.0 switch assembly:

1. Line up card with mounting holes, then reinstall the two hexhead screws near the top of the card.
2. Connect cables at the switch clock card: J1, J3, J4, J5. Make sure that no cable is plugged in at J2.
3. Reinstall top cover of switch assembly and reinstall all screws.
4. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the HiPS assembly from the service position.

Removing the Switch Planar Card (HiPS-LC8)

Note: Refer to "Handling Static-Sensitive Devices" on page 3-6 before removing or installing ESD sensitive devices.

Perform these procedures to remove the switch planar card from an HiPS-LC8 switch assembly:

1. Perform "Placing a Switch Assembly into the Service Position" on page 2-30 to place the switch assembly into the service position.
2. Remove the top cover of the switch assembly by removing the screws.
3. Remove the 8 data cables from inside the assembly.
4. Disconnect power cable from the switch planar.
5. Remove all screws from the switch planar, and then remove the planar.
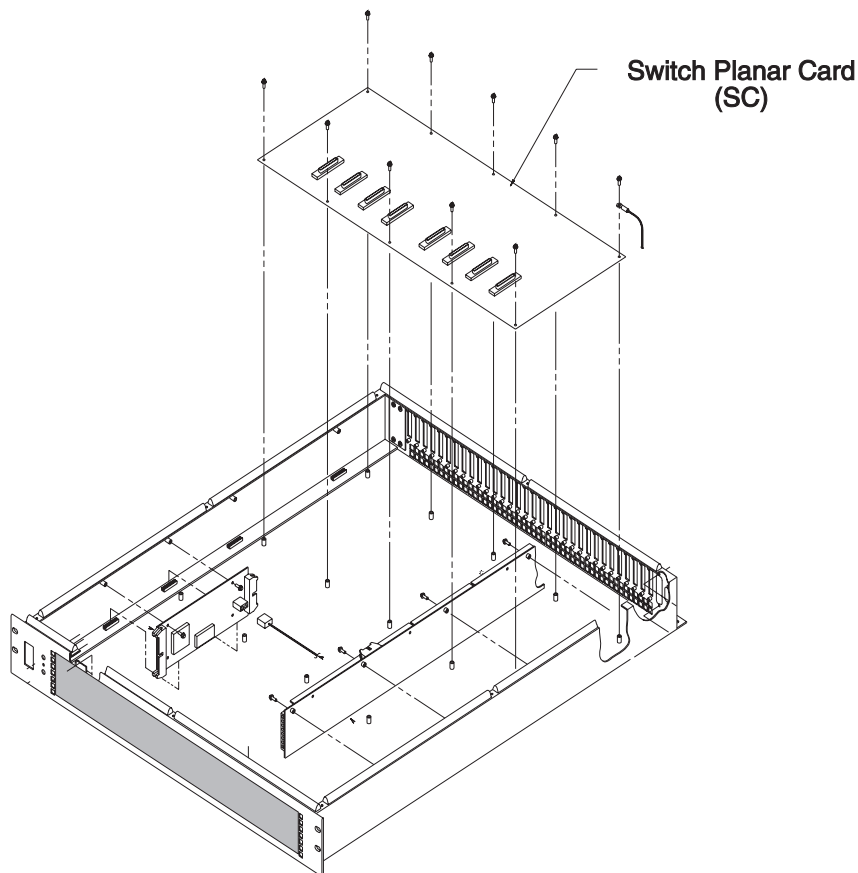
Figure   3-130. Removing the High Performance Switch 8-Port (HiPS-LC8) Planar Card

Replacing the Switch Planar Card (HiPS-LC8)

Perform these procedures to replace the switch planar in an HiPS-LC8 switch assembly:

1. Install switch planar in the switch assembly using screws.
2. Reconnect power cable at the switch planar.
3. Reinstall the 8 data cables inside the assembly.
4. Reinstall top cover of switch assembly and reinstall all screws.
5. Perform "Replacing a Switch Assembly from the Service Position" on page 2-30 to remove the HiPS assembly from the service position.

Appendix A. 604/604e High Node Messages and Codes

Offline Diagnostic Error Codes

Note: The Failure Percent value is calculated on a system model base. As some Failing Function Codes are system model specific but are associated with the same Error Number, it may happen that the sum of the Failure Percent values in one single box exceeds 100.

Find the error in the following tables then go to the "Start Map" in *RS/6000 SP: Maintenance Information, Volume 2*, unless otherwise instructed in the Description column.

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-000	C59	100	S1 asynchronous line internal registers error.
401-001	C59	100	S1 asynchronous line buffer exchange error.
401-002	C59	100	S1 asynchronous line junction signal error (initial test).
401-003	C59	100	S1 asynchronous line junction signal error (DTR to DSR link).
401-004	C59	100	S1 asynchronous line junction signal error (RTS to CTS link).
401-005	C59	100	S1 asynchronous line junction signal error (OUT2 to DCD link).
401-006	C59	100	S1 asynchronous line junction signal error (OUT1 to RL link).
401-007	C59	100	S1 asynchronous line buffer exchange error. External loop-back mode.
401-008	C59	100	S1 asynchronous line junction signal error (RTS to CTS link). External loop-back mode.
401-009	C59	100	S1 asynchronous line junction signal error (DTR to DSR link). External loop-back mode.
401-010	C59	100	S1 asynchronous line speed error. External loop-back mode.
401-020	C59	100	S2 asynchronous line internal registers error.
401-021	C59	100	S2 asynchronous line buffer exchange error.
401-022	C59	100	S2 asynchronous line junction signal error (initial test).
401-023	C59	100	S2 asynchronous line junction signal error (DTR to DSR link).
401-024	C59	100	S2 asynchronous line junction signal error (RTS to CTS link).
401-025	C59	100	S2 asynchronous line junction signal error (OUT2 to DCD link).
401-026	C59	100	S2 asynchronous line junction signal error (OUT1 to RL link).
401-027	C59	100	S2 asynchronous line buffer exchange error. External loop-back mode.
401-028	C59	100	S2 asynchronous line junction signal error (RTS to CTS link). External loop-back mode.
401-029	C59	100	S2 asynchronous line junction signal error (DTR to DSR link). External loop-back mode.
401-030	C59	100	S2 asynchronous line speed error. External loop-back mode.
401-040	C59	100	S3 asynchronous line internal registers error.

Table A-1 (Page 1 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-041	C59	100	S3 asynchronous line buffer exchange error.
401-042	C59	100	S3 asynchronous line junction signal error (initial test).
401-043	C59	100	S3 asynchronous line junction signal error (DTR to DSR link).
401-044	C59	100	S3 asynchronous line junction signal error (RTS to CTS link).
401-045	C59	100	S3 asynchronous line junction signal error (OUT2 to DCD link).
401-046	C59	100	S3 asynchronous line junction signal error (OUT1 to RL link).
401-047	C59	100	S3 asynchronous line buffer exchange error. External loop-back mode.
401-048	C59	100	S3 asynchronous line junction signal error (RTS to CTS link). External loop-back mode.
401-049	C59	100	S3 asynchronous line junction signal error (DTR to DSR link). External loop-back mode.
401-050	C59	100	S3 asynchronous line speed error. External loop-back mode.
401-060	C59	100	Flash EPROM standard area checksum error.
401-061	C59	100	Flash EPROM IPL area chcksum error.
401-070	C59	100	NVRAM error 1.
401-071	C59	100	NVRAM error 2.
401-080	C59	100	EPROM standard area checksum error.
401-081	C59	100	EPROM IPL area checksum error.
401-090	C59	100	TOD MSR register error.
401-091	C59	100	TOD internal RAM error.
401-092	C59	100	TOD wake-up mechanism error.
401-100	C59	100	Floppy disk controller DOR register error.
401-110	C59	100	BPP address register error.
401-111	C59	100	BPP DTR register error.
401-112	C59	100	BPP CTR register error.
401-120	C59	100	Miscellaneous PGCR register error.
401-121	C59	100	Miscellaneous DTR register error.
401-130	C59 C61 C63	50 25 25	CPU accessibility. Checkstop error.
401-131	C59 C61 C63	50 25 25	CPU accessibility. Single error.
401-132	C59 C61 C63	50 25 25	CPU accessibility. CPU not started.
401-140	all boards		Bad VPD Board.
401-141	all boards		No board present.
401-142	all boards		No coherent configuration on board.

Table A-1 (Page 2 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Table A-1 (Page 3 of 11). 604/604e High Node Firmware Error Codes (401–XXX Errors)			
Error Number	**Failing Function Codes**	**Failure Percent (%)**	**Description**
401-150	C59 C61 C63 C88	40 20 20 20	Asynchronous lines access. Line Sx: register error.
401-151	C59 C61 C63 C88	40 20 20 20	Asynchronous lines access. Line Sx: status register error.
401-152	C59 C61 C63 C88	40 20 20 20	Asynchronous lines access. Asynchronous line buffer exchange error.
401-153	C59 C61 C63 C88	40 20 20 20	Asynchronous lines access. Line Sx: register error on bit i.
401-160	C59 C61 C63 C88	40 20 20 20	BPP ext. Loop back. Status register error
401-161	C59 C61 C63 C88	40 20 20 20	BPP ext. Loop back. Error bit i#0.
401-162	C59 C61 C63 C88	40 20 20 20	BPP ext. Loop back. Error bit i#1.
401-170	C59 C61 C63 C88	40 20 20 20	Printer error: not selected.
401-171	C59 C61 C63 C88	40 20 20 20	Printer error: end of paper.
401-172	C59 C61 C63 C88	40 20 20 20	Printer on error.
401-173	C59 C61 C63 C88	40 20 20 20	Printer time out, always busy.
401-180	C59 Modem	20 80	DIAL-OUT test. Dial out not authorized.
401-181	C59 Modem	20 80	DIAL-OUT test. Quick on Call Service not subscribed.

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-182	C59 Modem	20 80	DIAL-OUT test. No customer Hub or Service Center phone Dial-Out.
401-183	C59 Modem	20 80	DIAL-OUT test. Modem parameters failed.
401-184	C59 Modem	20 80	DIAL-OUT test. Line busy.
401-185	C59 Modem	20 80	DIAL-OUT test. Connection time-out.
401-186	C59 Modem	20 80	DIAL-OUT test. Modem answer failed.
401-187	C59 Modem	20 80	DIAL-OUT test. Data time-out.
401-188	C59 Modem	20 80	DIAL-OUT test. Data Carrier detect junction failed.
401-189	C59 Modem	20 80	DIAL-OUT test. No data acknowledge.
401-190	C59	100	BPP external Loop back. Data register error.
401-191	C59	100	BP external Loop back. Status register error.
401-400	C59	100	JTAG chain integrity. Read IR failed.
401-401	C59	100	JTAG chain integrity. Read DR failed: chip #.
401-501	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. Map register error.
401-502	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. CONFIGURATION register error.
401-503	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. PERSONALIZE register error.
401-509	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. POS3 register error.
401-510	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. XIVR register error.
401-511	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. DSIER register error.
401-512	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. MFRR register error.
401-513	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. BUID register error.

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-514	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. APR register error.
401-515	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. BSR register error.
401-516	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. MD0 register error.
401-517	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. MD1 register error.
401-518	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. XIVR6 init value.
401-519	C59 C63 C61	50 25 25	Direct IO: IONIAN-SSGA. DSIER init value.
401-520	C59	100	Direct IO: IONIAN register access error.
401-521	C59 C61	80 20	Direct IO: SSGA POS register error.
401-522	C59 C61	80 20	Direct IO: SSGA interrupt register error.
401-523	C59 C90 MCA adapters	25 25 50	Direct IO: IONIAN-SSGA.IER register error on Base Unit.
401-524	C59 C90 MCA adapters	25 25 50	Direct IO: IONIAN-SSGA.IER register error on Base Unit.
401-530	C59 C61	80 20	Direct IO: NVRAM data lines access error.
401-531	C59 C61	80 20	Direct IO: NVRAM address lines access error. Walking 1 phase.
401-532	C59 C61	80 20	Direct IO: NVRAM address lines access error. Walking 0 phase.
401-540	C59 C61	80 20	Direct IO: Super IO UART1 access error.
401-541	C59 C61	80 20	Direct IO: Super IO UART2 access error.
401-542	C59 C61	80 20	Direct IO: 16550 UART access error.
401-543	C59 C61	80 20	Direct IO: Floppy disk access error.

Table A-1 (Page 5 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Table A-1 (Page 6 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)			
Error Number	**Failing Function Codes**	**Failure Percent (%)**	**Description**
401-544	C59 C61	80 20	Direct IO: BPP register access error.
401-550	C59 C61 C90 C91	60 20 10 10	Direct IO: Flash EPROM access error.
401-560	C59 C61	80 20	Direct IO: EPROM access error.
401-570	C59 C61	80 20	Direct IO: TOD imbedded RAM access error.
401-571	C59 C61	80 20	Direct IO: TOD registers access error.
401-58A	C59 C90 MCA adapters	25 25 50	Direct IO: IONIAN2. IER register error on Expansion Unit.
401-58B	C59 C90 MCA adapters	25 25 50	Direct IO: IONIAN2. IER register error on Expansion Unit.
401-580	C59 C63 C61	50 25 25	Direct IO: IONIAN2. TCE register error.
401-581	C59 C63 C61	50 25 25	Direct IO: IONIAN2. MAP register error.
401-582	C59 C63 C61	50 25 25	Direct IO: IONIAN2. CONFIGURATION register error.
401-583	C59 C63 C61	50 25 25	Direct IO: IONIAN2. PERSONALIZE register error.
401-584	C59 C63 C61	50 25 25	Direct IO: IONIAN2. DSC register error.
401-585	C59 C63 C61	50 25 25	Direct IO: IONIAN2. CSR register error.
401-586	C59 C63 C61	50 25 25	Direct IO: IONIaN2. BSR init value.
401-587	C59 C63 C61	50 25 25	Direct IO: IONIAN2. MD0 init value.
401-588	C59 C63 C61	50 25 25	Direct IO: IONIAN2. MD1 init value.

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-589	C59 C63 C61	50 25 25	Direct IO: IONIAN2. Not present.
401-590	C59 C63 C61	50 25 25	Diskette drive access. Error on lock command.
401-591	C59 C63 C61	50 25 25	Diskette drive access. Error on sense interrupt command.
401-592	C59 C63 C61	50 25 25	Diskette drive access. Error on write command.
401-593	C59 C63 C61	50 25 25	Diskette drive access. Error on read command.
401-594	C59 C63 C61	50 25 25	Diskette drive access. Buffer exchange error.
401-595	C59 C63 C61	50 25 25	Diskette drive access. Time-out error.
401-800	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS3 register error.
401-801	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS4 register error.
401-802	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS2 register error.
401-803	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. NCR SCRATCH A register error.
401-804	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. SCSI Bus control lines error.

Table A-1 (Page 7 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Table A-1 (Page 8 of 11). 604/604e High Node Firmware Error Codes (401–XXX Errors)			
Error Number	**Failing Function Codes**	**Failure Percent (%)**	**Description**
401-805	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing ACK signal error.
401-806	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Pending ACK signal error.
401-807	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing DMA interrupt error during transfer.
401-808	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. DMA status error.
401-809	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing DMA interrupt error after transfer.
401-810	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. DFE or SSI signal not asserted.
401-811	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Buffer exchange error.
401-812	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. LSA board not responding.
401-820	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS3 register error.
401-821	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS4 register error.

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-822	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS2 register error.
401-823	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. NCR SCRATCH A register error.
401-824	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. SCSI Byus control lines error.
401-825	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing ACK signal error.
401-826	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Pending ACK signal error.
401-827	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing DMA interrupt error during transfer.
401-828	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. DMA status error.
401-829	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing DMA interrupt after transfer.
401-830	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. DFE or SSI signal not asserted.
401-831	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Buffer exchange error.

