

RS/6000 SP



Uniprocessor Thin and Wide Node Service Guide

RS/6000 SP



Uniprocessor Thin and Wide Node Service Guide

Note!

Before using this information and the product it supports, read the safety information in the "Safety and environmental notices" on page xi and the information in "Notices" on page X-1.

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Safety and environmental notices

Safety notices (in English)

For general information concerning safety, refer to *Electrical Safety for IBM Customer Engineers* (S229-8124). For a copy of this publication, contact your IBM marketing representative or the IBM branch office serving your locality.

The following is a list of all safety notices (in English only) pertaining to SP hardware maintenance tasks from this and other RS/6000 SP node service guides. Translations of each of the safety notices into other languages are included in *RS/6000 SP: Installation and Relocation*

DANGER

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

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.

DANGER

In the U.S., Canada, and Japan, this product has a 4-wire power cable with a 4-prong plug. Use this power cable with a correctly grounded power receptacle to prevent possible electric shock.

DANGER

Before you connect the power cable of this product to ac power, verify that the power receptacle is correctly grounded and has the correct voltage.

DANGER

During an electrical storm, do not connect or disconnect any cable that has a conductive outer surface or a conductive connector.

DANGER

Switch off power and unplug the machine power cable from the power receptacle, before removing or installing any part that is connected to primary power.

DANGER

To prevent possible electrical shock during machine installation, relocation, or reconfiguration, connect the primary power cable only after connecting all electrical signal cables.

DANGER

High voltage present. Perform "Lockout safety procedures" to remove primary power to the frame.

DANGER

High voltage present. Perform "Lockout safety procedures" to remove primary power to the frame (and high-voltage transformer if present).

DANGER

High voltage present at test points. Use high voltage test probes.

DANGER

High energy present. Do not short 48V to frame or 48VRtn. Shorting will result in system outage and possible physical injury.

DANGER

If a unique power module fails, all LEDs will be off. The high voltage LED will be off even though the high voltage is still present.

DANGER

The remaining steps of the procedure contain measurements that are taken with power on. Remember that hazardous voltages are present.

DANGER

The frame main circuit breaker and the controller must not be switched on again now.

Before disconnecting the power cables from the power receptacles, ensure that the customer's branch distribution circuit breakers (customer power source circuit breakers) are Off and tagged with DO NOT OPERATE tags, S229-0237. Refer to "Lockout safety procedures", before proceeding.

DANGER

Before connecting AC power cords to electrical outlets, ensure that:

- The customer's branch distribution circuit breakers (customer power source circuit breakers) are off and tagged with DO NOT OPERATE tags, S229-0237 (or national language equivalent).
- The activities in "Performing the Customer 50/60 Hz Power Receptacle Safety Check" have been performed on all customer power source outlets and cable connectors.

DANGER

Ensure that the customer's branch distribution circuit breakers (customer power source circuit breakers) to the AC power outlets are off and tagged with DO NOT OPERATE tags, S229-0237 (or national language equivalent).

DANGER

Both the SEPBU power chassis and the PDU 48V power chassis are field replaceable units (FRUs) which contain NO serviceable parts; they are labeled as such. Do not attempt to isolate or repair these components, since doing so may result in severe injury or even death.

CAUTION:

The weight of the PDU assembly, 48 V dc power chassis, and the SEPBU power chassis is greater than 18 Kg (40 lbs). Be careful when removing or installing. Remove all 48 V dc power supplies from the power chassis before removing or installing the power chassis.

CAUTION:

The unit weight exceeds 18 Kg (40 lbs) and requires two service personnel to lift.

CAUTION:

The covers are to be closed at all times except for service by trained service personnel.

CAUTION:

When the unit is being serviced, the covers should not be left off or opened while the machine is running unattended.

CAUTION:

Due to weight of each thin node (under 18 Kg [40 lbs]), use care when removing and replacing thin nodes above shoulder height.

CAUTION:

The wide node weight may exceed 32 Kg (70.5 lbs).

CAUTION:

Do not open more than one wide node or switch assembly drawer at a time.

CAUTION:

Make sure the stability foot and wheel chocks are installed on the frame. These are required to maintain frame balance and position during service operations.

CAUTION:

Outer edges of chassis may be sharp. Care must be taken when removing and installing chassis.

CAUTION:

The ground strip may have sharp edges.

CAUTION:

Do not remove wide nodes or switch assemblies from the mounting slides. Caution must be observed when working with mounting slides to prevent pinched fingers or accidental release of the unit.

CAUTION:

Do not remove the drawer case mounting screws at the bottom of both sides.

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.

CAUTION:

Due to the weight of each wide node, use care when sliding and closing wide processor nodes above shoulder height.

CAUTION:

- When moving frames into position, team members should work together. Using one person on each corner of the frame can prevent strain.
- In raised floor installations, mechanically safe moldings should be installed around floor cutouts. Extreme caution should be used when moving frames during installation or removal because of the proximity of floor cutouts to casters.

CAUTION:

A Johnson bar (J-bar) or similar device must not be used at any time to lift or move frames.

CAUTION:

When using 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:

Portable ladders present a serious safety hazard if not used properly. Follow these general guidelines:

- Make sure the ladder is firm and steady, and has no defective rungs or braces.
- Work only on a level surface.
- Never use a metal ladder near electrical power lines.
- Never overreach. Instead, move the ladder.

Be as careful on a short ladder as on a 30-foot extension ladder. False security can lead to carelessness and falls which can cause painful injuries.

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.

About this book

This book is to help you, as a customer engineer diagnose and repair an RS/6000 SP Uniprocessor Thin or Wide Node by performing the following tasks:

- Identify field replaceable unit (FRU) locations
- Isolate RS/6000 SP failures using Maintenance Analysis Procedures (MAPs)
- Perform diagnostic service procedures
- Perform removal and replacement procedures
- Identify FRUs and their corresponding part numbers

RS/6000 SP hardware service library

Beginning with this release, *Maintenance Information Volumes 1-4* (GA22-7375, GA22-7376, GA22-7377, and GA22-7378) have been restructured into the following publications:

- *IBM RS/6000 SP: Installation and Relocation*, GA22-7441. Installation and relocation procedures, maintenance agreement and qualification procedures, frame and component identification information.
- *IBM RS/6000 SP: System Service Guide*, GA22-7442. General SP system service procedures, the system Start MAP, and MAPs and parts catalog for the frames and power subsystems. Use this book to begin a diagnostic procedure to isolate a problem to a specific major component of the SP system.
- *IBM RS/6000 SP: SP Switch Service Guide*, GA22-7443. Service procedures, MAPs, and parts catalog information specific to the SP Switch.
- *IBM RS/6000 SP: Uniprocessor Node Service Guide*, GA22-7445. Service procedures, MAPs, and parts catalog information specific to all uniprocessor-type nodes (this book).
- *IBM RS/6000: 604 and 604e SMP High Node Service Guide*, GA22-7446. Service procedures, MAPs, and parts catalog information specific to these nodes.
- *IBM RS/6000 SP: SMP Thin and Wide Node Service Guide*, GA22-7447. Service procedures, MAPs, and parts catalog information specific to these nodes.
- *IBM RS/6000 SP: POWER3 SMP High Node Service Guide*, GA22-7448. Service procedures, MAPs, and parts catalog information specific to this node.

As an alternative to ordering the individual books, you can use GBOF-5437 to order the complete RS6000 SP hardware service library.

For a complete list of other SP system publications and related information, see the bibliography section of *RS/6000 SP: Installation and Relocation*, GA22-7441.

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.

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.

How to use this book

This book is intended for product trained customer engineers only.