Table A-1 (Page 9 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-832	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. LSA board not responding.
401-840	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS3 register error.
401-841	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS4 register error.
401-842	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. POS2 register error.
401-843	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. NCR SCRATCH A register error.
401-844	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. SCSI Bus control lines error.
401-845	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing ACK signal error.
401-846	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Pending ACK signal error.
401-847	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing DMA interrupt error during transfer.
401-848	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. DMA status error.

Table A-1 (Page 10 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
401-849	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Missing DMA interrupt after transfer.
401-850	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. DFE or SSI signal not asserted.
401-851	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. Buffer exchange error.
401-852	LSA C59 C90 C61 C63	40 20 20 10 10	Channel reset and POS. LSA board not responding.

Table A-1 (Page 11 of 11). 604 /604e High Node Firmware Error Codes (401–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
402-000	C63	100	CPU processor error.
402-010	C63	100	Main memory addressing mechanism error.
402-011	C63	100	Main memory addressing mechanism. Bat translation error.
402-012	C63	100	Main memory addressing mechanism. Swap context PTE1 error.
402-013	C63	100	Main memory addressing mechanism. Swap context PTE2 error.
402-020	C63	100	Level 1 cache. HID0.31 value error.
402-030	C63	100	Level 2 cache. Accessibility test error.
402-031	C63	100	Level 2 cache. Data test error.
402-032	C63	100	Level 2 cache. TAG test error.
402-033	C63	100	Level 2 cache. Interrupt error.
402-040	C62 C63 C65	100 100 100	EEprom compatibility error.
402-100	C63 C61	50 50	Atomic instructions error. Memory reservation by slave processor lack.
402-101	C63 C61	50 50	Atomic instructions error. Memory reservation by master processor lack.
402-102	C63 C61	50 50	Atomic instructions error. Comparison error.

Table A-2 (Page 1 of 3). 604 /604e High Node Firmware Error Codes (402–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
402-103	C62 C63 C65	100 100 100	Atomic instructions error. Swap mechanism not available.
402-110	C63 C61	50 50	Caches coherencies. Concurrent coherent write accesses error.
402-111	C63 C61	50 50	Caches coherencies. Concurrent not coherent write accesses error.
402-112	C63 C61	50 50	Caches coherencies. DCBST from line owner error.
402-113	C63 C61	50 50	Caches coherencies. DCBF from line owner error.
402-114	C63 C61	50 50	Caches coherencies. DCBI from line owner error (Ph.1).
402-115	C63 C61	50 50	Caches coherencies. DCBI from line owner error (Ph.2).
402-116	C63 C61	50 50	Paradox detection. DCBST not from line owner.
402-117	C63 C61	50 50	Paradox detection. DCBF not from line owner.
402-118	C63 C61	50 50	Paradox detection. DCBI not from line owner (ph.1)..
402-119	C63 C61	50 50	Paradox detection. DCBT not from line owner (Ph.2)..
402-120	C63 C61	50 50	Caches coherencies. Test aborted by one CPU.
402-121	C63 C61	50 50	Caches coherencies. CPUs dialogue Time Out.
402-130	C63 C61	50 50	DCB ports arbitration error. Memory not updated error.
402-131	C63 C61	50 50	DCB ports arbitration error. Caches coherency or global memory coherency error.
402-132	C63 C61	50 50	DCB ports arbitration error. Memory coherency error.
402-133	C63 C61	50 50	DCB ports arbitration error. Odd processor DCBF or even processor read error.
402-134	C63 C61	50 50	DCB ports arbitration error. Cache write/read error.
402-135	C63 C61	50 50	DCB ports arbitration error. Test aborted by one CPU error.
402-136	C63 C61	50 50	DCB ports arbitration error. CPUs dialog time out.
402-140	C63 C61	50 50	System IO sharing. NVRAM access error.

Table A-2 (Page 2 of 3). 604 /604e High Node Firmware Error Codes (402–XXX Errors)

Table A-2 (Page 3 of 3). 604 /604e High Node Firmware Error Codes (402–XXX Errors)			
Error Number	**Failing Function Codes**	**Failure Percent (%)**	**Description**
402-150	C63 C61	50 50	Main memory sharing error. MM access error.
402-160	C63 C61	50 50	Multi-resource sharing error. NVRAM access error.
402-161	C63 C61	50 50	Multi-resource sharing error. MM access error.
402-170	C63 C61	50 50	Multi-processor Full. Private counter error.
402-171	C63 C61	50 50	Multi-processor Full. Shared counter error.
402-172	C63 C61	50 50	Multi-processor Full. Lock mechanism error.
402-173	C63 C61	50 50	Multi-processor FullReservation instruction error.
402-174	C63 C61	50 50	Multi-processor Full. Link coherency error.
402-500	C59 C61 ???	50 25 25	BUMP to CPUs interrupt error.
402-510	C59 C61 ???	50 25 25	CPUs to BUMP interrupt error.
402-520	C59 C61 ???	50 25 25	UART to CPUs interrupt error.
402-530	C59 C61 ???	50 25 25	CPUs to CPUs interrupt error. Even processors auto interrupt.
402-531	C59 C61 ???	50 25 25	CPUs to CPUs interrupt error. Odd processors auto interrupt.
402-532	C59 C61 ???	50 25 25	CPUs to CPUs interrupt error. Even to Odd processors interrupt.
402-533	C59 C61 ???	50 25 25	CPUs to CPUs interrupt error. Odd to Even processors interrupt.
402-540	C59	100	TOD to BUMP interrupt error.
402-550	C59	100	Internal interrupt management error.
402-560	C59	100	System error interrupt management.

Error Number	Failing Func-tion Codes	Failure Percent (%)	Description
403-000	B94 C61 C63	40 30 30	Main Memory data lines accessibility error. Write all 0 and 1 error.
403-001	B94 C61 C63	40 30 30	Main Memory data lines accessibility error. CPU bus error, walking 1 among 0.
403-002	B94 C61 C63	40 30 30	Main Memory data lines accessibility error. Main memory bus error, walking 1 among 0.
403-003	C61 C63 C61	40 30 30	Main Memory data lines accessibility error. CPU bus error, walking 0 among 1.
403-004	B94 C61 C63	40 30 30	Main Memory data lines accessibility error. Main memory bus error, walking 0 among 1.
403-005	B94 C61 C63	40 30 30	1, 2 ... 8 bytes bus transfer error.
403-010	B94 C61 C63	40 30 30	Main Memory address lines accessibility error. Write all 0 and 1 error.
403-011	B94 C61 C63	40 30 30	Main Memory address lines accessibility error. Walking 1 among 0 error.
403-012	B94 C61 C63	40 30 30	Main Memory address lines accessibility error. Walking 0 among 1 error.
403-013	B94 C61 C63	40 30 30	Main Memory address lines accessibility error. Unexpected inter-rupt.
403-020	B94 C61 C63	40 30 30	Main Memory board address accessibility error. Write all 0 and 1 error.
403-021	B94 C61 C63	40 30 30	Main Memory board address accessibility error. Board Nb i. 1x decoding error.
403-022	B94 C61 C63	40 30 30	Main Memory board address accessibility error. Data storage interrupt error.
403-030	B94 C61 C63	40 30 30	Main Memory basic tests error. Byte write error.
403-031	B94 C61 C63	40 30 30	Main Memory basic tests error. Aligned half-word write error.

Table A-3 (Page 1 of 6). 604 /604e High Node Firmware Error Codes (403–XXX Errors)

Table A-3 (Page 2 of 6). 604 /604e High Node Firmware Error Codes (403–XXX Errors)			
Error Number	Failing Function Codes	Failure Percent (%)	Description
403-032	B94 C61 C63	40 30 30	Main Memory basic tests error. Unaligned half-word write error.
403-033	B94 C61 C63	40 30 30	Main Memory basic tests error. Aligned word write error.
403-034	B94 C61 C63	40 30 30	Main Memory basic tests error. Unaligned word write error.
403-035	B94 C61 C63	40 30 30	Main Memory basic tests error. Aligned double-word write error. (floating double)
403-036	B94 C61 C63	40 30 30	Main Memory basic tests error. Aligned double-word write error. (floating simple)
403-037	B94 C61 C63	40 30 30	Main Memory basic tests error. Unaligned double-word write error. (floating double)
403-038	B94 C61 C63	40 30 30	Main Memory basic tests error. Work mode main memory addressing error.
403-039	B94 C61 C63	40 30 30	Main Memory basic tests error. Aligned multi-store error.
403-040	B94 C61 C63	40 30 30	Main Memory basic tests error. Aligned multi-load error.
403-041	B94 C61 C63	40 30 30	Main Memory basic tests error. Unaligned multi-store or multi-load error.
403-050	B94 B96 or B97	50 50	Main Memory components error. Address into address test error.
403-051	B94 B96 or B97	50 50	Main Memory components error. Invert address into address test error.
403-052	B94 B96 or B97	50 50	Main Memory components error. Bitmap elaboration mode warnings.
403-060	B94 B96 or B97	50 50	Main Memory ECC components check error. Address into address test error.
403-061	B94 B96 or B97	50 50	Main Memory ECC components check error. Invert address into address test error.

Error Number	Failing Function Codes	Failure Percent (%)	Description
403-062	B94 B96 or B97	50 50	Main Memory ECC components check error. Bitmap elaboration mode ECC warnings.
403-070	B94 B96 or B97	50 50	Error correction code mechanism. Syndrome generation error.
403-071	B94 B96 or B97	50 50	Error correction code mechanism. BUMP time out.
403-072	B94 B96 or B97	50 50	Error correction code mechanism. CPU time out.
403-073	B94 B96 or B97	50 50	Error correction code mechanism. Single Error generation error.
403-074	B94 B96 or B97	50 50	Error correction code mechanism. Multiple Error generation error.
403-075	B94 C64 D28 B96 B97 D33	50 50 50 50 50 50	DCB or SMC error. Multiple Error generation error.
403-080	B94 B96 or B97	50 50	Main memory refresh mechanism. Main memory read error.
403-081	B94 B96 or B97	50 50	Main memory refresh mechanism. Main memory refresh error.
403-090	B94 B96 or B97	50 50	Main memory full test. Phase number i error.
403-100	B48 C61 C62 C63 C65	40 30 30 30 30	ECC Data lines accessibility error. Write all 0 and 1 error.
403-101	B48 C61 C62 C63 C65	40 30 30 30 30	ECC Data lines accessibility error. Walking 1 among 0 error.
403-102	B48 C61 C62 C63 C65	40 30 30 30 30	ECC Data lines accessibility error. Walking 0 among 1 error.

Table A-3 (Page 3 of 6). 604 /604e High Node Firmware Error Codes (403–XXX Errors)

Table A-3 (Page 4 of 6). 604 /604e High Node Firmware Error Codes (403–XXX Errors)			
Error Number	Failing Function Codes	Failure Percent (%)	Description
403-103	B48 C61 C62 C63 C65	40 30 30 30 30	ECC Data lines accessibility error. RAM bus error.
403-500	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IOD-HW-STS error, bit i#1.
403-501	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IOD-HW-STS error, bit i#0.
403-502	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. CPU error.
403-505	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. MIR register error.
403-506	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IOD-HW-STS register error.
403-507	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IRR register error.
403-508	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. No external interrupt.
403-509	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. External interrupt return error.
403-510	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. Target processor error.
403-511	C59 169 C62 C63	50 25 25 25	BUMP to CPU interrupt error. Not responding BUMP error.
403-512	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IRR4 register error.
403-513	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IOD-HW-STS register error.
403-514	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. XIRR0 register error.

Error Number	Failing Function Codes	Failure Percent (%)	Description
403-515	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. XIRR4 register error.
403-516	C59 C61 C63	50 25 25	BUMP to CPU interrupt error. IRR register error.
403-520	C59 C61 C63	50 25 25	CPU to BUMP interrupt. IOD-HW-STS register error, bit i#1.
403-521	C59 C61 C63	50 25 25	CPU to BUMP interrupt. IOD-HW-STS register error, bit i#0.
403-522	C59 C61 C63	50 25 25	CPU to BUMP interrupt. CPU not responding.
403-523	C59 C61 C62 C63 C65	50 25 25 25 25	CPU to BUMP interrupt. No External interrupt.
403-525	C59 C61 C63	50 25 25	CPU to BUMP interrupt. IOD-HW-STS register error.
403-527	C59 C61 C63	50 25 25	CPU to BUMP interrupt. XIRR4 register error.
403-528	C59 C61 C63	50 25 25	CPU to BUMP interrupt. IOD-HW-STS register error.
403-529	C59 C61 C63	50 25 25	CPU to BUMP interrupt. XIRR0 register error.
403-530	C59 C61 C63	50 25 25	CPU to BUMP interrupt. XIRR4 register error.
403-531	C59 C61 C63	50 25 25	CPU to BUMP interrupt.. IRR register error.
403-540	C59 C61 C63	50 25 25	UART to CPU interrupt. IRR register error, bit i#1.
403-541	C59 C61 C63	50 25 25	UART to CPU interrupt. IRR register error, bit i#0.
403-542	C59 C61 C63	50 25 25	UART to CPU interrupt. No external interrupt.

Error Number	Failing Func- tion Codes	Failure Percent (%)	Description
403-543	C59 C61 C63	50 25 25	UART to CPU interrupt. External interrupt return error.
403-544	not available resource		UART to CPU interrupt. Target processor error.
403-545	C59 C61 C63	50 25 25	UART to CPU interrupt. XIRR4 register error.
403-546	C59 C61 C63	50 25 25	UART to CPU interrupt. IRR register error.
403-550	C59 C61 C63	50 25 25	CPU to CPU interrupt. MFRR register error.
403-551	C59 C61 C63	50 25 25	CPU to CPU interrupt. External interrupt return error.
403-552	C59 C61 C63	50 25 25	CPU to CPU interrupt. No external interrupt.
403-553	C59 C61 C63	50 25 25	CPU to CPU interrupt. Target processor error.
403-555	C59 C61 C63	50 25 25	CPU to CPU interrupt. XIRR register error.
403-560	C59 C61 C63	50 25 25	TOD to BUMP interrupt. Unexpected interrupt error.
403-561	C59 C61 C63	50 25 25	TOD to BUMP interrupt. No trap interrupt.
403-563	C59 C61 C62 C63 C65	50 25 25 25 25	TOD to BUMP interrupt. MSR register error. BUMP interrupt management.
403-565			MCA to CPU interrupt. All slots plugged with MCA boards.
403-566	909	100	MCA to CPU interrupt. LSA board not responding. No interrupt on a PIO STORE with buid # on slot #.
403-567	909	100	MCA to CPU interrupt. LSA board not responding. No interrupt on a PIO STORE with buid # on slot #.

Table A-4. 604 /604e High Node Firmware Error Codes (404–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
404-000	C63 C61	80 20	Atomic instructions error.
404-010	C63 C61	80 20	Caches coherencies. Concurrent coherent write accesses error.
404-011	C63 C61	80 20	Caches coherencies. Concurrent not coherent write accesses error.
404-012	C63 C61	80 20	Caches coherencies. DCBST from line owner error.
404-013	C63 C61	80 20	Caches coherencies. DCBF from line owner error.
404-014	C63 C61	80 20	Caches coherencies. ConcurrDCBI from line owner error.
404-015	C63 C61	80 20	Caches coherencies. Concurrent not coherent write accesses error.
404-016	C63 C61	80 20	Caches coherencies. DCBST not from line owner error.
404-017	C63 C61	80 20	Caches coherencies. DCBF not from line owner error.
404-018	C63 C61	80 20	Caches coherencies. DCBI not from line owner error.
404-019	C63 C61	80 20	Caches coherencies. DCBT not from line owner error.
404-020	C63 C61	80 20	DCB arbitration mechanism error.
404-030	C63 C61	80 20	TLB mechanism error.
404-040	C63 C61	80 20	Direct IO sharing error.
404-050	C63 B96 or B97 C61	50 30 20	Main memory sharing error.
404-060	C63 C61 C59 B96 or B97	30 30 20 20	Multi-resources sharing error.

Table A-5 (Page 1 of 3). 604 /604e High Node Firmware Error Codes (407–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
407-000	C59 C61 C63	40 30 30	No active processor.

Table A-5 (Page 2 of 3). 604 /604e High Node Firmware Error Codes (407–XXX Errors)			
Error Number	**Failing Function Codes**	**Failure Percent (%)**	**Description**
407-001	C59 C61 C63	40 30 30	BUMP and one processor active.
407-002	C59 C61 C63	40 30 30	More than one active processor for a mono-processor test.
407-003	C59 C61 C63	40 30 30	Un-coherent test parameters.
407-004	C59 C61 C63	40 30 30	ÁGx. Txø test: not defined.
407-011	C59 C61 C63	40 30 30	General test manager launching T-O.
407-012	C59 C61 C62 C63 C65	40 30 30 30 30	CPU/LSA test manager launching T-O.
407-013	C59 C61 C62 C63 C65	40 30 30 30 30	CPU/LSA test manager stopping T-O.
407-014	C59 C61 C63	40 30 30	CPU interrupt test manager launching T-O.
407-015	C59 C61 C63	40 30 30	CPU interrupt test manager stopping T-O.
407-016	C59 C61 C63	40 30 30	CPU multi-processor test manager launching T-O.
407-017	C59 C61 C63	40 30 30	CPU imulti-processor test manager stopping T-O.
407-018	C59 C61 C62 C63 C65	40 30 30 30 30	CPU test performing T-O.
407-019	C59 C61 C63	40 30 30	Operator test abort.

Table A-5 (Page 3 of 3). 604 /604e High Node Firmware Error Codes (407–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
407-020	C59 C61 C62 C63 C65	40 30 30 30 30	Checkstop error.
407-021	C59 C61 C62 C63 C65	40 30 30 30 30	Checkstop error, reset failing.
407-022	B48 C59 C61	60 20 20	Single error.
407-023	C59 C61 C62 C63 C65	40 30 30 30 30	CPU-NVRAM dialogue not OK.
407-024	C59 C61 C62 C63 C65	40 30 30 30 30	CPUi launching not OK.
407-030			Not defined parameter.

Table A-6. 604 /604e High Node Firmware Error Codes (408–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
408-000	C59 C60 C61 C63	60 20 10 10	Floppy disk peripheral accesses error.
408-060	B94 B96 or B97	50 50	Main memory Knaizuk-Hartmann test error.
408-080	C63 C61	90 10	Multi-resources full test error.

Table A-7 (Page 1 of 3). 604 /604e High Node Firmware Error Codes (409–XXX Errors)

Error Number	Failing Function Codes	Failure Percent (%)	Description
409-000	???	100	Planar vital part FATAL ERROR.
409-008	B94 or C64 or D28	100	No 2MB available in MM. All memory banks FATAL ERROR.

Error Number	Failing Function Codes	Failure Percent (%)	Description
409-050	None	None	This is not an error. This code indicates a change in configuration, that NV-RAM has been reset, etc. No parts should be replaced for this code.
409-051	None	None	This is not an error. This code indicates a change in configuration, that NV-RAM has been reset, etc. No parts should be replaced for this code.
409-052 T1 x	Firmware	100	-12 stand-by VOLT error. **x** is the unit number.
409-052 T2 x	Firmware	100	+12 stand-by VOLT error. **x** is the unit number.
409-053 T1 x	Firmware	100	485RX protocol error (lengths). **x** is the unit number.
409-053 T2 x	Firmware	100	485RX protocol error (time-out). **x** is the unit number.
409-053 T3 x	Firmware	100	485RX protocol error (checksum error). **x** is the unit number.
409-054 T1	Firmware	100	Marginature error (ASIC VOLT)
409-054 T2	Firmware	100	Marginature error (CPU VOLT)
409-054 T3 x	Firmware	100	Marginature error (+5 VOLT). **x** is the unit number.
409-055 T1	Firmware	100	VPD command error (read VPD).
409-055 T2	Firmware	100	VPD command error (write VPD).
409-056	Firmware	100	Marginature command error.
409-057	Firmware	100	Checksum logging not valid.
409-058	Firmware	100	Environment over temperature.
409-059 T1	Firmware	100	I2C bus error (wrong interrupt frame).
409-059 T2 x	Firmware	100	I2C bus error (unknown SIB interrupt). **x** is the unit number.
409-059 T3 x	Firmware	100	I2C bus error (unknown interrupt source). **x** is the unit number.
409-059 T4 x	Firmware	100	I2C bus error (unknown operator panel interrupt). **x** is the unit number.
409-080	C59 C60 C88 or C89	33 33 33	BUMP access to OPP or OPP access to SIF failed.
409-081	C59 C88 or C89	50 50	BUMP access to SIF failed.
409-082	C59 C60	80 20	Operator panel cannot access the BUMP. **Note:** This problem can be caused by an incorrectly installed CEC.
409-083	C60	100	OP microcontroller not working.
409-087	C63	100	MvRnot compatible with the CPU boards.
409-088	C63	100	Different cycle time between the present CPU boards.
409-089	C63	100	Different cycle time between CPU boards and MPB.
409-090	C88 or C89	100	No SIF reply on power-on command.
409-091	C88 or C89	100	SIF failure status on power-on command.
409-092	C59	100	No valid Flash EPROM/EPROM.
409-093	D19	100	MVR fan failed.

Error Number	Failing Function Codes	Failure Percent (%)	Description
409-094	D16	100	CPU fan failed.
409-095	???	100	Disk fan failed.
409-096	D17	100	MCA fan failed.
409-097	C92	100	Power supply failed.
409-098	152	100	Power supply hot. Go to the "604 or 604e High Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.
409-Axy	152	100	Power supply internal failure. Go to the "604 or 604e High Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.
F/W FATAL ERROR	Firmware	100	Firmware Panic: System restart from PON.

604 or 604e High Node Power/Keylock Status Register (PKSR)

When a failure occurs on a fan or on a power supply, the system produces a logging report for this event. The logging report can be viewed using **errpt**.

An errpt report about power and fan is the following:

```
LABEL:               EPOW_SUS
Description:         LOSS OF ELECTRICAL POWER
Probable Causes:     POWER SUBSYSTEM
                     INTERNAL POWER UNIT
Failure Causes:      POWER SUBSYSTEM
RECOMMENDED ACTIONS: CHECK POWER
POWER STATUS REGISTER:  9005 0007
```

The Power/Keylock Status Register has the following format:
PKSR Layout

Understanding PKSR

The PKSR status is logged in hexadecimal value: 8 digits are logged. Each hexadecimal digit must be converted in 4 binary digits: 32 bits are obtained. Divide the bits as indicated in the PKSR layout and check the bit values to understand the meaning of the register.

Example: Suppose you receive an error message whose PKSR content in hex is:

9005 007

converted to binary:

```
1001 000 0 0 0 0001 0 1 00000000 0000 0111
0   3 4 6 7 8 9 10 13   16    23 24   28 31 = Bit Numbering
```

This means that the following events occurred:

- fan 1 fault

- a warning cooling message is displayed on the console

- the cooling system is operating in backup mode

- the key is in normal position.

604 and 604E PKSR Values

Power Interrupt and Fan Fault (G Series and J Series only)

Bits 0-3 Values	Description
0000	No Interrupt
0001	Running on battery
0010	Programmed Power Off
0011	Manual switch off
0100	Remote power off
0101	Over temperature level 1
0110	Internal power supply failure
0111	Power supply overload
1000	Loss of Primary power (EPOW)
1001	Fan 1 fault
1010	Fan 2 fault
1011	Fan 3 fault
1100	Fan 4 fault
1100	Fan 5 fault
1100	Fan 6 fault
1111	Reserved

Power Up

Bits 4-6 Values	Description
000	Manual On button pushed
001	Remote On signal from external
010	Timed power on from TOD clock
011	Remote on signal from power control interface
100	Automatic restart

Power Up

Bit 7 Values	Description
0	No thermal warning
1	Thermal warning

Battery Status

Bit 8 Values	Description
0	Backup battery not installed
1	Backup battery installed

Battery Status

Bit 9 Values	Description
0	Backup battery OK (if installed)
1	Backup battery discharged or failing

Power Interrupt (Action for rc.powerfail)

Bits 10-13 Values	Description
0000	No action
0001	WARN_COOLING no reaction
0010	WARN_POWER error logging
0011	Severe cooling problem, SLOW_SHUTDOWN 10 minutes to shutdown
0100	Very severe cooling problem, FAST_SHUTDOWN 20 sec to shutdown
0101	IMMED_SHUTDOWN immediate power down

Power System Operating in Backup Mode

Bit 14 Values	Description
0	No power warning
1	Power system operating in backup mode warning

Cooling System Operating in Backup Mode

Bit 15 Values	Description
0	No cooling warning
1	Cooling system operating in backup mode warning

Power Fault and Fan Fault (R30, R40, and R50)

Bits 16-23 Values	Description
00000000	No Interrupt
00000001	Over temperature level 1 on power supply #1
00000010	Over temperature level 2 on power supply #1
00000011	Internal power supply failure on power supply #1
00000100	Power supply #1 overload
00000101	Loss of primary power on power supply #1
00000110	Over temperature level 1 on power supply #2
00000111	Over temperature level 2 on power supply #2
00001000	Internal power supply failure on power supply #2
00001001	Power supply #2 overload
00001010	Loss of primary power on power supply #2
00010000	Fan 1 fault
00100000	Fan 2 fault
00110000	Fan 3 fault
01000000	Fan 4 fault
01010000	Fan 5 fault
01100000	Fan 6 fault
01110000	Fan 7 fault
10000000	Fan 8 fault
10010000	Fan 9 fault
10100000	Fan 10 fault

Keylock Position

Bits 28-31 Values	Description
0101	Secure
0110	Service
0111	Normal

Appendix B. 332 MHz and POWER3 SMP Thin and Wide Node Messages and Codes

Error Code to FRU Index

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

If the codes in the following tables indicate a device which is present more than once in the processor node, a location code is needed to specify which device generated the error.

Location code descriptions can be found under "Location Codes" on page B-41.

Error codes can be obtained from the Service Processor Previous Boot history, System Management Services error log, and System Online Diagnostics (diag):

- **Service Processor Menu**. Check previous boot log for any errors.

    1. Logically power off the SMP node
    2. From the Service Processor Menu:
        – Choose System Information Menu
        – Choose Read Progress Indicators from Last System Boot
        – Choose Read Ssytem POST Errors (optional)
        – Examine data provided for unexpected error codes or abnormal termination of boot progress
        – Find error in this appendix and perform listed action.

- **System Management Services error log**

    1. Switch the node off, then on.
    2. When the word "keyboard" is displayed, press **1** on the TTY console.
    3. When the System Management Services appear, check the error log for any errors:
        – Choose Utilities
        – Choose Error Log
        – If an error is logged, check the time stamp
        – If the error was logged during the current boot attempt, record it
        – Find error in this appendix and perform listed action
        – If no recent error is logged in the error log, go to the "Minimum Configuration" MAP for this node type in *RS/6000 SP: Maintenance Information, Volume 2*

- **Node Online Diagnostics, Problem Determination**

    1. At a node prompt (either from TTY or TN connection), enter **diag**
    2. Press **Enter** to continue, then:
        – Choose Diagnostic Routines
        – Choose Problem Determination
        – Press **Enter** for All Resources
        – Press **F7** to Commit and execute
        – When test completes, examine results for error codes reported
        – Find error in this appendix and perform listed action

Attention: Some 48 V dc power cables to the processor nodes have in-line circuit breakers. Ensure that the in-line circuit breaker switch is off (0) before connecting or disconnecting 48 V dc power cables from the node.

Notes:

1. If more than eight digits are displayed in the operator panel, use only the first eight digits to find the error in the tables. The digits that display beyond the first eight digits are location codes that can assist you in diagnosing the problem. See "Location Codes" on page B-41.

2. The 332 MHz SMP node contains a separate service processor card, the POWER3 SMP thin and wide node does not. The service processor component of the POWER3 SMP thin and wide node is contained in the I/O planar.

3. If the MAPs indicate the I/O planar should be replaced, perform the following steps:

   a. Licensed programs frequently rely on network configuration and system information stored on the VPD on the I/O planar (see Figure 1-32 on page 1-37). If the MAPs indicate that the I/O planar should be replaced, swap the VPD from the old I/O planar to the new one. If the old VPD module has to be replaced, call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys from licensed programs may be required.
   b. Perform actions in note 4, below.
   c. Perform actions in note 5, below.

4. If a network adapter or I/O planar is replaced, notify the system administrator that the new hardware address can be acquired from the node using `smit hrdwrad_dialog` or `sphrdwrad` command. In addition, the operating system configuration of the network controller may need to be changed in order to enable system startup. Also, check to ensure that any client or server that addresses this system is updated.

5. If the I/O planar or service processor are replaced, you must check (and update if necessary) the system and service processor firmware prior to completing service. Refer to "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72.

6. Following successful repair of the processor node, go to the "End of Call" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.

   If you replace FRUs and the problem is still not corrected, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*, unless otherwise indicated in the tables.

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332 MHz SMP Thin and Wide Node AIX and Physical Location Code Reference Table	B-43

Firmware and Service Processor Codes

If you replace FRUs and the problem is still not corrected, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.

Error Code	Description	Action / Possible Failing FRU
203w0xyz	• w=loop number • x=0 missing link • y=port number • z=c for interconnect z=b missing link back z=E RIO de-configured	Check Cables, then Remote I/O.
20A80xxx	Remote initial program load (RIPL) error.	
20A80000	Insufficient information to boot.	Verify the IP address.
20A80001	Client IP address is already in use by other network device.	Change IP address.
20A80002	Cannot get gateway IP address.	Refer to "Checkpoints" on page B-29 table using code **E174**.
20A80003	Cannot get server hardware address.	Refer to "Checkpoints" on page B-29 table using code **E174**.
20A80004	Bootp failed.	Refer to "Checkpoints" on page B-29 table using code **E175**.
20A80005	File transmission (TFTP) failed.	Check network connection, try again.
20A80006	Image too big. Ran out of available firmware memory resources loading boot image.	Verify boot server configuration.
20D00xxx	Unknown/Unrecognized device	
20D0000F	Self-test failed on device, no error/location code information available.	Check the System Management Services error log entry (see step 3 on page B-1) for this error code. The location code (if present) in the error log entry should identify the location of the failing device.
20D00010	Self-test failed on device, can't locate package.	Contact your service support representative for assistance.
20D00011	Cannot determine machine model.	The machine model is part of the system Vital Product Data (VPD). Perform corrective actions listed for errors 2BA00050, 2BA00051
20E00xxx	Security	
20E00000	Power on Password entry error.	The password has been entered incorrectly. Retry installing the password.
20E00001	Privileged-access password entry error.	The password has been entered incorrectly. Retry installing the password.
20E00002	Privileged-access password jumper not enabled.	The privileged-access password jumper is not in the correct position for password initial entry. Consult the system's User's Guide for jumper location and position.
20E00003	Power on Password must be set for Unattended mode.	Unattended mode requires the setting of the Power On password before it is enabled.
20E00004	Gold cap drained or needs replacement.	Replace I/O planar. (See notes on B-2.)
20E00005	EEPROM locked.	1. Turn off, then turn on the processor node 2. Replace the I/O planar (See notes on B-2)