When performing RS/6000 SP maintenance, the CE must follow **all** "Maintenance Analysis Procedures" beginning with the Start MAPs in the *RS/6000 SP: System Service Guide*.

Beginning with the Start MAPs, 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)
- MCA 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 on-line and in printed form from the following sources:

- The RS/6000 website at <http://www.rs6000.ibm.com>
- The Resource Center on the PSSP product media
- The Service Information Library (SIL)
- Printed and CDROM versions (which can be ordered from IBM)
- IBM internal use versions available on MKTTOOLS

For more information on these sources and an extensive listing of RS/6000 SP Related publications, see the bibliography section of *RS/6000 SP: Installation and Relocation*, GA22-7441.

Chapter 1. Maintenance analysis procedures (MAPs)

This chapter provides information for identifying problems and guides you to the most likely failed Field Replaceable Unit (FRU). The MAPs then refer you to the FRU Removal/Replacement procedures for the corrective action.

Note: Refer to “Service position procedures” on page 3-14 for information about placing processor node in (or removing it from) the service position.

Lockout safety procedures

The following lockout safety procedures are used to electrically isolate the frame and ensure the safety of all service personnel while servicing this machine:

- For SEPBU equipped frames, refer to “SEPBU lockout procedures.”
- For PDU equipped frames, refer to “PDU lockout/tagout procedure” on page 1-2.

SEPBU lockout procedures

Initial SEPBU lockout procedure: This procedure ensures that no power is present in the machine, and that primary power can not be accidentally applied. This procedure is referenced as required by the maintenance procedures.

Note: Be sure that the ac line cord is disconnected from the customer's main power outlet before attaching the cord to the SEPBU.

1. Make sure the **frame's** main power switch is in the Off ('0').
2. The following phase-to-phase ac voltage measurements are to be taken at the ac filter (located inside the rear cover at the bottom of the frame):
 - Between test points Z1 and Z2.
 - Between test points Z1 and Z3.
 - Between test points Z2 and Z3.

Note: The purpose of these measurements is to guarantee that primary power is initially present at the test points. If the voltages measurements indicate that primary power is not present, have customer switch on power for this frame, then go back to Step 2 of the “Initial SEPBU lockout procedure.”

3. Switch off frame circuit breaker (located inside rear cover near bottom) to disengage ac power inside frame.
4. Depending on your customer's safety requirements, you **must** perform either the “SEPBU lockout/tagout procedure” or the “SEPBU lockout/bagout procedure” on page 1-2 to completely isolate the frame from the electrical supply.

SEPBU lockout/tagout procedure: After completing the initial lockout procedure:

1. Have the customer switch off primary power to this frame from an **external** circuit breaker.
2. Verify that there is no power present by repeating the measurements made in Step 2 of the “Initial SEPBU lockout procedure.”
 - If power is still present, inform customer of this fact and return to Step 4 of the “Initial SEPBU lockout procedure.”

3. When the proper circuit breaker has been located, install a lock on the circuit breaker to lockout the circuit breaker.
 - If a lock **is not** available, attach a DO NOT OPERATE tag (S229-0237) directly to the circuit breaker.
4. You may now perform maintenance on primary power components per the instructions.

SEPBU lockout/bagout procedure: After completing the initial lockout procedure:

1. Locate the power plug for this frame and remove the plug from the receptacle.
2. Verify that there is no power present by repeating the measurements made in Step 2 of the “Initial SEPBU lockout procedure” on page 1-1. If power **is** still present:
 - a. Check with customer or other maintenance personnel **before reconnecting** the power plug you just removed.
 - b. Return to Step 1 of “SEPBU lockout/bagout procedure” and locate the correct plug.
3. When the correct plug has been removed from the receptacle, install a safety lockout bag (part number 74F9606) over the plug and lock the bag closed.
4. You may now perform maintenance on primary power components per the instructions.

PDU lockout/tagout procedure

This procedure ensures that no power is present in the machine, and that primary power can not be accidentally applied. This procedure is referenced as required by the MAPs.

1. Use a multimeter with the pair of high-voltage probes (part number 93F2731). Set the multimeter to the highest ac voltage setting.
2. The following measurements are to be taken at the ac filter (located inside the rear cover at the bottom of the frame). Measure phase-to-phase ac voltage between test points O1 and O2. Repeat measurement for test points O1 and O3. Repeat measurement between test points O2 and O3.
3. The purpose here is to guarantee that initially primary power is present at the test points. If the voltages measured in Step 2 indicate that primary power is not present, have customer switch on power for this frame, then go back to Step 2.
4. Switch off frame circuit breaker (located inside rear cover near bottom) to disengage ac power inside frame.
5. Now have customer switch off primary power to this frame from an external circuit breaker.
6. Verify that there is no power present by repeating the measurements made in Step 2. If power is still present, inform customer of this fact and return to Step 4.
7. Now that the proper circuit breaker has been located, install a lock on this circuit breaker to lockout the circuit breaker, OR if a lock is not available, attach a DO NOT OPERATE tag (S229-0237) directly to the circuit breaker.
8. You may now perform maintenance on primary power components per the instructions.

PDU lockout/bagout procedure

This may be used as an alternative to the Lockout/Tagout Procedure to ensure that no power is present in the machine, and that primary power can not be accidentally applied. This procedure is also referenced as required by the MAPs.

1. Use a multimeter with the pair of high-voltage probes (part number 93F2731). Set the multimeter to the highest ac voltage setting.

2. The following measurements are to be taken at the ac filter (located inside the rear cover at the bottom of the frame). Measure phase-to-phase ac voltage between test points O1 and O2. Repeat measurement for test points O1 and O3. Repeat measurement between test points O2 and O3.
3. The purpose here is to guarantee that initially primary power is present at the test points. If the voltages measured in Step 2 indicate that primary power is not present, have customer switch on power for this frame, then go back to Step 2.
4. Switch off frame circuit breaker (located inside rear cover near bottom) to disengage ac power inside frame.
5. Now locate plug for this frame, and remove plug from receptacle.
6. Verify that there is no power present by repeating the measurements made in Step 2. If power is still present, check with customer or other maintenance personnel before reconnecting plug from Step 5. Return to Step 5 to locate the correct plug.
7. Now that the correct plug has been removed from the receptacle, install a safety lockout bag (part number 74F9606) over the plug and lock the bag closed.
8. You may now perform maintenance on primary power components per the instructions.

Uniprocessor thin node MAPs

Thin Node/Thin Node 2 environment (MAP 0160)	1-3
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Thin Node/Thin Node 2 environment (MAP 0160)

Note: Refer to “Service position procedures” on page 3-14 for information about placing processor node in (or removing it from) the service position.

Step 0160–001: System monitor reports “Warning”, “Shutdown”, or “Failure” message associated with processor node.

1. Does message indicate “Shutdown” or “Failure”?
 - If yes, go to “Step 0160–003” on page 1-4.
 - If no, go to “Step 0160–002.”

Step 0160–002: You received a warning message.

1. Check for warning messages displayed in the node environment display frame.
2. Does this same message occur on more than one processor node?
 - If yes, notify the next level of support.
 - If no, you may either:
 - Perform preventative maintenance now by returning to “Step 0160–001,”
 - Or Defer maintenance until a later date.

Thin Node/Thin Node 2 environment (MAP 0160)

Step 0160–003: You detect a serious environmental condition in the processor node.

Note: If you just completed a service action on this processor node, check the node for loose cables or shorts.