Table B-1 (Page 1 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
20E00008	CMOS corrupted or tampering evident, CMOS initialized.	Check your machine for evidence of tampering. If no tampering evident: Replace I/O planar. (See notes on B-2.)
20E00009	Invalid password entered - system locked.	The password has been entered incorrectly 3 times. Turn off, then turn on the processor node, then enter the password correctly.
20E0000A	EEPROM lock problem.	If for privileged-access password install, is jumper in correct position? Consult the system's User's Guide for jumper location and position. 1. Power the node circuit breaker(s) off and then on, retry 2. Replace I/O planar. (See notes on B-2)
20E0000B	EEPROM write problem.	1. Power the node circuit breaker(s) off and then on, retry 2. Replace I/O planar. (See notes on B-2)
20E0000C	EEPROM read problem.	1. Power the node circuit breaker(s) off and then on, retry 2. Replace I/O planar. (See notes on B-2)
20E00017	Cold boot needed for password entry.	Turn off, turn on the processor node.
20EE0xxx	Informational	
20EE0003	IP parameter requires 3 dots "."	Enter valid IP parameter. Example: 000.000.000.000
20EE0004	Invalid IP parameter.	Enter valid (numeric) IP parameter. Example: 000.000.000.000
20EE0005	Invalid IP parameter (>255).	Enter valid (numeric) IP parameter in the range of 0 to 255. Example: 255.192.002.000
20EE0006	No SCSI controllers present.	The I/O planar should always have (at least) one integrated PCI SCSI controller; replace the I/O planar. (See notes on B-2.)
20EE0008	No configurable adapters found in the system.	This warning occurs when the selected SMS function cannot locate any devices/adapters supported by the function. If a supported device is installed: 1. Replace the device or adapter 2. Replace I/O planar, (See notes on B-2)
20EE0009	Unable to communicate with the Service processor.	1. Replace the service processor card (332 MHz SMP node) 2. Replace I/O planar, (See notes on B-2) 3. Replace system planar

Table B-1 (Page 2 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Table B-1 (Page 3 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
20EE000A	Pointer to the operating system found in non-volatile storage.	Values normally found in non-volatile storage that point to the location of an operating system were not found. This can happen for two reasons, either your installed operating system doesn't support storing the values or some event occurred that caused the system to lose non-volatile storage information (drainage of the Gold cap). If you are running AIX, this information can be reconstructed by running the bootlist command specifying the device that the operating system is installed on. Please refer to your AIX documentation for the exact syntax and usage of the bootlist command. In order to boot the operating system so that the above mentioned values can be reconstructed, power the system down and power it back up again, this should cause the system to look for the operating system in the devices contained in the custom boot list or in the default boot list, depending on the condition of the system. If this is not successful, modify the boot sequence (also known as boot list) to include devices that are known to contain a copy of the operating system. This can be accomplished by using the System Management Services menus. For example, select a hard disk known to have a copy of the operating system as the first and only device in the boot sequence (boot list) and attempt to boot again.
20EE000B	The system was not able to find an operating system on the device list that was attempted.	Modify the boot sequence (also known as boot list) to include devices that are known to contain a copy of the operating system. This can be accomplished by using the System Management Services menus. For example, select a hard disk known to have a copy of the operating system as the first and only device in the boot sequence (boot list) and attempt to boot again. If the System Management Services menus do not display valid SCSI devices which were previously available: 1. Ensure SCSI signal, SCSI terminator, and power cables are securely connected and not damaged 2. Replace the I/O planar. (See notes on B-2)

Error Code	Description	Action / Possible Failing FRU

21A000xxx	SCSI device errors	**Notes:**
		
		1. Before replacing any system components:
		
		  a. Ensure that the controller and each device on the SCSI bus is assigned a unique SCSI ID
		  b. Ensure SCSI bus is properly terminated
		  c. Ensure SCSI signal and power cables are securely connected and not damaged
		
		2. The location code information is required to identify the ID of SCSI device failures as well as to indicate the location of the controller to which the device is attached

21A00001	Test Unit Ready failed - hardware error.	Refer to the notes in error code 21A000xxx. 1. Replace the SCSI device 2. Replace the SCSI cable 3. Replace the SCSI controller
21A00002	Test Unit Ready failed - sense data available.	Refer to the notes in error code 21A000xxx. 1. Replace the media (Removable media devices) 2. Replace the SCSI device
21A00003	Send Diagnostic failed.	Refer to the notes in error code 21A000xxx. Replace the SCSI device.
21A00004	Send Diagnostic failed - DevOfl cmd.	Refer to the notes in error code 21A000xxx. Replace the SCSI device.
21F20xxx	SCSI read/write optical.	Refer to 21A00xxx for a description and repair action for the xxx value.
22000001	Internal wrap test failed.	Replace adapter.
22001001	Internal wrap test failed.	Replace adapter.
22002001	Adapter failed to complete hardware initialization.	Replace adapter.
22010001	Adapter failed to complete hardware initialization.	Replace adapter.
22011001	Adapter failed to complete hardware initialization.	Replace adapter.
25000000	Memory controller failed.	Replace the system planar.
25010xxx	Flash update problem.	
25010003	Cannot open OPENPROM package.	Replace I/O planar. (See notes on B-2.)
25010004	Cannot find OPENPROM node.	Replace I/O planar. (See notes on B-2.)
25010006	System id does not match image system id.	Make sure correct and non-corrupted firmware file is used.
25010007	Image has bad CRC.	Make sure correct and non-corrupted firmware file is used.

Table B-1 (Page 4 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
25010008	Flash is write protected, update cancelled.	1. Power the node circuit breaker(s) off and then on, retry 2. Replace I/O planar. (See notes on B-2)
25010009	Flash module is unsupported or not recognized.	Make sure correct and non-corrupted firmware file is used.
2501000A	Flash write protected.	1. Power the node circuit breaker(s) off and then on, retry 2. Replace I/O planar. (See notes on B-2)
25A0xxx0	L2 Cache controller problem.	1. Replace the processor card 2. Replace the system planar See error code 2B2xxx22 for xxx definitions.
25A0xxx1	L2 Cache controller problem.	1. Replace the processor card 2. Replace the system planar See error code 2B2xxx22 for xxx definitions.
25A1xxx1	L2 SRAM failure	Replace the processor card See error code 2B2xxx22 for xxx definitions.
25A80xxx	NVRAM problems	**NVRAM problem resolution:** **Note:** The gold cap, which is charged by the supervisor bus, will maintain NVRAM data and RTC (clock) for about 5 days with the node disconnected from the supervisor bus. 1. Errors reported against NVRAM can be caused by low gold cap voltage and (more rarely) power outages that occur during normal system usage. With the exception of the 25A80000 error, these errors are warnings that the NVRAM data content had to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, any system customization (eg. boot device list) information has been lost, the system may need to be re-configured. 2. **332 MHz SMP node**: Verify that a jumper is installed on I/O planar J15 pins 2 and 3. Refer to Figure 1-32 on page 1-37. **POWER3 SMP thin and wide node**: Verify that a jumper is installed on I/O planar J14 pins 2 and 3. Refer to Figure 1-41 on page 1-42. 3. If the error is persistent, replace the I/O planar. (See notes on B-2.)
25A80000	Initialization failed, device test failed.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80001	Init-nvram invoked, ALL of NVRAM initialized.	Refer to "Action/Failing FRU" under error code 25A80xxx.

Error Code	Description	Action / Possible Failing FRU
25A80002	Init-nvram invoked, some data partitions may have been preserved.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80011	Data corruption detected, ALL of NVRAM initialized.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80012	Data corruption detected, some data partitions may have been preserved.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80100	NVRAM data validation check failed.	Turn off, turn on the processor node and retry the operation before replacing any system component. Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80201	Unable to expand target partition while saving configuration variable.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80202	Unable to expand target partition while writing error log entry.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80203	Unable to expand target partition while writing VPD data.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80210	Setenv/$Setenv parameter error - name contains a null character.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25A80211	Setenv/$Setenv parameter error - value contains a null character.	Refer to "Action/Failing FRU" under error code 25A80xxx.
25AA0xxx	EEPROM problems	**EEPROM problem resolution:** 1. Ensure that the EEPROM Security jumper is in the correct position if doing a privileged-access password install 2. Retry the operation 3. If retries do not solve the problem, replace the I/O planar. (See notes on B-2)
25AA0000	Unable to unlock EEPROM.	Refer to "Action/Failing FRU" under error code 25AA0xxx.
25AA0001	Read-Recv error.	Refer to "Action/Failing FRU" under error code 25AA0xxx.
25AA0002	Read-Trans error.	Refer to "Action/Failing FRU" under error code 25AA0xxx.
25AA0003	Write-enable error.	Refer to "Action/Failing FRU" under error code 25AA0xxx.
25AA0004	Write-recv error.	Refer to "Action/Failing FRU" under error code 25AA0xxx.
25AA0005	Write-disable error.	Refer to Action under error code 25AA0xxx.
25AA0006	Write-Trans error.	Refer to Action under error code 25AA0xxx.
25AA0007	Unable to lock EEPROM.	Refer to Action under error code 25AA0xxx.
25B00001	No memory modules detected in either memory card 1 or 2.	1. Reseat any installed memory card(s) and retry 2. Reseat any installed memory modules on the installed memory cards 3. Replace memory card(s)

Table B-1 (Page 6 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
25Cyyxxx	Memory Card problems (Also see the following codes for exact match.)	See "Memory PD Bits" on page B-28 for definition of "yy".
		Be sure to check second line of the LCD display for location codes. Refer to "332 MHz SMP Thin and Wide Node AIX and Physical Location Code Reference Table" on page B-43 to decode P1-Mx.x, and "Location Diagrams of the RS/6000 SP Components" on page 1-3 for card and DIMM locations.
		Alternatively, you can use the location code obtained from the System Management Services Error Log utility (see step 3 on page B-1) to identify which memory module (or memory module pair) the error is reported against.
25Cyy001	Memory module is not supported.	Replace unsupported memory module.
		Note: Memory module must be replaced with a supported type memory module. If an unsupported memory module is replaced the same unsupported type, the error does not go away.
		There may be 2 memory module related memory errors reported to indicate a memory module pair. One of the 2 indicated memory modules may be good, when replacing memory replace 1 memory module at a time, not both.
		See "Memory PD Bits" on page B-28 for definition of "yy".
		Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information.
25Cyy002	Memory module fails memory test.	1. Replace memory module 2. Replace memory card 3. Replace the system planar
		See "Memory PD Bits" on page B-28 for definition of "yy"
		Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information.
25Cyy003	PD bits are mis-matched or missing one memory module.	1. Make sure both memory modules in the pair are the same type 2. Replace system planar
		See "Memory PD Bits" on page B-28 for definition of "yy"
		Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information.

Error Code	Description	Action / Possible Failing FRU
25Cyy004	Memory modules are disabled.	Remove this unused memory module. Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information. **Note:** If more than 3GB memory is installed in a 332 MHz SMP node, this error will occur.
25Cyy005	Memory module failed address test.	1. Replace memory module 2. Replace memory card 3. Replace system planar 4. Replace processor card See "Memory PD Bits" on page B-28 for definition of "yy" Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information.
25Cyy006	Memory module failed inter-extent test.	1. Replace memory module 2. Replace memory card 3. Replace system planar 4. Replace processor card See "Memory PD Bits" on page B-28 for definition of "yy" Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information.
25Cyy007	Memory module failed extent access test.	1. Replace memory module 2. Replace memory card 3. Replace system planar 4. Replace processor card See "Memory PD Bits" on page B-28 for definition of "yy" Refer to "Action/Possible Failing FRU" for 25Cyyxxx for more information.
25Cyy008	Memory module has been deconfigured.	Replace memory module. See "Memory PD Bits" on page B-28 for definition of "yy".
26020001	Invalid PCI adapter vendor ID.	1. Move adapter to another slot (behind a different PCI bridge) 2. Check for available firmware updates for adapter. Apply if available 3. Run AIX diagnostics on adapter 4. Replace adapter 5. Check for system firmware updates. Apply if available 6. Replace power FRU 7. Replace I/O planar

Table B-1 (Page 8 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Table B-1 (Page 9 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
26020002	Invalid PCI adapter device ID.	1. Move adapter to another slot (behind a different PCI bridge) 2. Check for available firmware updates for adapter. Apply if available 3. Run AIX diagnostics on adapter 4. Replace adapter 5. Check for system firmware updates. Apply if available 6. Replace power FRU 7. Replace I/O planar
26020003	Invalid PCI adapter class code.	1. Move adapter to another slot (behind a different PCI bridge) 2. Check for available firmware updates for adapter. Apply if available 3. Run AIX diagnostics on adapter 4. Replace adapter 5. Check for system firmware updates. Apply if available 6. Replace power FRU 7. Replace I/O planar
26020007	Failed to allocate bus resources to PCI adapter.	1. Move adapter to another slot (behind a different PCI bridge) 2. Check for available firmware updates for adapter. Apply if availabl. 3. Run AIX diagnostics on adapter 4. Replace adapter 5. Check for system firmware updates. Apply if available 6. Replace power FRU 7. Replace I/O planar
26800Cxx	Machine check occurred.	If the location coe shown on LCD identifies a PCI adapter slot: 1. Replace the adapter in the slot identified 2. Replace I/O planar If the location code does not identify a PCI adapter slot, or if there is no location code: Replace I/O planar.

Error Code	Description	Action / Possible Failing FRU

28030xxx	Real-Time Clock (RTC) errors
	
	(Also see the following codes for exact match.)
		Note: The gold cap, which is charged by the supervisor bus, will maintain NVRAM data and RTC (clock) for about 5 days with the node disconnected from the supervisor bus.
		
		1. Errors reported against the Real Time Clock (RTC) can be caused by low gold cap voltage and (more rarely) power outages that occur during normal system usage. These errors are warnings that the RTC data content needs to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, the Power On Password and Time and Date information has been lost.
		
		   • To set/restore a Power-On Password, use the System Management Services utility
		   • To set/restore the Time and Date, use the operating system facility
		
		2. **332 MHz SMP node**: Verify that a jumper is installed on I/O planar J15 pins 2 and 3. Refer to Figure 1-32 on page 1-37.
		
		POWER3 SMP thin and wide node: Verify that a jumper is installed on I/O planar J14 pins 2 and 3. Refer to Figure 1-41 on page 1-42.
		
		3. If the error is persistent, replace the I/O planar. (See notes on B-2)

28030001	RTC initialization required- RTC not updating, corrected.	Refer to "Action/Failing FRU" under error code 28030xxx.
28030002	Bad time/date values	1. Set the time and date 2. Refer to "Action/Failing FRU" under error code 28030xxx
29000002	Super I/O sub-device 1,0 controller failed self-test.	Replace the I/O planar. (See notes on B-2.)
2B200402	Unsupported processor.	Replace the processor card.

Table B-1 (Page 10 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Error Code	Description	Action / Possible Failing FRU
	Table B-1 (Page 11 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.	
2B2xxx22	Processor disabled.	Replace the processor card. Where xxx indicates the processor type as follows: **000** 166 Mhz 1 or 2 way processor card **200** 166 Mhz 1 or 2 way processor card **211** Down level VPD. Contact next level of support. **251** 166 Mhz 1 way processor card **261** 166 Mhz 2 way processor card **451** 332 Mhz 1 way processor card **461** 332 Mhz 2 way processor card **4A1** 332 Mhz 2 way processor card **654** POWER3 SMP 1–way processor card **Note:** Only the last three processor types are supported on this node.
2B2xxx31	Processor card failed	Replace processor card See error code 2B2xxx22 for xxx definitions.
2B2xxx42	Unsupported processor type	Replace processor card See error code 2B2xxx22 for xxx definitions.
2BA00xxx	Service processor	
2BA00000	Service processor POST failure.	1. Power off the node circuit breaker(s) and wait until the power LEDs are off 2. Power on the node circuit breaker(s), retry the operation 3. Replace the service processor card (332 MHz SMP node) 4. Replace the I/O planar. (See notes on B-2)
2BA00012	Service processor reports self-test failure.	1. Power off the node circuit breaker(s) and wait until the power LEDs are off 2. Power on the node circuit breaker(s), retry the operation 3. Replace the service processor card (332 MHz SMP node) 4. Replace the I/O planar. (See notes on B-2)
2BA00013	Service processor reports bad NVRAM CRC.	Refer to "Action/Failing FRU" under error code 25A80xxx.
2BA00014	Service processor reports bad service processor firmware.	Re-program the system firmware. See "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72 for flash EPROM and firmware update procedures.
2BA00017	Service processor reports bad or low battery.	1. Refer to "Action/Failing FRU" under error code 25A80xxx 2. If problem persists, replace the service processor
2BA00018	EPOW test failure.	1. Replace the service processor card (332 MHz SMP node) 2. Replace the I/O planar. (See notes on B-2)

Error Code	Description	Action / Possible Failing FRU
2BA00019	IRQ13 test failure.	1. Replace the I/O planar. (See notes on B-2) 2. Replace the service processor card (332 MHz SMP node)
2BA00024	Service processor reports bad power controller firmware.	Re-program the system firmware. See "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72 for flash EPROM and firmware update procedures.
2BA00040	Service processor reports service processor VPD module not present.	1. Re-program the service processor firmware. See "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72 for flash EPROM and firmware update procedures 2. Replace the service processor card (332 MHz SMP node)
2BA00041	Service processor VPD is corrupted.	1. Re-program the service processor firmware. See "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72 for flash EPROM and firmware update procedures 2. Replace the service processor card (332 MHz SMP node)
2BA00050	Service processor reports system VPD module not present or not recognizable.	Replace the I/O planar. **Note:** Do not swap the old VPD module from the old I/O planar to the new one. See notes on B-2.
2BA00051	System VPD data corrupted.	Replace the I/O planar. **Note:** Do not swap the old VPD module from the old I/O planar to the new one. See notes on B-2.
2BA00060	Service processor reports I/O planar VPD module not present.	Replace the I/O planar. (See notes on B-2.)
2BA00061	Service processor reports I/O planar VPD data corrupted.	Replace the I/O planar. (See notes on B-2.)
2BA00062	Service processor reports system planar VPD module not present.	Replace the system planar.
2BA00063	Service processor reports system planar VPD data corrupted.	Replace the system planar.
2BA00064	Service processor reports PCI riser card VPD module not present.	1. Make sure firmware level is up to date 2. Replace the PCI riser card (332 MHz SMP node)
2BA00065	Service processor reports PCI riser card VPD data corrupted.	Replace the PCI riser card (332 MHz SMP node).
2BA00066	Service processor reports PCI expansion planar VPD module not present.	Replace the PCI expansion planar.
2BA00067	Service processor reports PCI expansion planar VPD data corrupted.	Replace the PCI expansion planar.

Table B-1 (Page 13 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
2BA00070	Service processor reports processor card VPD module not present.	Replace the processor card(s).
2BA00071	VPD data corrupted for processor card in slot 1.	Replace the processor card in slot 1.
2BA00073	VPD data corrupted for processor card in slot 2.	Replace the processor card in slot 2.
2BA00100	Service processor firmware recovery information could not be written to diskette.	1. Check diskette media write protect tab 2. Replace the diskette drive
2BA00101	Service processor is not installed, update cancelled.	1. Install the service processor 2. Retry operation
2BA00102	No service processor update diskette in drive.	Insert the diskette.
2BA00103	Service processor firmware update file is corrupted, update cancelled.	1. Obtain new service processor firmware 2. Retry operation
2BA00104	Service processor firmware update file is the same level as the service processor firmware, update cancelled.	1. Obtain new level of service processor firmware 2. Retry operation
2BA00200	Service processor firmware update error occurred, update not completed. Error occurred during service processor flash write operation.	Service processor firmware update error recovery procedure: 1. Turn the system Off 2. Turn the system On 3. Retry operation. If problem persists, replace service processor card (332 MHz SMP node)
2BA00201	Service processor firmware update error occurred, update not completed. Error occurred while reading service processor CRC.	See error code 2BA00200 for recovery procedure.
2BA00202	Service processor firmware update error occurred, update not completed. Error occurred while verifying service processor CRC.	See error code 2BA00200 for recovery procedure.
2BA00203	Service processor firmware update error occurred, update not completed. Error occurred while reading new service processor CRC after updating service processor firmware.	See error code 2BA00200 for recovery procedure.
2BA00204	Service processor firmware update error occurred, update not completed. Error occurred while calculate CRC write.	See error code 2BA00200 for recovery procedure.
2BA00300	Service processor reports slow fan number 1.	1. Replace fan 1 2. If problem persists, replace CPU power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00301	Service processor reports slow fan number 2.	1. Replace fan 2 2. If problem persists, replace CPU power FRU 3. Replace I/O planar. (See notes on B-2)

Table B-1 (Page 14 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
2BA00302	Service processor reports slow fan number 3.	1. Replace fan 3 2. If problem persists, replace I/O power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00303	Service processor reports slow fan number 4.	1. Replace fan 4 2. If problem persists, replace I/O power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00309	Service processor reports generic cooling alert.	1. Check for cool air flow obstructions to the system 2. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node). 3. Replace I/O planar. (See notes on B-2)
2BA00310	Service processor reports CPU over temperature alert.	1. Check for cool air flow obstructions to the system 2. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node). 3. If the problem persists, replace processor card
2BA00311	Service processor reports I/O over temperature alert.	1. Check for cool air flow obstructions to the system 2. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node). 3. Replace I/O planar. (See notes on B-2)
2BA00312	Service processor reports memory over temperature alert.	1. Check for cool air flow obstructions to the system 2. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card. 3. Replace Memory card
2BA00313	Service processor reports generic power alert.	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00314	Service processor reports 5V over voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00315	Service processor reports 5V under voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00316	Service processor reports 3.3V over voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)

Error Code	Description	Action / Possible Failing FRU
2BA00317	Service processor reports 3.3V under voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00318	Service processor reports 2.5V over voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00319	Service processor reports 2.5V under voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00320	Service processor reports +12V over voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00321	Service processor reports +12V under voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00322	Service processor reports -12V over voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00323	Service processor reports -12V under voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00324	Service processor reports 5V standby over voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00325xyz	Service processor reports 5V standby under voltage alert.	1. Replace CPU power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00326	Service processor reports PCI expansion planar 5V over voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00327	Service processor reports PCI expansion planar 5V under voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00328	Service processor reports PCI expansion planar 3.3V over voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00329	Service processor reports PCI expansion planar 3.3V under voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00330	Service processor reports PCI expansion planar +12V over voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00331	Service processor reports PCI expansion planar +12V under voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00332	Service processor reports PCI expansion planar -12V over voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00333	Service processor reports PCI expansion planar -12V under voltage alert.	1. Replace I/O power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00334	Service processor reports generic slow shut-down request.	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2) 3. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node).

Table B-1 (Page 16 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
2BA00335	Service processor reports CPU critical over temperature slow shutdown request.	1. Check for cool air flow obstructions to the system 2. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning) 3. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node). 4. If problem persists, replace processor card
2BA00336	Service processor reports IO critical over temperature slow shutdown request.	1. Check for cool air flow obstructions to the system 2. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning) 3. If problem persists, replace I/O planar. (See notes on B-2) 4. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node)
2BA00337	Service processor reports memory critical over temperature slow Shutdown request.	1. Check for cool air flow obstructions to the system 2. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning) 3. If problem persists, replace memory card 4. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node)
2BA00338	Service processor reports generic fast shutdown request.	1. Replace Power FRU 2. Replace I/O planar. (See notes on B-2) 3. Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node)
2BA00340	Service processor reports locked fan - fast shutdown request fan number 1.	1. Replace fan 1 2. If problem persists, replace CPU power FRU 3. Replace I/O planar. (See notes on B-2)

Error Code	Description	Action / Possible Failing FRU
2BA00341	Service processor reports locked fan - fast shutdown request fan number 2.	1. Replace fan 2 2. If problem persists, replace CPU power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00342	Service processor reports locked fan - fast shutdown request fan number 3.	1. Replace fan 3 2. If problem persists, replace I/O power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00343	Service processor reports locked fan - fast shutdown request fan number 4.	1. Replace fan 4 2. If problem persists, replace I/O power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00350	Service processor reports generic immediate shutdown request.	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00351	Service processor reports generic power loss EPOW.	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00352	Service processor reports loss of power (frame).	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00353	Service processor reports loss of power (power button).	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2)
2BA00360	Service processor reports slow DASD fan 1.	1. Replace DASD fan 1 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00361	Service processor reports slow DASD fan 2.	1. Replace DASD fan 2 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00362	Service processor reports slow DASD fan 3.	1. Replace DASD fan 3 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00363	Service processor reports slow DASD fan 4.	1. Replace DASD fan 4 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00364	Service processor reports locked DASD fan 1.	1. Remove obstruction from DASD fan 1 2. Replace DASD fan 1 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00365	Service processor reports locked DASD fan 2.	1. Remove obstruction from DASD fan 2 2. Replace DASD fan 2 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00366	Service processor reports locked DASD fan 3.	1. Remove obstruction from DASD fan 3 2. Replace DASD fan 3 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00367	Service processor reports locked DASD fan 4.	1. Remove obstruction from DASD fan 4 2. Replace DASD fan 4 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00368	Service processor reports slow CEC fan 1.	1. Replace CEC fan 1 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)

Table B-1 (Page 17 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.

Table B-1 (Page 18 of 18). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
2BA00369	Service processor reports slow CEC fan 2.	1. Replace CEC fan 2 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00370	Service processor reports slow CEC fan 3.	1. Replace CEC fan 3 2. If problem persists, replace power FRU 3. Replace I/O planar. (See notes on B-2)
2BA00371	Service processor reports locked CEC fan 1.	1. Remove obstruction from CEC fan 1 2. Replace CEC fan 1 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00372	Service processor reports locked CEC fan 2.	1. Remove obstruction from CEC fan 2 2. Replace CEC fan 2 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00373	Service processor reports locked CEC fan 3.	1. Remove obstruction from CEC fan 3 2. Replace CEC fan 3 3. If problem persists, replace power FRU 4. Replace I/O planar. (See notes on B-2)
2BA00374	Service processor reports power supply 1 and DASD fans failed.	1. Replace CPU power FRU 2. Replace I/O planar (See notes on B-2)
2BA00375	Service processor reports power supply 2 and DASD fans failed.	1. Replace I/O power FRU 2. Replace I/O planar (See notes on B-2)
2BA00376	Service processor reports power supply failure.	1. Replace failing power FRU 2. Replace I/O planar (See notes on B-2)
2BA00399	Service processor reports unsupported value in EPOW.	Replace I/O planar. (See notes on B-2)

Table B-2 (Page 1 of 8). Service Processor Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
40100005	A loss of system power detected.	Possible 48V power loss. If not, replace power FRU
40100007	Immediate shutdown.	Possible 48V power loss. If not, replace power FRU
40110001	Power supply fail.	1. Power FRU 2. I/O planar. (See notes on B-2) 3. Service processor 4. Possible problem with DASD power 5. System planar 6. Power cables to system planar
40110002	Voltage is present, but not detected on both processor cards.	1. Check power interlock tab on CPU power FRU 2. Check power cable at processor card(s) for proper seating (332 MHz SMP node) 3. Check power cable at system planar for proper seating (POWER3 SMP node) 4. Reseat processor card(s) 5. Replace CPU power FRU 6. Replace system planar power cable assembly

Table B-2 (Page 2 of 8). Service Processor Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
40110003	Voltage is present, but not detected on one processor card. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the service processor error log.)	1. Check power interlock tab on CPU power FRU 2. Check power cable at processor card(s) for proper seating (332 MHz SMP node) 3. Check power cable at system planar for proper seating (POWER3 SMP node) 4. Reseat processor card(s) 5. Replace failing processor card 6. Replace planar power cable assembly
40111002	An unknown power problem detected.	1. Replace power FRU 2. Replace I/O planar. (See notes on B-2)
40111022	A high 5.0 voltage reading detected.	1. Replace CPU (or I/O) power FRU 2. Replace processor card
40111032	A high 3.3 voltage reading detected.	1. Replace processor card 2. Replace CPU (or I/O) power FRU
40111042	A high 2.5 voltage reading detected.	1. Replace processor card 2. Replace CPU power FRU
40111052	A high +12 voltage reading detected.	1. Replace CPU (or I/O) power FRU 2. Replace I/O planar. (See notes on B-2)
40111062	A high −12 voltage reading detected.	1. Replace CPU (or I/O) power FRU 2. Replace I/O planar. (See notes on B-2)
40111072	A high +5 standby voltage reading detected.	1. Replace processor card 2. Replace CPU (or I/O) power FRU
40111082	A low 5.0 voltage reading detected.	1. Replace CPU (or I/O) power FRU 2. Replace processor card
40111092	A low 3.3 voltage reading detected.	1. Replace processor card 2. Replace CPU (or I/O) power FRU
401110A2	A low +5 standby voltage reading detected.	1. Replace processor card 2. Replace CPU (or I/O) power FRU
401110B2	A low +12 voltage reading detected.	1. Replace CPU (or I/O) power FRU 2. Replace I/O planar. (See notes on B-2)
401110C2	A low −12 voltage reading detected.	1. Replace CPU (or I/O) power FRU 2. Replace I/O planar. (See notes on B-2)
401110D2	A low +5 voltage reading detected.	1. Replace processor card 2. Replace CPU (or I/O) power FRU
40111101	Power good signal low on either processor cards. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the service processor error log.)	1. Check power cable at processor card(s) 2. Reseat failing processor card 3. Replace failing processor card 4. Replace planar power cable assembly
40111102	Wrong processor cards plugged into the system.	1. Remove cards 2. Verify part numbers 3. Install valid cards

Table B-2 (Page 3 of 8). Service Processor Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
4020xxxx	Cooling problem detected (Also see following codes for exact match.)	Read the Service Processor Error Logs. Perform "Read Service Processor Error Logs" in Service Processor Menus. If various temperature faults (402xxxxx and 2BA003xx) are logged, replace the service processor card (332 MHz SMP node).
40200001	An unknown cooling problem detected.	Cooling problem; check system fans. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40200021	A CPU temperature warning detected.	Over temperature on processor card. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40200023	A critical CPU temperature condition detected.	Critical temperature on processor card. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40200031	An I/O planar temperature warning detected.	Over temperature on I/O planar. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40200033	A critical I/O planar temperature condition detected.	Critical temperature on I/O planar. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40200041	A memory temperature warning detected.	Over temperature on the memory card. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40200043	A critical memory temperature condition detected.	Critical temperature on the memory card. Refer to "Action/Possible Failing FRU" under error code 4020xxxx for more information.
40210011	A slow fan detected.	Check: 1. Room operating temperature 2. Fans
40210014	1. A stopped fan detected 2. If the system is running, refer to the AIX error log to find which fan is failing. If the system is not running, refer to the SP error log 3. Fan connector unplugged 4. Fan sensor defective	1. Check connector 2. Replace failing fan 3. Replace power FRU **Note:** SP Menu locations = F0-F3. AIX error log locations = F1-F4.
40210024	Loss of fan and subsequent slow fan. If the system is running, refer to the AIX error log to find which fan is failing. If the system is not running, refer to the SP error log.	1. Replace failing fan 2. Replace power FRU
40210091	Loss of fan. Refer to the SP error log to find which fan is failing.	1. Replace failing fan 2. Replace power FRU
40211804	Failure to communicate with FMC.	1. Replace failing fan 2. Replace power FRU

Table B-2 (Page 4 of 8). Service Processor Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
40A00000	System firmware IPL failure (surveillance).	1. Check for errors or unusual conditions that might prevent the CPU from reporting heartbeat messages; such as system dump, machine check or checkstop error. Review the service processor error log. 2. If any logs show a hardware problem, open a hardware PMR and perform appropriate maintenance action. 3. If no hardware problem indicators found, collect information using SNAP tool, then open a software PMR to have collected data analyzed.
40B00000	The operating system surveillance interval exceeded.	Refer to "Action/Failing FRU" under error code 40A00000.
40B00100	Surveillance timeout on CPU 1 (slot 1).	Refer to "Action/Failing FRU" under error code 40A00000.
40B00101	Surveillance timeout on CPU 2 (slot 1).	Refer to "Action/Failing FRU" under error code 40A00000.
40B00102	Surveillance timeout on CPU 3 (slot 2).	Refer to "Action/Failing FRU" under error code 40A00000.
40B00103	Surveillance timeout on CPU 4 (slot 2).	Refer to "Action/Failing FRU" under error code 40A00000.
40D00003	An unknown slow shutdown commanded.	Critical cooling problem. Check to ensure the temperature is in the ambient range.
40D00004	An unknown fast shutdown commanded.	Locked fan failure detected. Make sure all fans are operating normally.
40D00101	BIST on I/O planar failed.	Replace I/O planar. (See notes on B-2.)
40D00102	BIST on system planar failed.	Replace system planar.
45800000	Memory controller checkstop	Replace system planar. Perform the "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*
45C00000	Memory checkstop (uncorrectable memory error)	1. Reboot the system in Service Mode. This preserves the AIX error log. Run diagnostics in problem determination mode. 2. Replace system planar
48800909	System VPD error	Replace I/O planar. (See notes on B-2.)
4880090A	Generic VPD error	Perform the "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*
4880090B	Error identifying system type using VPD	1. I2C bus error 2. Replace I/O planar
4880090C	JTAG unable to confirm system type using system VPD	1. Remove cards 2. Verify part numbers 3. Install valid cards