1. Check the node environment, node detail, and node diagnostic display frames.
2. Based on the text of the message, use the following table to continue service:

Table 1-1. Uniprocessor thin node environmental conditions	
Condition	Action
"...P48 OK..."	Go to "Thin Processor Node power (MAP 0180)" on page 1-21.
"...shutdownP4..." "...shutdownP5..." "...shutdownP12..." "...shutdownN12..."	Go to "Step 0160–004."
"...fanfail..."	Go to "Step 0160–009" on page 1-6.
"...shutdownTemp..."	Go to "Step 0160–011" on page 1-6.
"...memoryProtect..."	Go to "Step 0160–016" on page 1-8.

Step 0160–004: One or more of the following conditions exist:

- Voltage out of range: +4 V "shutdownP4"
 - Voltage out of range: +5 V "shutdownP5"
 - Voltage out of range: +12 V "shutdownP12"
 - Voltage out of range: –12 V "shutdownN12"
 - CPU card power problem: +4 V
 - Planar power problem: +5 V, +12 V, or –12 V
1. Place processor node in service position.
 2. Check planar power cable connections at node supervisor card N00-NS-J102 and I/O planar N00-PL-J2. Check the condition of the planar power cables.
 3. If this is a problem involving a +4 V supply, check the following components:
 - a. Cable connections at node supervisor card N00-NS-J204 and CPU card N00-PR-P3
 - b. Condition of the +4 V supply cables
 - c. Daughter card connections from N00-NS-J103 to N00-DP-J203
 4. Do all connections and power cables appear to be okay?
 - If yes, go to "Step 0160–005."
 - If no, take the following actions:
 - Fix or replace the cables if necessary.
 - Go to "Step 0160–010" on page 1-6.

Step 0160–005: Power cables appear to be OK.

1. Is this a +5 V, +12 V, –12 V, or planar power problem?
 - If yes, go to "Step 0160–006" on page 1-5.
 - If no, go to "Step 0160–019" on page 1-9.

Step 0160–006: You have a +5 V, +12 V, –12 V, or planar power problem.

1. Inside the processor node, disconnect planar power cable N00-NS-P102 from node supervisor card .
2. Using a digital multimeter, measure resistance between the appropriate pins on cable N00-NS-P102.
3. Compare the measured values to the values listed in Table 1-2 on page 1-5.
4. Do not reconnect the planar power cable at this time.

Note: When measuring resistance, be sure you are testing the correct leads.

Table 1-2. Uniprocessor Thin Node power diagram

Voltage	Measure From (positive lead)	To GND (negative lead)	Acceptable Range
+5 V	Pin 1 (red) (see note)	Pin 2 (black)	5 - 35 Ohms
+12 V	Pin 3 (yellow) (see note)	Pin 2 (black)	500 - 9000 Ohms
–12 V	Pin 9 (purple) (see note)	Pin 2 (black)	500 - 1200 Ohms
Note: Pins 1, 3, and 9 are black in the 120 and 160 MHz thin processor node.			

5. Is the measured resistance in acceptable range?

- If yes, go to “Step 0160–008.”
- If no, go to “Step 0160–007.”

Step 0160–007:

1. Remove cable at I/O planar N00-PL-J2, then check resistance on connector N00-PL-J2 using the same pins.
2. Is resistance the same as in “Step 0160–006”?
 - If yes, the problem is in the RS/6000 power distribution.
 - a. Reconnect planar cable at N00-NS-P102 only.
 - b. Go to “Thin Processor Node dc short/open (MAP 0210)” on page 1-33.
 - If no, perform the following steps:
 - a. Replace planar power cable N00-NS-P102.
 - b. Go to “Step 0160–010” on page 1-6.

Step 0160–008: Problem in node supervisor card.

1. Replace node supervisor card.
2. Is there a +4 V dc problem?
 - If yes, go to “Step 0160–019” on page 1-9.
 - If no, go to “Step 0160–009” on page 1-6.

Step 0160–009:

1. One or more of the following conditions exist:
 - Warning Fan: “fanwarning1”, “fanwarning2”, “fanwarning3”
 - Shutdown Fan: “fanfail1”, “fanfail2”, “fanfail3”
2. Place processor node in service position (see “Service position procedures” on page 3-14 for placing processor nodes in or removing from service position).
3. Use the following table to reseal or replace components:

Table 1-3. Uniprocessor Thin Node service actions		
Priority	Component	Action
1	Fan 1, 2, or 3	<ol style="list-style-type: none">1. Check specified fan for blockage or loose cable connection.2. Fix any obvious problem(s). If none are found, continue at Priority 2.3. Continue at “Step 0160–010.”
2	Fan 1, 2, or 3	<ol style="list-style-type: none">1. Replace fan as described in Chapter 4, “FRU removals and replacements” on page 4-1.2. Continue at “Step 0160–010.”
3	Node supervisor card	<ol style="list-style-type: none">1. Replace card.2. Continue at “Step 0160–010.”
4	Node supervisor control cable	<ol style="list-style-type: none">1. Replace cable. Refer to Figure 1-1 on page 1-7, for cable connections.2. Continue at “Step 0160–010.”
5	All replaced	Call next level of support.

Step 0160–010: You replaced or reseated the component.

1. Perform the following:
 - a. Make sure that all cables and components are connected inside the processor node.
 - b. Remove processor node from service position.
 - c. Reconnect all cables at rear of the processor node.
 - d. Put circuit breaker at the front of processor node in the On (‘1’) position.
 - e. Check to see if the Environmental (yellow) LED is ON or FLASHING.
2. Is the Environmental (yellow) LED ON or FLASHING?
 - If the yellow LED is on or flashing, take the following steps:
 - a. Put circuit breaker at the front of the processor node in the Off (‘0’) position.
 - b. Go to “Step 0160–009” to service the next highest priority component.
 - If the yellow LED is not on or flashing, the problem has been resolved.
 - Go to “End of call MAP (MAP 0650)” in *RS/6000 SP: System Service Guide*.