Error Code	Description	Action / Possible Failing FRU
		Table B-2 (Page 5 of 8). Service Processor Error Codes.
4B2xxxyy	CPU problem	Except for xxx=010. Where *xxx* is the processor type. Refer to error code 2B2xxx22 for types. See the following code entries for specific description and actions.
4B2xxx00	Checkstop	1. Remove processor card in slot 2 (if installed). If the problem is resolved, replace the processor card. Else, continue 2. Exchange processor card in slot 1 with processor card removed from slot 2 in the previous step (replace processor card if only one processor card exists). If the problem is resolved, replace processor card. Else, continue 3. Replace CPU power FRU 4. Perform the "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*
4B2xxx01	Checkstop - slot 1 fail.	1. Attempt to run Online (Disk Based) Diagnostics, this preserves the AIX error log; if the reboot fails, attempt Network Boot Diagnostics. If node boots to diagnostics, run in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. Replace processor card in slot 1 3. Replace system planar 4. Replace I/O planar (See notes on B-2)
4B2xxx02	Checkstop - slot 2 fail	1. Attempt to run Online (Disk Based) Diagnostics, this preserves the AIX error log; if the reboot fails, attempt Network Boot Diagnostics. If node boots to diagnostics, run in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. Replace processor card in slot 2 3. Replace system planar 4. Replace I/O planar. (See notes on B-2)
4B2xxx10	Machine check - 0	1. Attempt to run Online (Disk Based) Diagnostics, this preserves the AIX error log; if the reboot fails, attempt Network Boot Diagnostics. If node boots to diagnostics, run in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. Perform "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2.*

Table B-2 (Page 6 of 8). Service Processor Error Codes.		
Error Code	**Description**	**Action / Possible Failing FRU**
4B2xxx11	Machine check - 1 (stuck active)	1. Remove processor card in slot 2 (if installed). If problem is resolved, replace processor card, else continue. 2. Exchange processor card in slot 1 with processor card removed from slot 2 in step 1 (replace processor card if only one card exists). If problem is resolved, replace processor card, else continue. 3. Replace system board
4B2xxx41	ABIST fail.	1. Check power interlock tab on CPU power FRU 2. Replace processor card in slot 1 3. Replace system planar 4. Replace CPU power FRU 5. Replace planar power cable assembly 6. Replace I/O planar
4B2xxx42	ABIST fail.	Replace processor card in slot 2.
4B2xxx43	Service Processor reports JTAG fail.	1. Make sure power cables at processor card and system planar are properly seated. 2. The service processor card is the least likely failure, but it is the tester in this case. Replace the service processor card to assure true failure indication. If the failure disappears, the service processor card was bad. Otherwise, reinstall the old service processor card. 3. REMOVE the processor card(s) and the system planar. If the failure returns, replace the I/O planar. (See notes on B-2.) Otherwise, continue. 4. Install the system board WITHOUT the processor card(s). If the failure returns, replace the system planar. Otherwise, continue. 5. Install the processor card in slot 1. If the failure returns, replace that processor card. Otherwise, continue. 6. Install the processor card in slot 2 (if there was one). If the failure returns, replace that processor card. Otherwise, continue. 7. If the failure no longer exists, the problem was a bad connection, and you have reseated the possible connections.
4B2xxx51	LBIST fail	1. Check power interlock tab on CPU power FRU 2. Replace processor card in slot 1 3. Replace system planar 4. Replace CPU power FRU 5. Replace planar power cable assembly 6. Replace I/O planar

Error Code	Description	Action / Possible Failing FRU
4B2xxx52	LBIST fail	1. Check power interlock tab on CPU power FRU 2. Replace processor card in slot 2 3. Replace system planar 4. Replace CPU power FRU 5. Replace planar power cable assembly 6. Replace I/O planar
4B200054	The processor cards are not compatible with each other.	1. Remove cards 2. Verify part numbers 3. Install valid cards
4B200055	No processor card found.	1. If only one processor card is used, it must be in slot 1 2. If two processor cards are being used, replace the card in slot 1
4B200056	No processor card in first slot.	1. If only one processor card is used, it must be in slot 1 2. If two processor cards are being used, replace the card in slot 1
4B200057	Processor cards are not compatible with each other.	1. Remove cards 2. Verify part numbers 3. Install valid (compatible) cards
4B200058	Compatibility test on processor card 1 failed	1. Remove cards 2. Verify part numbers 3. Install valid (compatible) cards
4B200059	Compatibility test on processor card 1 failed	1. Remove cards 2. Verify part numbers 3. Install valid (compatible) cards
4B201000	Checkstop.	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from Ethernet. If the reboot is successful, run diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue 2. Replace processor card 3. Replace system planar 4. Replace PCI adapter 5. Replace I/O planar. (See notes on B-2)
4B201020	TEA Error.	Perform "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.
4BA00000	The system support controller detects the service processor, but cannot establish communication. The system halts.	1. Replace the service processor card (332 MHz SMP node) 2. Replace the I/O Planar. (See notes on B-2)
4BA00001	The system support controller cannot detect the service processor.	1. Replace the service processor (332 MHz SMP node) 2. Replace the I/O Planar. (See notes on B-2)

Error Code	Description	Action / Possible Failing FRU
4BA00800	Unknown service processor error.	Check level of service processor, if it is the latest level and problem persists, call support.
4BA00814	NVRAM checksum (CRC) fail.	Recoverable temporary condition, unless succeeded by 4BA80015.
4BA00815	NVRAM reinitialization fail.	Replace I/O planar.
4BA00826	Service processor cannot call home.	Replace the I/O Planar. (See notes on B-2.)
4BA00828	Flash update (CRC) checksum fail.	Replace the flash image.
4BA00829	Bad system firmware.	Replace the I/O Planar. (See notes on B-2.)
4BA00830	Boot fail.	1. Verify bootlist in SMS menus 2. See "E1xx Code Boot Problems" on page 2-46
4BA00831	Bad service processor image.	Replace the I/O Planar. (See notes on B-2.)
4BA00832	Error while doing flash update.	1. Power the system on and retry the flash programming a few times 2. Replace I/O planar
4BA10001	SSC SRAM fail.	1. Replace I/O planar. (See notes on B-2) 2. Replace service processor card (332 MHz SMP node)
4BA10002	SSC flash fail.	1. Replace I/O planar. (See notes on B-2) 2. Replace service processor card (332 MHz SMP node)
4BA10003	Service processor fail.	Replace service processor card (332 MHz SMP node).
4BA10004	Service processor firmware fail.	1. If attempting to download service processor firmware, verify that the firmware file is not corrupted 2. Power the node circuit breaker(s) off 3. Wait 30 seconds, then power the node circuit breaker(s) on 4. If you get the same symptom, replace the service processor card (332 MHz SMP node)
4BA10005	I2C Path Fail.	1. Replace I/O planar. (See notes on B-2) 2. Replace processor card 3. Replace system planar
4BA80013	NVRAM.	Perform "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.
4BA80014	NVRAM (CRC) checksum fail.	Recoverable temporary condition, unless succeeded by ABA80015.
4BA80015	NVRAM reinitialization fail.	Replace NVRAM module.

Table B-2 (Page 8 of 8). Service Processor Error Codes.

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

If you replace FRUs and the problem is still not corrected, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*, unless otherwise indicated in the tables.

Table   *B-3. 332 MHz SMP and POWER3 SMP Thin and Wide Node Memory Module PD bits*

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

Notes:

1. To get the memory size and part number, use the Service Processor menus ("Service Processor Menus" on page 2-56) or **lscfg -pv ³ pg** and look for information for the "memory-module".

2. Memory modules must be installed in pairs. 32MB memory modules are **not** supported in the 332 MHz SMP and POWER3 SMP thin and wide nodes.

Bus SRN to FRU Reference Table

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

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

SRN	Bus Identification	Possible Failing Device and AIX Location Code	Associated FRU
9CC-100	PCI bus 00	Internal SCSI port 1 (10-60)	I/O planar. (See notes on B-2.)
		Internal Ethernet port (10-80)	I/O planar. (See notes on B-2.)
		PCI adapter installed in thin node chassis slot I2 (10-70 to 10-77)	Adapter
		PCI adapter installed in thin node chassis slot I3 (10-68 to 10-6F)	Adapter
9CC-101	PCI bus 01	PCI adapter installed in I/O expansion chassis slot I1 (20-58 to 20-5F)	Adapter
		PCI adapter installed in I/O expansion chassis slot I2 (20-60 to 20-67)	Adapter
		PCI adapter installed in I/O expansion chassis slot I3 (20-68 to 20-6F)	Adapter
		PCI adapter installed in I/O expansion chassis slot I4 (20-70 to 20-77)	Adapter
9CC-102	PCI bus 02	PCI adapter installed in I/O expansion chassis slot I5 (2F-00 to 2F-07)	Adapter
		PCI adapter installed in I/O expansion chassis slot I6 (2F-08 to 2F-0F)	Adapter
		PCI adapter installed in I/O expansion chassis slot I7 (2F-10 to 2F-17)	Adapter
		PCI adapter installed in I/O expansion chassis slot I8 (2F-18 to 2F-1F)	Adapter
651-730	ISA bus	Diskette drive port/device (01-D1-00-00)	I/O planar. (See notes on B-2.)
		Serial ports (1 and 2)/device (01-S1 and 01-S2)	I/O planar. (See notes on B-2.)
		Mouse port/device (01-K1-01-00)	I/O planar. (See notes on B-2.)
		Keyboard port/device (01-K1-00-00)	I/O Planar. (See notes on B-2.)

Table B-4. 332 MHz SMP and POWER3 SMP Thin and Wide Node Bus SRN to FRU Reference Table

Checkpoints

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

Before taking actions listed with a checkpoint, it is a good idea to look for better symptoms in the Service Processor error log. See "System Information Menu (332 MHz SMP Thin and Wide Nodes)" on page 2-64 or "System Information Menu (POWER3 SMP Thin and Wide Nodes)" on page 2-65.

Service Processor Checkpoints

Service Processor checkpoints are in the range E010 to E0FF. The message **OK** indicates successful service processor testing and initialization. Firmware checkpoints are listed in "Firmware Checkpoints" on page B-33.

Note: Go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2* for any of the following conditions:

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

Table B-5 (Page 1 of 4). 332 MHz SMP and POWER3 SMP Thin and Wide Node Service Processor Checkpoints.		
Checkpoint	**Description**	**Action/ Possible Failing FRU**
E000	System support controller begins operation. This is an informational checkpoint.	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes B-2) See the note on B-30.
E010	Starting service processor self-tests	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2)
E011	Service processor self-tests completed successfully	NA
E012	Begin to set up service processor heaps	1. Replace I/O planar. (See notes on B-2) 2. Replace service processor card (332 MHz SMP node)
E01F	Bad self-test; cannot continue	
E020	Configuring CMOS	1. Replace I/O planar. (See notes on B-2) 2. Replace service processor card (332 MHz SMP node)
E021	Configuring NVRAM	1. Replace I/O planar. (See notes on B-2) 2. Replace service processor card (332 MHz SMP node)
E025	Service processor accessing VPD on memory card 1.	Replace I/O planar.
E026	Service processor accessing VPD on memory card 2.	Replace I/O planar.
E030	Beginning to build I2C resources	1. Replace service processor card (332 MHz SMP node) 2. Replace processor card 3. Replace I/O planar. (See notes on B-2)

Checkpoint	Description	Action/ Possible Failing FRU
		Table B-5 (Page 2 of 4). 332 MHz SMP and POWER3 SMP Thin and Wide Node Service Processor Checkpoints.
E031	Finished building I2C resources	1. Replace service processor card (332 MHz SMP node) 2. Replace processor card 3. Replace I/O planar. (See notes on B-2)
E032	JTAG self-test	
E040	Starting serial port tests	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E042	Configuring serial port 1	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E043	Configuring serial port 2	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E044	Preparing to set serial port line speed	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E045	Preparing to initialize serial port	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E05x	Reserved.	Call for support.
E060	Preparing to auto power-on (power restored)	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E061	Preparing to auto power-on (Timer)	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E070	Configuring modem	1. Replace modem 2. Replace service processor card (332 MHz SMP node) 3. Replace I/O planar. (See notes on B-2) 4. Replace processor card
E072	Preparing to call home	1. Replace modem 2. Replace service processor card (332 MHz SMP node) 3. Replace I/O planar. (See notes on B-2) 4. Replace processor card

Checkpoint	Description	Action/ Possible Failing FRU
	Table B-5 (Page 3 of 4). 332 MHz SMP and POWER3 SMP Thin and Wide Node Service Processor Check-points.	
E075	Entering Service Processor menus	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E076	Leaving Service Processor menus; attempting to disconnect modems	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card
E0A0	Beginning Bring-Up Phase	1. Replace service processor card (332 MHz SMP node) 2. Replace I/O planar. (See notes on B-2) 3. Replace processor card 4. Replace PCI riser card assembly (332 MHz SMP node)
E0B0	Starting CPU BIST	1. Replace processor card 2. Replace I/O planar. (See notes on B-2) 3. Replace service processor card (332 MHz SMP node)
E0BF	CPU BIST fail	1. Replace CPU card 2. Replace system planar 3. Replace I/O planar
E0C0	Starting X5 BIST	1. Replace processor card 2. Replace I/O planar. (See notes on B-2) 3. Replace service processor card (332 MHz SMP node)
E0D0	Creating scanlog	Wait up to 5 minutes for dump to complete.
E0E0	Pulling CPU out of reset	1. Replace processor card 2. Replace I/O planar. (See notes on B-2) 3. Replace service processor card (332 MHz SMP node)
E0E1	CPU power supply not properly seated.	1. Make sure the CPU power supply is properly seated. Push on the CPU power supply lever marked "PUSH" 2. Replace processor card 3. Replace I/O planar. (See notes on B-2) 4. Replace system planar 5. Replace service processor card (332 MHz SMP node) 6. Replace CPU power FRU 7. Replace SSA (or other PCI) adapter
E0E2	Check point for "Hot-Swap" fans and power supply.	Power supply hot-swap is in progress. Fans and power supply must be replaced within 5 minutes. After 5 minutes the service processor initiates a fast shutdown of the system. **Note:** Not applicable for this node.

Checkpoint	Description	Action/ Possible Failing FRU
E0FF	Bad Service Processor (SP) firmware. Reflash.	1. If attempting to download service processor firmware, verify that the firmware file is not corrupted 2. Power the node circuit breaker(s) off 3. Wait 30 seconds, then power the node circuit breaker(s) on 4. If you get the same symptom, replace the service processor card
OK	Service processor ready waiting for power-On	None. Normal operation.
STBY	Service Processor ready. System was shut-down by the operating system and is still powered on.	This condition can be requested by a privi-leged system user with no faults. See the service processor error log for possible operating system fault indications.

Firmware Checkpoints

Firmware uses progress codes (checkpoints) in the range of E1xx to EFFF. These checkpoints occur during system startup and maybe be useful in diagnosing certain problems. Service processor checkpoints are listed in "Service Processor Checkpoints" on page B-30.

Note: If you replace FRUs and the problem is still not corrected, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*, unless otherwise indicated in the tables.