Step 0160–011

Thin Node Supervisor Control Cable

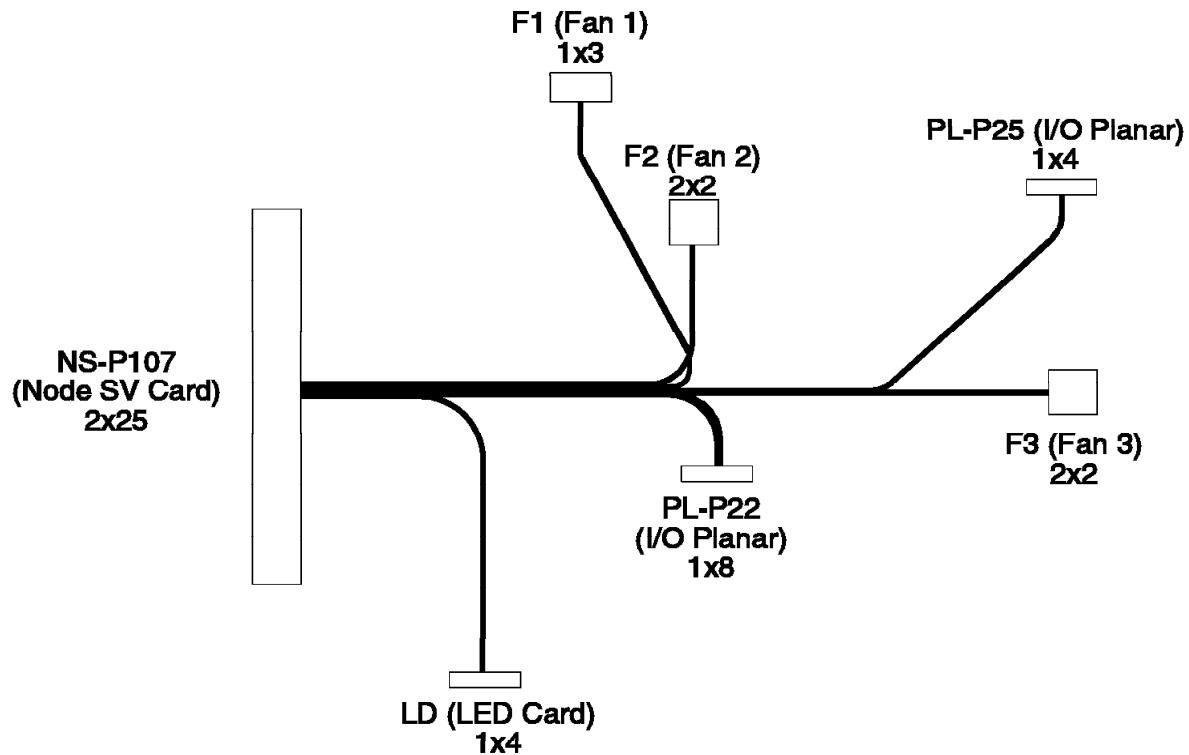


Figure 1-1. Thin Node supervisor control cable

1. Over temperature condition: "shutdownTemp"
 - Temperature is out of specified range; however, you do not find serious electrical current or fan speed problems.
2. Check for airflow blockage at air intakes and exhaust of the processor node and system frame.
3. Check air temperature around the frame, looking for sources of abnormally high temperatures (above 40°C or 104°F).
4. Is there an obvious airflow blockage or abnormally high temperature source near air intakes?
 - If yes, go to "Step 0160–015" on page 1-8.
 - If no, go to "Step 0160–012."

Step 0160–012:

1. Problem in node supervisor card.
 - a. Place processor node in service position.
 - b. Replace node supervisor card.
 - c. Perform "Node supervisor self-test" on page 3-10.
2. Does card pass self-test?
 - If yes, go to "Step 0160–013" on page 1-8.
 - If no, go to "Step 0160–014" on page 1-8.

Thin Node/Thin Node 2 environment (MAP 0160)

Step 0160–013: Node supervisor card is okay.

1. Put circuit breaker at the front of the processor node in the On ('1') position.
2. Check to see if the Environmental (yellow) LED is ON or FLASHING.
3. Is Environmental (yellow) LED ON or FLASHING?
 - If yes, go to "Step 0160–014" on page 1-8.
 - If no, problem resolved.
 - a. Remove processor node from service position.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0160–014: Environmental (yellow) LED ON or FLASHING.

1. Check cable connections to node supervisor card.
2. Are there any obvious problems such as a loose or broken cable?
 - If yes:
 - a. Fix obvious problems.
 - b. Go to "Step 0160–013."
 - If no, call next level of support.

Step 0160–015: You find an airflow blockage or abnormally high temperature source near air intakes.

1. Perform the following steps:
 - a. Place processor node in service position.
 - b. Power off the processor node.
 - c. Remove blockage or high temperature source.
 - d. Reconnect all cables at rear of the processor node.
 - e. With Environmental (yellow) LED Off, power on the processor node.
2. Does the processor node IPL?
 - If yes, Problem resolved.
 - a. Remove processor node from service position.
 - b. Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.
 - If no, processor has problem with IPL.
 - a. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0160–016: Memory protection error: "memoryProtect."

1. This fault is normally generated when invalid memory cards are installed in the processor node.
2. Have memory parts been changed recently (since last successful IPL) in this processor node?
 - If yes, go to "Step 0160–018" on page 1-9.
 - If no, go to "Step 0160–017" on page 1-9

Step 0160–017: The memory protection error "memoryProtect" appears. You have not changed memory parts recently.

1. Problem may be one of the following:

- Base memory card
- CPU card
- I/O planar
- Node supervisor control cable

2. Replace parts one at a time, until problem is corrected.

3. Are you able to correct the problem?

- If yes, problem resolved.
 - Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.
- If no, call next level of support.

Step 0160–018: You see the memory protection error: "memoryProtect." You have changed memory parts recently.

1. Check memory card and SIMM part numbers in *Diagnostic Information for Micro Channel Bus Systems* (SA38-0532) and *Adapters, Devices and Cable Information* (SA38-0533) to ensure that they are compatible with the fastest Type 7012 machines.
2. If necessary, call next level of support.

Step 0160–019: Problem with +4 V dc for CPU card power.

1. Disconnect CPU power cable N00-DP-J204 at +4 V daughter power card.
2. Using a digital multimeter, measure resistance between pin 1 and pin 5 on cable N00-DP-P204.

Table 1-4. Uniprocessor Thin Node + 4 V power diagram

Voltage	Measure from (positive lead)	To GND (negative lead)	Acceptable Range
+4 V	Pin 1 (red)	Pin 5 (black)	4.0 - 100 Ohms

3. Is the measured resistance in acceptable range?

- If yes, go to "Step 0160–025" on page 1-11.
- If no, go to "Step 0160–020."

Step 0160–020: The measured resistance is outside of acceptable range.

1. Remove CPU card from processor node.
2. Repeat measurement from "Step 0160–019."
3. Is the measured resistance in acceptable range?
 - If yes, go to "Step 0160–023" on page 1-10.
 - If no, go to "Step 0160–021" on page 1-10.

Thin Node/Thin Node 2 environment (MAP 0160)

Step 0160–021: The measured resistance between pin 1 and pin 5 on cable NOO-DP-P204 is outside acceptable range.

1. Disconnect CPU power cable at CPU card N00-PR-P3.
2. Measure resistance between pin 1 and pin 5 on CPU card N00-PR-P3.
3. Is the resistance the same as in “Step 0160–020”?
 - If yes, go to “Step 0160–022.”
 - If no:
 - a. Replace CPU power cable NOO-PR-P3.
 - b. Go to “Step 0160–027” on page 1-11.

Step 0160–022: Problem on CPU card.

1. If the resistance is above the acceptable range, check for component damage due to a short.
2. Check for any obvious problems on CPU card (such as missing or loose components, damaged components).
3. Is there an obvious problem on the CPU card?
 - If yes:
 - Fix obvious problem.
 - Replace parts suspected of causing problem, if required.
 - Go to “Step 0160–020” on page 1-9.
 - If no:
 - Replace base CPU card.
 - Transfer all cache and memory SIMMs from the original CPU card to the new one.
 - Go to “Step 0160–020” on page 1-9.

Step 0160–023: Problem may be related to I/O planar and/or memory card.

1. Check for any obvious problems on CPU card connector to I/O planar (such as loose connections, poor contacts).
2. Are there any obvious problems?
 - If yes:
 - a. Fix obvious problem and replace any damaged parts.
 - b. Go to “Step 0160–027” on page 1-11.
 - If no, go to “Step 0160–024.”

Step 0160–024: There are no obvious problems.

1. Remove memory card from processor node.
2. Reinstall CPU card.
3. Repeat measurement from “Step 0160–019” on page 1-9.
4. Is the measured resistance in acceptable range?
 - If yes:

- a. Check memory SIMMs for obvious problems.
 - Replace any suspect memory SIMMs.
 - b. Replace base memory card.
 - Transfer good memory SIMMs from the original card to the new one.
 - c. Go to “Step 0160–027.”
- If no, the problem is either CPU card or I/O planar. Take the following steps:
 - a. Replace CPU card.
 - b. Repeat measurement from “Step 0160–019” on page 1-9.
 - c. If resistance is still out of range:
 - replace the I/O planar.
 - Go to “Step 0160–027.”

Step 0160–025: You may have a problem with node supervisor or +4 V daughter card.

1. Check for an obvious problem with jumper card between +4 V daughter card N00-DP-J203 and node supervisor card N00-NS-J103 (such as a loose connection).
2. Is there an obvious problem?
 - If yes:
 - a. Fix obvious problem and if necessary, replace damaged components.
 - b. Go to “Step 0160–027.”
 - If no, go to “Step 0160–026.”

Step 0160–026: You did not find an obvious problem with the node supervisor or +4 V daughter card. Take the following steps:

1. Replace +4 V daughter card.
2. If you suspect the jumper card of having a problem, replace it.
3. Restore processor node by performing steps in “Step 0160–027”; then return to this step to continue.
4. Is the environmental (yellow) LED ON or FLASHING?
 - If yes:
 - a. Replace node supervisor card.
 - b. Go to “Step 0160–027.”
 - If no, problem resolved.
 - Go to “End of call MAP (MAP 0650)” in *RS/6000 SP: System Service Guide*.

Step 0160–027: You have replaced or reseated the component.

1. Make sure all cables and components are connected inside processor node.
2. Remove processor node from service position.
3. Reconnect all cables at rear of the processor node.
4. Put circuit breaker at the front of the processor node in the On (‘1’) position.
5. Check the environmental (yellow) LED for an ON or FLASHING condition.

120/160 MHz Thin Node environment (MAP 0170)

6. Is the environmental (yellow) LED ON or FLASHING?

- If yes, problem not resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
- If no, problem resolved.
 - Go to "Step 0160–019" on page 1-9.

120/160 MHz Thin Node environment (MAP 0170)

Note: Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing them from the service position.

Step 0170–001:

1. System monitor reports "Warning", "Shutdown", or "Failure" message associated with processor node.
2. Does message indicate "Shutdown" or "Failure"?
 - If yes, go to "Step 0170–003."
 - If no, go to "Step 0170–002."

Step 0170–002:

1. You received a warning message.
2. Check for warning messages displayed in the node environment display frame.
3. Does this same message occur on more than one processor node?
 - If yes, notify next level of support.
 - If no, immediate service is not required.
 - Perform preventative maintenance by treating the message as a "Shutdown" or "Failure" message. Go to "Step 0170–003."
 - Defer service until a later date.

Step 0170–003: You have detected a serious environmental condition in the processor node.

Note: If service action has just been completed on this processor node, check for loose cables and electrical shorts.

1. Check the following display frames:
 - Node environment
 - Node detail
 - node diagnostic
2. Based on the text of the message, use the following table to continue service:

Table 1-5. Uniprocessor Thin Node environmental conditions

Condition	Action
"...P48 OK..."	Go to "Thin Processor Node power (MAP 0180)" on page 1-21.
"...shutdownP2_5d..." "...shutdownP4d..." "...shutdownP5..." "...shutdownP12..." "...shutdownN12..."	Go to "Step 0170–004" on page 1-13.
"...fanfail..."	Go to "Step 0170–009" on page 1-15.
"...shutdownTemp..."	Go to "Step 0170–011" on page 1-16.
"...memoryProtect..."	Go to "Step 0170–015" on page 1-18.

Step 0170–004:

- One or more of the following conditions exist:
 - Voltage out of range: +2.5 V "shutdownP2_5"
 - Voltage out of range: +4 V "shutdownP4"
 - Voltage out of range: +5 V "shutdownP5"
 - Voltage out of range: +12 V "shutdownP12"
 - Voltage out of range: –12 V "shutdownN12"
 - CPU card power problem: +2.5 V
 - Planar power problem: +5 V, +12 V, or –12 V
- Place processor node in service position.
- Check planar power cables and connections at node supervisor card N00-NS-J102 and I/O planar N00-PL-J2.
- If this is a problem involving a +4 V supply, check the following:
 - Cable connections at node daughter card N00-DP-J204 and planar card N00-PL-P3.
 - Condition of cables.
 - Daughter card connections from N00-NS-J103 to N00-DP-J203.
- Do power cables appear to be okay?
 - If yes, go to "Step 0170–005."
 - If no:
 - Fix or replace cables as necessary.
 - Go to "Step 0170–010" on page 1-16.

Step 0170–005: Power cables appear to be okay.

- Is this a +5 V, +12 V, –12 V, or planar power problem?
 - If yes, go to "Step 0170–006" on page 1-14
 - If no, go to "Step 0170–017" on page 1-18.

Step 0170–006: You have detected a serious environmental condition in the processor node. However, the power cables appear to be okay. This condition may be caused by a + 5V, + 12V, or -12V planar power problem.

1. Disconnect planar power cable N00-NS-P102 from node supervisor card inside processor node.
2. Using a digital multimeter, measure resistance between the appropriate pins on cable N00-NS-P102.
3. Be careful to measure resistance on the appropriate leads.
4. Compare results with the values in the following table.

Note: Do not reconnect the planar power cable at this time.

Table 1-6. Uniprocessor Thin Node power diagram			
Voltage	Measure From (positive lead)	To GND (negative lead)	Acceptable Range
+5 V	Pin 1 (black)	Pin 2 (black)	5 - 35 Ohms
+12 V	Pin 3 (black)	Pin 2 (black)	500 - 9000 Ohms
-12 V	Pin 9 (black)	Pin 2 (black)	500 - 1200 Ohms

5. Is the measured resistance in acceptable range?

- If yes, go to “Step 0170–008.”
- If no, go to “Step 0170–007.”

Step 0170–007: The measured resistance is not in acceptable range.

1. Remove cable at I/O planar N00-PL-J2.
2. Check resistance on connector N00-PL-J2 using the same pins as in “Step 0170–006.”
3. Is resistance the same as in “Step 0170–006”?
 - If yes, problem in RS/6000 power distribution.
 - a. Reconnect planar cable at N00-NS-P102.
 - b. Go to “Thin Processor Node dc short/open (MAP 0210)” on page 1-33.
 - If no:
 - a. Replace planar power cable N00-NS-P102.
 - b. Go to “Step 0170–010” on page 1-16.

Step 0170–008: You detect a serious environmental condition in the processor node, which may be caused by a + 5V, + 12V, or —12V planar power problem. The measured resistance is within the acceptable range.

1. Problem in node supervisor card.
2. Replace node supervisor card.
3. Is there a +4 V dc problem?
 - If yes, go to “Step 0170–017” on page 1-18.
 - If no, go to “Step 0170–009” on page 1-15.

Step 0170–009: You have determined that this is not a + 4 V dc problem.

1. One or both of the following conditions exist:
 - Warning Fan: “fanwarning1”, “fanwarning2”, “fanwarning3”, “fanwarning4”
 - Shutdown Fan: “fanfail1”, “fanfail2”, “fanfail3”, “fanfail4”
2. Place processor node in service position.
3. Use the following table to reseal or replace components:

<i>Table 1-7. Uniprocessor Thin Node service actions</i>		
Priority	Component	Action
1	Fan 1, 2, 3, or 4	1. Check specified fan for blockage or loose cable connection. 2. Fix any obvious problem(s). If none are found, continue at Priority 2. 3. Continue at “Step 0170–010” on page 1-16.
2	Fan 1, 2, 3, or 4	1. Replace fan as described in Chapter 4, “FRU removals and replacements” on page 4-1. 2. Continue at “Step 0170–010” on page 1-16.
3	Node supervisor card	1. Replace card. 2. Continue at “Step 0170–010” on page 1-16.
4	Node supervisor control cable	1. Replace cable. Refer to Figure 1-1 on page 1-7, for cable connections. 2. Continue at “Step 0170–010” on page 1-16.
5	All replaced	Call next level of support.