Checkpoint	Description	Action/ Possible Failing FRU
		Table B-6 (Page 1 of 9). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Checkpoints.
E100	Reserved/unused	See the note on B-30.
E101	Video enabled, extended memory test (quick restart path)	See the note on B-30.
E102	Firmware restart (quick restart path)	See the note on B-30.
E103	Set memory refresh (composite img)	See the note on B-30.
E104	Set memory refresh (recovery block)	See the note on B-30.
E105	Transfer control to operating system (normal boot).	See "E1xx Code Boot Problems" on page 2-46.
E108	Run recovery block base memory (test 2K), set stack	See the note on B-30.
E109	Copy CRC verification code to RAM	See the note on B-30.
E10A	Turn on cache	See the note on B-30.
E10B	Flush cache	See the note on B-30.
E10C	Jump to CRC verification code in RAM	See the note on B-30.
E10D	Compute composite image CRC	See the note on B-30.

Checkpoint	Description	Action/ Possible Failing FRU
E10E	Jump back to ROM	See the note on B-30.
E10F	Transfer control to Open Firmware	See the note on B-30.
E110	Turn off cache, check if composite image CRC is valid	See the note on B-30.
E111	GOOD CRC - jump to composite image	See the note on B-30.
E112	BAD CRC - initialize base memory, stack	See the note on B-30.
E113	BAD CRC - copy uncompressed recovery block code to RAM	See the note on B-30.
E114	BAD CRC - jump to code in RAM	See the note on B-30.
E115	BAD CRC - turn on cache	See the note on B-30.
E116	BAD CRC - copy recovery block data section to RAM	See the note on B-30.
E117	BAD CRC - Invalidate and flush cache, set TOC	See the note on B-30.
E118	BAD CRC - branch to high level recovery control routine.	See the note on B-30.
E119	Initialize base memory, stack	See the note on B-30.
E11A	Copy uncompressed recovery block code to RAM	See the note on B-30.
E11B	Jump to code in RAM	See the note on B-30.
E11C	Turn on cache	See the note on B-30.
E11D	Copy recovery block data section to RAM	See the note on B-30.
E11E	Invalidate and flush cache, set TOC	See the note on B-30.
E11F	Branch to high level control routine.	See the note on B-30.
E120	Initialize I/O and early memory block	See the note on B-30.
E121	Initialize service processor	See the note on B-30.
E122	No memory detected (system lockup)	1. Replace memory modules 2. Replace memory card 3. Replace system planar 4. See the note on B-30
E123	No memory module found in socket.	See the note on B-30.
E124	Disable defective memory bank	See the note on B-30.
E125	Clear PCI devices command reg, go forth	See the note on B-30.
E126	Check valid image - start	See the note on B-30.
E127	Check valid image - successful	See the note on B-30.
E128	Disable interrupts, set interrupt vectors for Open Firmware.	See the note on B-30.
E129	Validate target RAM address	See the note on B-30.
E12A	Copy ROM to RAM, flush cache	See the note on B-30.
E12B	Set MP operational parameters	See the note on B-30.

Table   B-6 (Page 2 of 9). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
		Table B-6 (Page 3 of 9). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Checkpoints.
E12C	Set MP CPU node characteristics	See the note on B-30.
E12D	Park secondary processors in parking lot	See the note on B-30.
E12E	Primary processor sync	See the note on B-30.
E12F	Unexpected return from Open Firmware (system lockup)	See the note on B-30.
E130	Build device tree	See the note on B-30.
E131	Create ROOT node	See the note on B-30.
E132	Create cpus node	See the note on B-30.
E133	Create L2 Cache node	See the note on B-30.
E134	Create memory node	See the note on B-30.
E135	Create memory module node	See the note on B-30.
E136	Test memory	See the note on B-30.
E137	Create openprom node	See the note on B-30.
E138	Create options node	See the note on B-30.
E139	Create aliases node and system aliases	See the note on B-30.
E13A	Create packages node	See the note on B-30.
E140	PReP style load	See the note on B-30.
E149	Create boot mgr node	See the note on B-30.
E14C	Create terminal-emulator node	See the note on B-30.
E14D	Load boot image	See "E1xx Code Boot Problems" on page 2-46.
E14E	Create client interface node/directory	See the note on B-30.
E14F	NVRAM validation, config variable token generation	See the note on B-30.
E150	Create host (primary) PCI controller node	See the note on B-30.
E151	Probing primary PCI bus	1. Replace PCI adapters 2. Replace I/O planar If a network adapter or I/O planar is replaced, see B-2. See the note on B-30.
E152	Probe for adapter FCODE, evaluate if present	1. PCI adapters 2. I/O planar If a network adapter or I/O planar is replaced, see B-2. See the note on B-30.

Checkpoint	Description	Action/ Possible Failing FRU
E153	End adapter FCODE, probe/evaluation	1. Perform minimum configuration isolation of PCI adapters 2. If unsuccessful, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2.* For wide node, focus on I/O expansion planar, PCI riser card, and flex cable. For thin/wide node, focus on I/O planar.
E154	Create PCI bridge node	See the note on B-30.
E155	Probe PCI bridge secondary bus	Perform actions for code E153.
E156	Create PCI ethernet node	See the note on B-30.
E15A	Create 64 bit host (primary) PCI controller node	See the note on B-30.
E15B	Transferring control to operating system (service mode boot)	See "E1xx Code Boot Problems" on page 2-46.
E15C	Probe primary 64 bit PCI bus	See the note on B-30.
E15D	Create host PCI controller node	See the note on B-30.
E15E	Create MPIC node	See the note on B-30.
E15F	Adapter VPD probe	See the note on B-30.
E160	CPU node VPD creation	See the note on B-30.
E161	Root node VPD creation	See the note on B-30.
E162	SP node VPD creation	See the note on B-30.
E164	Create PCI graphics node (P9)	See the note on B-30.
E168	Create PCI graphics node (S3)	See the note on B-30.
E16C	GTX100P subsystem open request.	See the note on B-30.
E16D	GTX100P Planar not detected or failed diagnostics.	See the note on B-30.
E16E	GTX100P subsystem open successful.	See the note on B-30.
E16F	GTX100P close subsystem.	See the note on B-30.
E170	Start of PCI bus probe	See the note on B-30.
E171	Executing PCI-delay function	See the note on B-30.
E174	Establish host connection	Refer to "E1xx Code Boot Problems" on page 2-46 for general considerations.

Table B-6 (Page 4 of 9). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Checkpoints.

Checkpoint	Description	Action/ Possible Failing FRU
E175	BootP request	Refer to "E1xx Code Boot Problems" on page 2-46 for general considerations. 1. Power off, then on, then retry the boot operation 2. Verify the network connection (network could be down) 3. Have network administrator verify the server configuration for this client
E176	TFTP file transfer	See the note on B-30.
E177	Transfer failure due to TFTP error condition	See the note on B-30.
E178	Create PCI token ring node	See the note on B-30.
E180	Service processor command setup	See the note on B-30.
E183	Service processor POST	See the note on B-30.
E190	Create ISA node	See the note on B-30.
E193	Initialize Super I/O.	See the note on B-30.
E196	Probe ISA bus.	See the note on B-30.
E19B	Create service processor node.	See the note on B-30.
E19C	Create tablet node.	See the note on B-30.
E19D	Create NVRAM node.	See the note on B-30.
E19E	Real time clock (RTC) creation and initial- ization.	Refer to error code 28030xxx in "Firmware and Service Processor Codes" on page B-2.
E19F	Create EEPROM node.	See the note on B-30.
E1AD	See description of checkpoint E1DE.	See the note on B-30.
E1B0	Create lpt node.	See the note on B-30.
E1B1	Create serial node.	See the note on B-30.
E1B2	Create audio node.	See the note on B-30.
E1B3	Create 8042 node.	See the note on B-30.
E1B6	Probe for (ISA) keyboard.	See the note on B-30.
E1BA	Enable L2 cache.	See the note on B-30.
E1BB	Set cache parms for burst.	See the note on B-30.
E1BC	Set cache parms for 512KB.	See the note on B-30.
E1BD	Probe for (ISA) mouse.	See the note on B-30.
E1BE	Create op-panel node.	See the note on B-30.
E1BF	Create pwr-mgmt node.	See the note on B-30.
E1C0	Create ISA ethernet node.	See the note on B-30.
E1C5	Create ISA interrupt controller (pic) node.	See the note on B-30.
E1C6	Create dma node.	See the note on B-30.
E1D0	Create PCI SCSI node.	See the note on B-30.

Checkpoint	Description	Action/ Possible Failing FRU
E1D3	Create (* wildcard *) SCSI block device node (SD).	See the note on B-30.
E1D4	Create (* wildcard *) SCSI byte device node (ST).	See the note on B-30.
E1DB	Create floppy controller (FDC) node.	See the note on B-30.
E1DC	Dynamic console selection.	If selection screen(s) can be seen on the write-enabled console and the appropriate key is pressed, but there is no response to the keystroke within 60 seconds: 1. Reset the node supervisor by issuing following command from the control workstation: `hmcmds -G boot_supervisor FRAME#:SLOT#` (Node supervisor will flash slot address. Ignore messages about expected states on/off.) 2. Replace the node supervisor card 3. Replace the I/O planar 4. Replace the Processor card in Slot 2
E1DD	Early processor exception	Replace I/O planar (See notes on B-2.) See the note on B-30.
E1DE	Alternating pattern of E1DE and E1AD is used to indicate a Default Catch condition before the firmware "checkpoint" word is available.	Replace I/O planar (See notes on B-2.) See the note on B-30.
E1DF	Create diskette drive (disk) node	See the note on B-30.
E1E0	Program flash	See the note on B-30.
E1E1	Flash update complete	See the note on B-30.
E1E2	Initialize System I/O	See the note on B-30.
E1E3	PReP boot image initialization.	See the note on B-30.
E1E4	Initialize Super I/O with default values.	See the note on B-30.
E1E5	XCOFF boot image initialization.	See the note on B-30.
E1E6	Set up early memory allocation heap.	See the note on B-30.
E1E7	PE boot image initialization.	See the note on B-30.
E1E8	Initialize primary diskette drive (polled mode).	See the note on B-30.
E1E9	ELF boot image initialization.	See the note on B-30.

Checkpoint	Description	Action/ Possible Failing FRU
E1EA	Firmware flash corrupted	1. Ensure that the hard drive contains a recovery image appropriate for this processor node 2. The System Management Services recovery procedure for the flash EEPROM should be executed. See "Service Processor Flash EPROM Updates (and System Firmware)" on page 2-72 If the hard drive contains the correct recovery image file, then suspect: 1. The recovery image file 2. The hard disk 3. The I/O planar. (See notes on B-2) See the note on B-30.
E1EB	Verify flash EPROM recovery image.	Perform actions for code E1EA.
E1EC	Get recovery image entry point	See the note on B-30.
E1ED	Invalidate instruction cache	See the note on B-30.
E1EE	Jump to composite image	See the note on B-30.
E1EF	Erase flash	See the note on B-30.
E1F0	Start O.B.E.	See the note on B-30.
E1F1	Begin self-test sequence on boot device(s)	See the note on B-30.
E1F2	Power-On Password prompt.	Prompt should be visible on the system console. If a console is attached but nothing is displayed on it, go to the "Start Map" in *RS/6000 SP: Maintenance Information, Volume 2*.
E1F3	Privileged-Access Password prompt.	Prompt should be visible on the system console. If a console is attached but nothing is displayed on it, go to the "Start Map" in *RS/6000 SP: Maintenance Information, Volume 2*.
E1F5	Build boot device list.	See the note on B-30.
E1F6	Determine boot device sequence.	See the note on B-30.
E1F7	No boot image located.	See the note on B-30.
E1FB	Scan SCSI bus for attached devices.	See the note on B-30.

Checkpoint	Description	Action/ Possible Failing FRU
		Table B-6 (Page 8 of 9). 332 MHz SMP and POWER3 SMP Thin and Wide Node Firmware Checkpoints.
E1FD	Default Catch	The operator panel alternates between the code E1FD and another Exxx code, where Exxx is the point at which the error occurred. If the Exxx is not listed in this table, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2.*
E201	Setup PHB BARC addresses.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E202	Initialize PHB registers and PHB's PCI configuration registers.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E203	Look for PCI to ISA bridge.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E204	Setup ISA bridge. PCI config. registers and initialize	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E206	Look for PRISM on PCG and switch to 50MHz.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E207	Setup Data gather mode and 64/32-bit mode on PCG.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E208	Assign bus number on PCG.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E209	Assign PCI I/O addresses on PCI.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E20A	Assign PCI I/O addresses on PCG	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E20B	Check MCERs stuck at fault.	1. Replace the system planar. See the note on B-30 2. Replace the interposer card in the I/O expansion assembly 3. If the problem persists, go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2.*
E20C	Testing L2 cache.	Replace the processor card (See notes on B-2.) See the note on B-30.
E211	IPL ROS CRC checking.	Replace the I/O planar (See notes on B-2.) See the note on B-30.
E212	Processor POST.	Replace the processor card (See notes on B-2.) See the note on B-30.
E213	Initial memory configuration.	1. Replace the memory card (See notes on B-2) 2. Replace the system planar. See the note on B-30

Checkpoint	Description	Action/ Possible Failing FRU
E214	Memory test.	Replace the memory card (See notes on B-2.) See the note on B-30.
E216	Copy ROS into RAM. Setup Translation and C environment.	Replace the memory card (See notes on B-2.) See the note on B-30.
E218	Memory test	Replace the memory card (See notes on B-2.) See the note on B-30.
E220	Final memory configuration.	Go to "332 MHz SMP Node Minimum Configuration" or "POWER3 SMP Thin and Wide Node Minimum Configuration" MAP in *RS/6000 SP: Maintenance Information, Volume 2*.
E297	Start firmware softload path execution	See the note on B-30.
E298	Start firmware softload path execution	See the note on B-30.
E3xx	Memory test	See "Memory Test Hang Problem" on page 2-44.
E440	Validate NVRAM, initialize partitions as needed.	1. Verify that the system and service processor firmware levels are at the current release levels, update as necessary 2. Replace the memory card (See notes on B-2.) See the note on B-30
E441	Generate /options node NVRAM configuration variable properties.	1. Verify that the system and service processor firmware levels are at the current release levels, update as necessary 2. Replace the memory card (See notes on B-2. Also, see the note on B-30)
E442	Validate NVRAM partitions.	1. Verify that the system and service processor firmware levels are at the current release levels, update as necessary 2. Replace the memory card (See notes on B-2.) See the note on B-30
E443	Generate NVRAM configuration variable dictionary words	Suspect a system firmware problem if this problem persists. Verify that the system firmware is at the current release level, update as necessary. See the note on B-30.

Location Codes

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

Physical Location Codes

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

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

- The - (dash) separator character represents a normal structural relationship where the child is a separate physical package and it plugs into (or is connected to) the parent. For example, P1-C1 is a processor card (C1) plugged into a planar (P1), or P1-M1 is a memory card (M1) plugged into a planar (P1).

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

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

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

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

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

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

332 MHz SMP Thin and Wide Node AIX and Physical Location Code Reference Table

Note: Refer to "Location Diagrams of the RS/6000 SP Components" on page 1-3 for figures showing physical locations.