120/160 MHz Thin Node environment (MAP 0170)

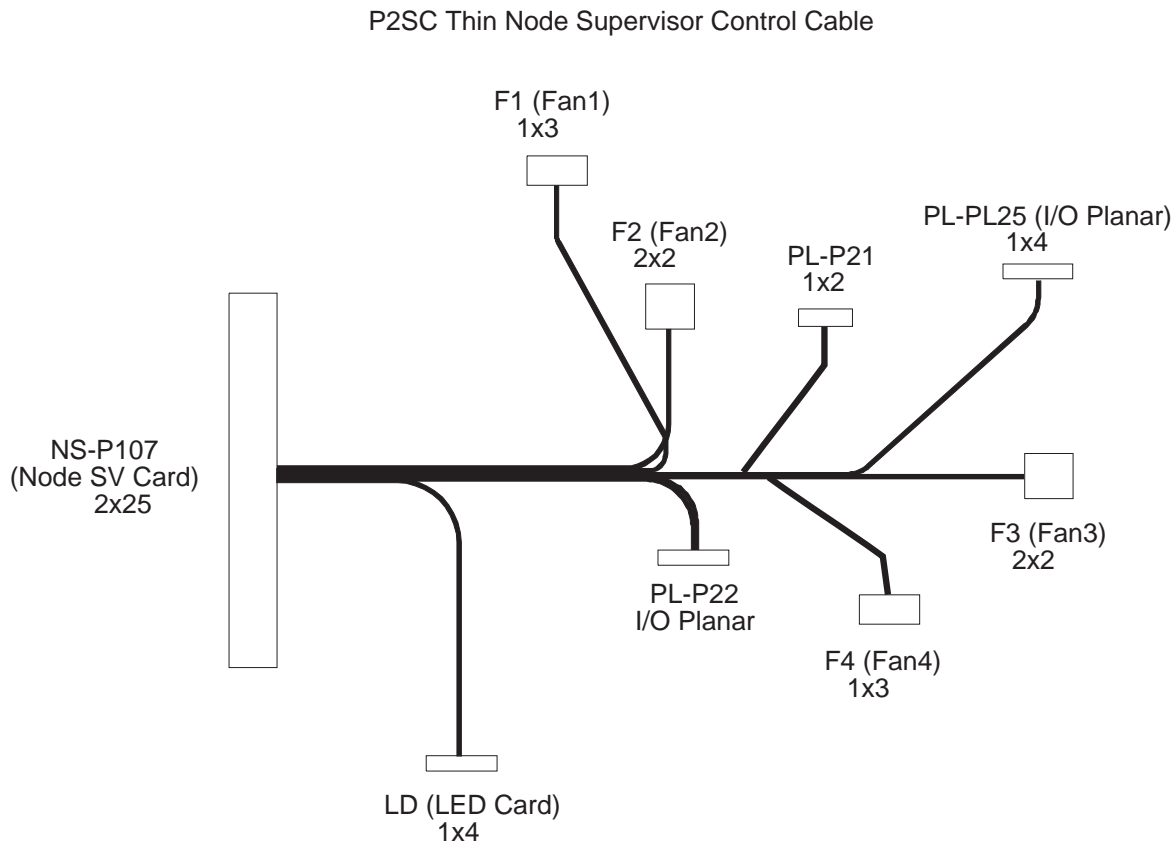


Figure 1-2. 120 or 160 MHz Thin Node supervisor control cable

Step 0170–010: After you have replaced or reseated faulty or suspect components:

1. Make sure that all cables and components are connected inside the processor node.
2. Remove processor node from service position.
3. Reconnect all cables at rear of the processor node.
4. Put circuit breaker at the front of processor node in the On ('1') position.
5. Check to see if the Environmental (yellow) LED is ON or FLASHING.
6. Is the Environmental (yellow) LED ON or FLASHING?
 - If yes:
 - a. Put circuit breaker at the front of the processor node in the Off ('0') position.
 - b. Go to "Step 0170–009" on page 1-15 to service the next highest priority component.
 - If no, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0170–011: After receiving a "shutdown temp" warning, you consulted the "Uniprocessor thin node environmental conditions" table. The table referred you to this step.

1. Over temperature condition: "shutdownTemp".
2. Temperature is out of specified range; however, no serious electrical current or fan speed problems have been detected.
 - a. Check for airflow blockage at air intakes and exhaust of the processor node and system frame.

- b. Check air temperature around the frame, looking for sources of abnormally high temperatures (above 40°C or 104°F).
3. Is there an obvious airflow blockage or abnormally high temperature source near air intakes?
 - If yes, go to "Step 0170–014."
 - If no, go to "Step 0170–012."

Step 0170–012: You did not find an obvious airflow blockage or abnormally high temperature source near air intakes.

1. Problem in node supervisor card.
2. Place processor node in service position.
3. Replace node supervisor card.
4. Perform "Node supervisor self-test" on page 3-10.
5. Does card pass self-test?
 - If yes, go to "Step 0170–013."
 - If no:
 - Check cables and cable connections to node supervisor card.
 - If there are obvious problems with the cables and connections, fix them and go to "Step 0170–013."
 - If there are no obvious problems, call the next level of support.

Step 0170–013: In previous steps, you concluded that the problem is in the node supervisor card. After passing a self-test, the node supervisor card is found to be okay.

1. Put circuit breaker at the front of the processor node in the On ('1') position.
2. Check Environmental (yellow) LED for ON or FLASHING condition.
3. Is Environmental (yellow) LED ON or FLASHING?
 - If yes, go to "Step 0170–014."
 - If no, problem resolved.
 - a. Remove processor node from service position.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0170–014: The Environmental (yellow) LED is ON or is FLASHING.

1. Place processor node in service position.
2. Power off the processor node, and remove blockage.
3. Reconnect all cables at rear of the processor node.
4. With Environmental (yellow) LED Off, power on the processor node. Does the processor node IPL?
 - If yes, problem resolved.
 - a. Remove processor node from service position.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, processor has problem with IPL.

120/160 MHz Thin Node environment (MAP 0170)

- Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.

Step 0170–015: After receiving a "memoryProtect" warning, you consulted the "Uniprocessor Thin Node environmental conditions" table. The table referred you to this step.

1. This fault is normally generated only when invalid memory cards are installed in the processor node.
2. Have memory parts in this processor node been changed since the last successful IPL?
 - If yes:
 - Check memory card and SIMM part numbers in *Diagnostic Information for Micro Channel Bus Systems* (SA38-0532) and *Adapters, Devices and Cable Information* (SA38-0533) to ensure that they are compatible with the fastest Type 7012 machines.
 - If necessary, call next level of support.
 - If no, go to "Step 0170–016."

Step 0170–016: You are receiving a memory protection error message. You find that the memory parts in this processor node have not been changed since the last successful IPL.

1. Problem may be one of the following:
 - Base memory card.
 - I/O planar.
 - Node supervisor control cable.
2. Replace parts, one at a time, until problem is corrected.
3. Are you able to correct the problem?
 - If yes, Problem resolved. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, call next level of support.

Step 0170–017: After replacing the node supervisor card, you still have a problem with dc voltage for the I/O planar.

1. Disconnect power cable N00-DP-J204 at daughter power card.
2. Using a digital multimeter, measure resistance between pin 1 and pin 5 on cable NOO-DP-P204.