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Thin Node Chassis				
System planar	00-00	P1		
Processor Card 1	00-00	P1-C1	Processor Connectors J9 and J8	CPU ID 0x00 and 0x01 (if 2-way card)
Processor card 2	00-00	P1-C2	Processor Connector J6 and J5	CPU ID 0x04 and 0x05 (if 2-way card)
Memory Card 1	00-00	P1-M1	Processor Connector J12	
Memory Card 1 modules 1 thru 16	00-00	P1-M1.1 through P1-M1.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
Memory Card 2	00-00	P1-M2	Processor Connector J13	
Memory Card 2 modules 1 thru 16	00-00	P1-M2.1 through P1-M2.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
Power mix card				
Power mix card		X4	I/O planar connector P2 System planar connectors J1, J2, J3, J4	
Thin Node I/O Components				
I/O planar	00-00	P2		
Diskette Port	01-D1	P2/D1	I/O planar connector J1	0x03f0
Keyboard Port	01-K1-00	P2/K1	I/O planar connector J3	0x0060
Mouse Port	01-K1-01	P2/O1	I/O planar connector J3	0x0060
Serial Port 1	01-S1	P2/S1	No connector	0x0318

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Serial Port 2	01-S2	P2/S2	I/O planar connector J10	0x0218
Ethernet Port	10-80	P2/E1	I/O planar connector J13 (TP) or J14 (BNC/coax)	Host Bridge ID00, Device 06
SCSI Port 1	10-60	P2/Z1	Power interface card Connector J2	Host Bridge ID00, Device 04
Card in Slot I1 (TB3MX)	00-f1000000	P2-I1	I/O planar connector J9	
Adapter in PCI Slot I2	10-70	P2-I2	I/O planar connector J8	
Adapter in PCI Slot I3	10-68	P2-I3	I/O planar connector J7	
I/O Expansion Chassis I/O Components				
PCI expansion planar		P3		
PCI Riser Card [1]	20-78	P3.1 or P3-X1	PCI expansion planar Connector J9	
Adapter in PCI Slot I1	20-58 to 20-5F	P3-I1	PCI expansion planar Connector J1	Host Bridge ID01, Device 01
Adapter in PCI Slot I2	20-60 to 20-67	P3-I2	PCI expansion planar connector J2	Host Bridge ID01, Device 02
Adapter in PCI Slot I3	20-68 to 20-6F	P3-I3	PCI expansion planar connector J3	Host Bridge ID00, Device 03
Adapter in PCI Slot I4	20-70 to 20-77	P3-I4	PCI expansion planar connector J4	Host Bridge ID00, Device 04
Adapter in PCI Slot I5	2F-00 to 2F-07	P3.1-I5	PCI expansion planar connector J5	Host Bridge ID02, Device 01
Adapter in PCI Slot I6	2F-00 to 2F-07	P3.1-I6	PCI expansion planar connector J6	Host Bridge ID02, Device 02
Adapter in PCI Slot I7	2F-00 to 2F-07	P3.1-I7	PCI expansion planar connector J7	Host Bridge ID02, Device 03
Adapter in PCI Slot I8	2F-00 to 2F-07	P3.1-I8	PCI expansion planar connector J8	Host Bridge ID02, Device 04
SCSI Devices				
DASD in thin node chassis - Lower tray	10-60-00-0,0	P2-Z1-A0		Primary SCSI Bus ID 0[1]

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
DASD in thin node chassis - Upper tray	10-60-00-1,0	P2-Z1-A1		Primary SCSI Bus ID 1[1]
DASD in I/O expansion chassis - Lower tray	10-60-00-2,0	P2-Z1-A2		Primary SCSI Bus ID 2[1]
DASD in I/O expansion chassis - Upper tray	10-60-00-3,0	P2-Z1-A3		Primary SCSI Bus ID 3[1]
DASD in I/O expansion chassis when connected to PCI adapter in slot P3-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID.	P3-In-Z1-B2.G		SCSI Bus ID G[1]
Service Processor				
Service Processor (SP) card		P2-X1	I/O planar connector J5	
Node Supervisor				
Node Supervisor Card		L1-N1	Power mix card connector J1	
Power Supply				
CPU Power FRU		V1	Power mix card connector J5	
I/O Power FRU		V2	Power mix card connector J5	
Fans				
Fan 1 and Fan 2		F1 and F2	Fan connectors on CPU power FRU	
Fan 3 and Fan 4		F3 and F4	Fan connectors on I/O power FRU	
Notes:				
1. The SCSI bus ID's are the recommended values. Features installed at the manufacturing site will correspond to these IDs. Field installations may not comply with these recommendations.				

POWER3 SMP Thin and Wide Node AIX and Physical Location Code Reference Table

Note: Refer to "Location Diagrams of the RS/6000 SP Components" on page 1-3 for figures showing physical locations.

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Thin Node Chassis				
System planar	00-00	P1		

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Processor Card 0	00-00	P1-C1	Processor Connectors J5	
Processor card 2	00-02	P1-C2	Processor Connector J8	
Memory Card 1	00-00	P1-M1	Processor Connector J3	
Memory Card 1 modules 1 thru 16		P1-M1.1 through P1-M1.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	
Memory Card 2	00-00	P1-M2.1 through P1-M2.16	Processor Connector J2	
Memory Card 2 modules 1 thru 16		P1-M2.1 through P1-M2.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	
Power mix card				
Power mix card		X4	I/O planar connector P2 System planar connectors J1, J2, J3, J4	
Thin Node I/O Components				
I/O planar		P2		
Diskette Port	01-D1	P2/D1	I/O planar connector J1	
Keyboard/mouse Port	01-K1	P2/K1	I/O planar connector J3	
Serial Port 1	01-S1	P2/S1	I/O planar connector J13	
Serial Port 2	01-S2	P2/S2	I/O planar connector J12	
Ethernet Port	10-60	P2/E1	I/O planar connector J15 or J16	
SCSI Port	10-68	P2/Z1	I/O planar connector J13	
Card in Slot I1 (TB3MX2)	00-fb000000	P2-I1	I/O planar connector J9	
PCI Slot I1	10-78	P2-I3	I/O planar connector J7	

FRU Name	AIX Location Code	Physical Location Code	Physical Con-nection	Logical Identifica-tion
PCI Slot I2	10-80	P2-I2	I/O planar con-nector J8	
I/O Expansion Chassis I/O Components				
PCI expansion planar		P3		
PCI Slot I1	20-58 to 20-5F	P3-I1	PCI expansion planar Connector J1	
PCI Slot I2	20-60 to 20-67	P3-I2	PCI expansion planar connector J2	
PCI Slot I3	20-68 to 20-6F	P3-I3	PCI expansion planar connector J3	
PCI Slot I4	20-70 to 20-77	P3-I4	PCI expansion planar connector J4	
PCI Slot I5	30-58 to 30-5F	P3-I 5	PCI expansion planar connector J5	
Slot I6	30-60 to 30-67	P3-I6	PCI expansion planar connector J6	
PCI Slot I7	30-68 to 30-6F	P3-I7	PCI expansion planar connector J7	
PCI Slot I8	30-70 to 30-77	P3-I8	PCI expansion planar connector J8	
SCSI Devices				
DASD in thin node chassis - Lower tray	10-60-00-0,0	P2-Z1-A0		Primary SCSI Bus ID 0[1]
DASD in thin node chassis - Upper tray	10-60-00-1,0	P2-Z1-A1		Primary SCSI Bus ID 1[1]
DASD in I/O expansion chassis - Lower tray	10-60-00-2,0	P2-Z1-A2		Primary SCSI Bus ID 2[1]
DASD in I/O expansion chassis - Upper tray	10-60-00-3,0	P2-Z1-A3		Primary SCSI Bus ID 3[1]

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
DASD in I/O expansion chassis when connected to PCI adapter in slot P3-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID.	P3-In-Z1-B2.G		SCSI Bus ID G[1]
Node Supervisor				
Node Supervisor Card		L1-N1	Power mix card connector J1	
Power Supply				
CPU Power FRU		V1	Power mix card connector J5	
I/O Power FRU		V2	Power mix card connector J5	
Fans				
Fan 1 and Fan 2		F1 and F2	Fan connectors on CPU power FRU	
Fan 3 and Fan 4		F3 and F4	Fan connectors on I/O power FRU	
Voltage Levels				
+5 V		I/O planar P2		
+3.3 V		I/O planar P2		
+5 V SB		I/O planar P2		
+12 V		I/O planar P2		
+5 V		I/O expansion planar P3		
+3.3 V		I/O expansion planar P3		
+12 V		I/O expansion planar P3		
-12 V		I/O expansion planar P3		
Inlet Temp		P2		
Notes:				

1. The SCSI bus ID's are the recommended values. Features installed at the manufacturing site will correspond to these IDs. Field installations may not comply with these recommendations.

AIX Location Codes

The basic formats of the AIX location codes are:

- For non-SCSI devices/drives

     AB-CD-EF-GH

- For SCSI devices/drives

     AB-CD-EF-G,H

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

```
AB-CD-EF-GH
 ³  ³  ³  ³
 ³  ³  ³  Device/FRU/Port ID
 ³  ³  Connector ID
 ³  devfunc Number, Adapter Number or Physical Location
Bus Type or PCI Parent Bus
```

- The AB value identifies a bus type or PCI parent bus as assigned by the firmware

- The CD value identifies adapter number, adapter's devfunc number, or physical location. The devfunc number is defined as the PCI device number times 8, plus the function number

- The EF value identifies a connector

- The GH value identifies a port, address, device, or FRU

Adapters and cards are identified with just AB-CD

The possible values for AB are:

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

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

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

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

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

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

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

- For async devices GH defines the port on the fanout box. The values are 00 to 15

- For a diskette drive H defines which diskette drive 1 or 2. G is always 0

- For all other devices GH is equal to 00

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

For SCSI the location code is defined as:

```
AB-CD-EF-G,H
 ³  ³  ³ ³ ³
 ³  ³  ³ ³ ³ Logical Unit address of the SCSI Device
 ³  ³  ³ Control Unit Address of the SCSI Device
 ³  ³  Connector ID
 ³  devfunc Number, Adapter Number or Physical Location
 Bus Type or PCI Parent Bus
```

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

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

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

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

Examples of physical location codes displayed by AIX are:

Processor card in slot 1 of planar 1

P1-C1

Memory module in system planar slot 2

P1-M2

Memory module 12 in card in slot 2 of system planar

U1-P1-M2.12

Examples of AIX location codes displayed are:

Integrated PCI adapter

10-80	Ethernet
10-60	Integrated SCSI Port 1

Pluggable PCI adapters

00-f100000	SP Switch MX adapter, thin node chassis slot I1
10-70 to 10-77	Any PCI adapter in thin node chassis slot I2
10-68 to 10-6F	Any PCI adapter in thin node chassis slot I3
20-78	PCI riser card
20-58 to 20-5F	Any PCI adapter in I/O expansion chassis slot I1
20-60 to 20-67	Any PCI adapter in I/O expansion chassis slot I2
20-68 to 20-6F	Any PCI adapter in I/O expansion chassis slot I3
20-70 to 20-77	Any PCI adapter in I/O expansion chassis slot I4
2F-00 to 2F-07	(332 MHz SMP node) Any PCI adapter in I/O expansion chassis slot I5
2F-08 to 2F-0F	(332 MHz SMP node) Any PCI adapter in I/O expansion chassis slot I6
2F-10 to 2F-17	(332 MHz SMP node) Any PCI adapter in I/O expansion chassis slot I7
2F-18 to 2F-1F	(332 MHz SMP node) Any PCI adapter in I/O expansion chassis slot I8
30-00 to 30-07	(POWER3 SMP thin and wide node) Any PCI adapter in I/O expansion chassis slot I5
30-08 to 30-0F	(POWER3 SMP thin and wide node) Any PCI adapter in I/O expansion chassis slot I6
30-10 to 30-17	(POWER3 SMP thin and wide node) Any PCI adapter in I/O expansion chassis slot I7
30-18 to 30-1F	(POWER3 SMP thin and wide node) Any PCI adapter in I/O expansion chassis slot I8

Integrated ISA adapters

01-D1	Diskette adapter
01-S1	Serial port 1 adapter
01-S2	Serial port 2 adapter

Non-integrated ISA adapters

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

Device attached to SCSI controller

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

Power/Keylock Status Register (PKSR)

When a failure occurs on a fan or on a power supply, the system produces a logging report for this event. The logging report can be viewed using **errpt**.

An errpt report about power and fan is the following:

```
LABEL:                EPOW_SUS
Description:          LOSS OF ELECTRICAL POWER
Probable Causes:      POWER SUBSYSTEM
                      INTERNAL POWER UNIT
Failure Causes:      POWER SUBSYSTEM
RECOMMENDED ACTIONS:  CHECK POWER
POWER STATUS REGISTER:  9005 0007
```

The Power/Keylock Status Register has the following format:
PKSR Layout

Understanding PKSR

The PKSR status is logged in hexadecimal value: 8 digits are logged. Each hexadecimal digit must be converted in 4 binary digits: 32 bits are obtained. Divide the bits as indicated in the PKSR layout and check the bit values to understand the meaning of the register.

Example: Suppose you receive an error message whose PKSR content in hex is:

```
9005 007
```

converted to binary:

```
1001 000 0 0 0 0001 0 1 00000000 0000 0111
0   3 4 6 7 8 9 10 13    16     23 24   28 31 = Bit Numbering
```

This means that the following events occurred:

- fan 1 fault

- a warning cooling message is displayed on the console

- the cooling system is operating in backup mode

- the key is in normal position

PKSR Values

Power Interrupt and Fan Fault

Bits 0-3 Values	Description
0000	No Interrupt
0001	Running on battery
0010	Programmed Power Off
0011	Manual switch off
0100	Remote power off
0101	Over temperature level 1
0110	Internal power supply failure
0111	Power supply overload
1000	Loss of Primary power (EPOW)
1001	Fan 1 fault
1010	Fan 2 fault
1011	Fan 3 fault
1100	Fan 4 fault
1100	Fan 5 fault
1100	Fan 6 fault
1111	Reserved

Power Up

Bits 4-6 Values	Description
000	Manual On button pushed
001	Remote On signal from external
010	Timed power on from TOD clock
011	Remote on signal from power control interface
100	Automatic restart

Power Up

Bit 7 Values	Description
0	No thermal warning
1	Thermal warning

Battery Status

Bit 8 Values	Description
0	Backup battery not installed
1	Backup battery installed

Battery Status

Bit 9 Values	Description
0	Backup battery OK (if installed)
1	Backup battery discharged or failing

Power Interrupt (Action for rc.powerfail)

Bits 10-13 Values	Description
0000	No action
0001	WARN_COOLING no reaction
0010	WARN_POWER error logging
0011	Severe cooling problem, SLOW_SHUTDOWN 10 minutes to shutdown
0100	Very severe cooling problem, FAST_SHUTDOWN 20 sec to shutdown
0101	IMMED_SHUTDOWN immediate power down

Power System Operating in Backup Mode

Bit 14 Values	Description
0	No power warning
1	Power system operating in backup mode warning

Cooling System Operating in Backup Mode

Bit 15 Values	Description
0	No cooling warning
1	Cooling system operating in backup mode warning

Power Fault and Fan Fault (R30, R40, and R50)

Bits 16-23 Values	Description
00000000	No Interrupt
00000001	Over temperature level 1 on power supply #1
00000010	Over temperature level 2 on power supply #1
00000011	Internal power supply failure on power supply #1
00000100	Power supply #1 overload
00000101	Loss of primary power on power supply #1
00000110	Over temperature level 1 on power supply #2
00000111	Over temperature level 2 on power supply #2
00001000	Internal power supply failure on power supply #2
00001001	Power supply #2 overload
00001010	Loss of primary power on power supply #2
00010000	Fan 1 fault
00100000	Fan 2 fault
00110000	Fan 3 fault
01000000	Fan 4 fault
01010000	Fan 5 fault
01100000	Fan 6 fault
01110000	Fan 7 fault
10000000	Fan 8 fault
10010000	Fan 9 fault
10100000	Fan 10 fault

Keylock Position

Bits 28-31 Values	Description
0101	Secure
0110	Service
0111	Normal

Index

Numerics

S

Communicating Your Comments to IBM

RS/6000 SP
Maintenance Information Volume 3,
Locations and Service Procedures

Publication No. GA22-7377-01

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Maintenance Information Volume 3,
Locations and Service Procedures

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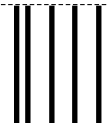
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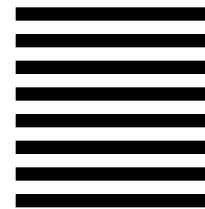
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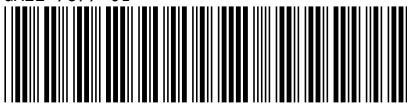
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