Table 1-8. Uniprocessor Thin Node 2.5 & 4 V power diagram

Voltage	Measure from (positive lead)	To GND (negative lead)	Acceptable Range
+2.5 V	Pin 1 (black)	Pin 5 (black)	4.0 - 100 Ohms
+4 V	Pin 1 (red)	Pin 5 (black)	4.0 - 100 Ohms

3. Is the measured resistance in acceptable range?
 - If yes, go to "Step 0170–022" on page 1-20.
 - If no, go to "Step 0170–018" on page 1-19.

Step 0170–018: The measured resistance is not within the acceptable range shown in Table 1-8.

1. Remove the memory card(s) from processor node, then repeat measurement from “Step 0170–017.”
2. Is the measured resistance in acceptable range?
 - If yes, go to “Step 0170–020” on page 1-19.
 - If no, go to “Step 0170–019” on page 1-19.

Step 0170–019: The measured resistance is not within the acceptable range shown in Table 1-8 on page 1-18.

1. Disconnect power cable at I/O planar N00-PL-P3.
2. Measure resistance between pin 1 and pin 5 on N00-PL-P3.
3. Is the resistance the same as in “Step 0170–018”?
 - If yes, the problem is on the I/O Planar:
 - a. Replace I/O planar, transferring all memory cards from the original I/O planar to the new one.
 - b. Remove processor node from service position.
 - c. Go to “End of call MAP (MAP 0650)” in *RS/6000 SP: System Service Guide*.
 - If no:
 - Replace power cable NOO-PR-P3.
 - Go to “Step 0170–024” on page 1-21.

Step 0170–020: The measured resistance is within the acceptable range shown in Table 1-8 on page 1-18.

1. Problem with a memory card.
 - Install memory card in processor node.
 - Disconnect power cable N00-DP-J204 at daughter power card.
 - Using a digital multimeter, measure resistance between pin 1 and pin 5 on cable NOO-DP-P204.

Table 1-9. Uniprocessor Thin Node 2.5 & 4 V power diagram

Voltage	Measure from (positive lead)	To GND (negative lead)	Acceptable Range
+2.5 V	Pin 1 (black)	Pin 5 (black)	4.0 - 100 Ohms
+4 V	Pin 1 (red)	Pin 5 (black)	4.0 - 100 Ohms

2. Is the measured resistance in acceptable range?
 - If yes:
 - a. Install second memory card (if applicable).
 - b. Go to “Step 0170–024” on page 1-21.
 - If no, go to “Step 0170–021” on page 1-20.

Step 0170–021:

1. Problem in either memory card.
 - a. Check memory SIMMs for obvious problems.
 - b. Replace any suspect memory SIMMs.
 - c. Replace base memory card, transferring all good memory SIMMs from the original card to the new one.
 - d. Repeat measurement from “Step 0170–020” on page 1-19.
2. Is the measured resistance in acceptable range?
 - If yes, go to “Step 0170–024” on page 1-21.
 - If no:
 - a. Replace I/O planar.
 - b. Go to “Step 0170–024” on page 1-21 .

Step 0170–022: The measured resistance is within the acceptable range shown in Table 1-8 on page 1-18.

1. Possible problem with node supervisor or daughter card.
2. Check for an obvious problem with jumper card between daughter card N00-DP-J203 and node supervisor card N00-NS-J103 (such as a loose connection).
3. Is there an obvious problem?
 - If yes:
 - a. Fix obvious problems.
 - b. Replace damaged components.
 - c. Go to “Step 0170–024” on page 1-21.
 - If no, go to “Step 0170–023.”

Step 0170–023: There are no obvious problems with cards.

1. Replace daughter card.
2. If suspected of a problem, replace the jumper card.
3. Restore processor node, by performing steps in “Step 0170–024” on page 1-21.
4. Is the environmental (yellow) LED ON or FLASHING?
 - If yes:
 - a. Replace node supervisor card.
 - b. Go to “Step 0170–024” on page 1-21.
 - If no, problem resolved.
 - a. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0170–024: Component replaced or reseated.

1. Make sure all cables and components are connected inside processor node.
2. Remove processor node from service position.
3. Reconnect all cables at rear of the processor node.
4. Put circuit breaker at the front of the processor node in the On ('1') position.
5. Check the environmental (yellow) LED for an ON or FLASHING condition.
6. Is the environmental (yellow) LED ON or FLASHING?
 - If yes, problem not resolved. Go to "Step 0170–017" on page 1-18.
 - If no, Problem resolved. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Thin Processor Node power (MAP 0180)

Note: Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing them from the service position.

Step 0180–001: Locate the Power (green) LED for this processor node. This green light can be seen on the system monitor. The Power LED has three different states, each of which indicate a different set of conditions in the node:

Power (Green)	
Off	No 48 V dc power available at processor node.
Flashing	Power available at processor node, but RS/6000 logic is Off.
On	Power available at processor node, and RS/6000 logic is On.

1. From the system monitor, check the Power (green) LED for this processor node.
2. Is Power (green) LED Off?
 - If yes:
 - Possible problem with node power harness or node supervisor card.
 - Go to "Step 0180–005" on page 1-22.
 - If no, go to "Step 0180–002."

Step 0180–002: The Power (green) LED is not Off.

1. Processor node getting 48 V dc power.
2. Is Power (green) LED flashing?
 - If yes, go to "Step 0180–003" on page 1-22.
 - If no, the green light is on, which indicates that there is no problem with the power supply.
 - a. Verify that you have the proper processor node.
 - b. Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.
 - c. If this is the proper processor node, call the next level of support.

Thin Processor Node power (MAP 0180)

Step 0180–003: The Power (green) LED is flashing.

1. Processor node is getting power.
 - Power on RS/6000 logic from the virtual front panel on the control workstation.
2. Does Power (green) LED stop flashing and remain on?
 - If yes, go to "Step 0180–004" on page 1-22.
 - If no:
 - Node is not responding to the command.
 - Go to "Frame supervisor not responding (MAP 0110)" in *RS/6000 SP: System Service Guide*.

Step 0180–004: Power (green) LED has stopped flashing and remains on.

1. RS/6000 logic getting power.
2. Does processor node IPL successfully?
 - If yes:
 - a. No problem detected.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - a. Processor node has problem with IPL.
 - b. Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.

Step 0180–005: The Power (green) LED is off.

1. Check circuit breaker at front of processor node.
2. Put circuit breaker in the On ('1') position if it is not already in this position.
3. Does the circuit breaker stay in the On ('1') position?
 - If yes:
 - a. There may be a problem with the 48 V dc harness.
 - b. Go to "Step 0180–007" on page 1-23.
 - If no, go to "Step 0180–006."

Step 0180–006: The circuit breaker does not stay in the On ('1') position.

1. Place processor node in service position.
2. Check node power harness inside processor node for any obvious problems which might cause a short.
3. Is there an obvious problem which might cause a short?
 - If yes:
 - a. Fix obvious problems.
 - b. If necessary, replace node power harness N00-NS-J110.
 - c. Remove processor node from service position.
 - d. Reconnect all cables at rear of the processor node.

- e. Reinstall processor node in the frame and connect power and supervisor cables at rear of processor node.
- f. Go to "Step 0180-005" on page 1-22.
- If no:
 - a. Replace the node supervisor card.
 - b. Remove processor node from service position.
 - c. Reconnect all cables at rear of the processor node.
 - d. Reinstall processor node in the frame and connect power and supervisor cables at rear of processor node.
 - e. Go to "Step 0180-005" on page 1-22.

Step 0180-007: From control workstation or processor node, check Power (green) LED for this node.

1. Is Power (green) LED Off?

- If yes, go to "Step 0180-008."
- If no:
 - a. You have resolved the problem.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0180-008: The Power (Green) LED is Off.

1. Check the frame for other power harnesses.

Note: Processor nodes receive 48-volt power through one of four power harnesses. The sets of processor nodes are as follows:

PDU-BH-P1:	Processor nodes 1, 2, 3, 4
PDU-BH-P2:	Processor nodes 5, 6, 7, 8
PDU-BH-P3:	Processor nodes 9, 10, 11, 12
PDU-BH-P4:	Processor nodes 13, 14, 15, 16

2. If there are other power harnesses, check to see if processor nodes are attached to these harnesses.

3. If nodes are attached, check to see if they are on:

- Ensure that the other processor nodes have their circuit breaker in the On ('1') position.
- Check the Power (green) LEDs on the other processors to see if they are ON or Flashing.

4. Are the Power (green) LED on other processors nodes On or Flashing?

- If yes, go to "Step 0180-009."
- If no, Go to "Main power (MAP 0450)" in *RS/6000 SP: System Service Guide*.

Step 0180-009:

1. If the failing processor node is sharing a dc power harness with other processor nodes, check the other nodes for the same symptom - circuit breaker on but Power (green) LED not lit.

2. Is this the only processor node showing this symptom?

- If yes, go to "Step 0180-010" on page 1-24.
- If no:
 - a. Problem with 48 V dc power distribution.

Thin Processor Node power (MAP 0180)

- b. Go to "Open in 48V dc distribution (MAP 0560)" in *RS/6000 SP: System Service Guide*.

Step 0180–010: This is the only processor node showing this symptom.

1. Check cable connection at processor node tailgate N00-BH-J8 for a good connection.
2. Is there a good connection?
 - If yes, go to "Step 0180–011."
 - If no:
 - a. Fix cable connection problem.
 - b. go to "Step 0180–007" on page 1-23.

Step 0180–011: This is the only processor node showing these symptoms. The connection at processor node tailgate N00-BH-J8 is good.

1. Place processor node in service position.
2. Put circuit breaker at front of processor node in the On ('1') position.
3. Unplug 48 V dc harness N00-NS-P110 from node supervisor card.
4. Using a digital multimeter, check for continuity from node tailgate N00-BH-J8 pin 1 to plug N00-NS-P110 pin 1.
5. Check for continuity from node tailgate N00-BH-J8 pin 5 to plug N00-NS-J110 pin 2.
6. Is there continuity?
 - If yes:
 - a. Possible problem with node supervisor card or node power harness inside processor node.
 - b. go to "Step 0180–013" on page 1-25.
 - If no, go to "Step 0180–012."

Step 0180–012:

1. Check continuity between two tabs of processor node circuit breaker.
2. Is there continuity?
 - If yes:
 - a. Problem with node power harness inside processor node.
 - 1) Replace the node power harness N00-NS-P110 inside this processor node.
 - 2) Reinstall processor node in frame.
 - 3) Go to "Step 0180–014" on page 1-25 to verify fix.
 - If no:
 - a. Problem with circuit breaker.
 - Replace processor node circuit breaker.
 - Replug N00-NS-P110 at node supervisor card.
 - Go to "Step 0180–014" on page 1-25 to verify fix.

Step 0180–013:

1. Using a digital multimeter, check for continuity between tailgate N00-NS-J110 pin 1 and pin 2.
2. Does the multimeter indicate an open condition?
 - If yes:
 - a. Replace the node supervisor card, taking care to replug all cables, including node power harness NOO-NS-P110.
 - b. Go to "Step 0180–014" to verify fix.
 - If no, problem with node power harness inside processor node.
 - a. Replace the node power harness N00-NS-P110 inside this processor node.
 - b. Reinstall processor node in frame.
 - c. Go to "Step 0180–014" to verify fix.

Step 0180–014: In order to verify a fix:

1. Remove processor node from service position.
2. Reconnect all cables at rear of processor node.
3. Put circuit breaker at front of processor node in the On ('1') position.
4. Check Power (green) LED for an OFF position.
5. Is the Power (green) LED OFF?
 - If yes:
 - a. Problem with the 48 V dc power distribution to this processor node.
 - b. Go to "Open in 48V dc distribution (MAP 0560)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - Problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Thin Processor Node control (MAP 0190)

Attention: The processor nodes must be removed from active configuration before continuing. If processor nodes are off, continue; otherwise, ask customer to initiate shutdown procedure and power-off processor nodes from the control workstation, or defer maintenance until all jobs are completed. Powering off a processor node in a parallel environment will cause all jobs to flush from the queue and switch initialization to rerun.

Attention: Some processor nodes are equipped with either the High Performance Switch (HiPS) or the POWERparallel Switch (SPS). Unless the processor node has been powered off or fenced (or the switch data cable has been disconnected), servicing a processor node equipped with either of these switches will effect the entire switch network.

Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing them from the service position.

Refer to "Viewing Switch Partitions" in *RS/6000 SP: SP Switch Service Guide* for locating, fencing, and unfencing nodes within a switch partition.

Step 0190–001:

1. Customer or CE has detected a problem in the Processor node.
2. Use the following table to continue service:

Table 1-10. Uniprocessor Thin Node control diagnostic table	
Condition	Action
<ul style="list-style-type: none">• 3-digit LEDs are displayed but missing segments or remain blank	Go to “Step 0190–019” on page 1-32.
<ul style="list-style-type: none">• Node will not reset• Mode switch problem—problem setting NORMAL, SECURE, or SERVICE mode.	Go to “Step 0190–002.”
<ul style="list-style-type: none">• No response from TTY console	Go to “Step 0190–014” on page 1-30.
<ul style="list-style-type: none">• Yellow or green LEDs on node will not light.	Go to “Step 0190–022” on page 1-33.

Step 0190–002: Node will not reset or mode switch problem.

1. Check with customer to make sure this processor node is not in the current active configuration.
2. If processor node is *not* operational and actively working at this time, continue service.
3. If it *is* operational and actively working, schedule a time convenient for the customer.
4. From the control workstation, open the node front panel display.
5. Make note of the mode switch position for this processor node—NORMAL, SECURE, or SERVICE.
6. Set mode switch to something other than that recorded above.
7. If not already there, set the mode switch to SERVICE.

Note: Do NOT recycle node power until reset fault is verified.

8. Does the mode switch fail to toggle?
 - If yes, go to “Step 0190–007” on page 1-27.
 - If no, go to “Step 0190–003.”

Step 0190–003: Problem not related to mode switch.

1. Was the mode switch in the SERVICE position in “Step 0190–002”?
 - If yes, go to “Step 0190–005” on page 1-27.
 - If no, go to “Step 0190–004.”

Step 0190–004:

1. Customer may have tried to reset processor node in SECURE mode.

Note: Reset will only take effect in NORMAL or SERVICE modes.

2. From the control workstation, reset this processor node.
3. Does processor node reset?
 - If yes, no problem found.
 - a. Inform customer that the processor node will not reset if the mode switch is in the SECURE position.

- b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
- If no, problem with reset.
 - go to "Step 0190–007."

Step 0190–005: In "Step 0190–002" on page 1-26, the mode switch was in the SERVICE position..

1. Reset this processor node from the control workstation.
2. Does processor node reset?
 - If yes, go to "Step 0190–006."
 - If no, problem with reset.
 - Go to "Step 0190–007."

Step 0190–006: The processor node does reset. Intermittent problem may be occurring.

1. Please record the following:
 - Node number
 - Date / Time fault reported
 - Type of fault reported
2. Check logs to see if this fault has been previously recorded.
3. Is this a recurring fault?
 - If yes, you have detected an intermittent fault.
 - a. Treat this fault as a solid failure.
 - b. go to "Step 0190–012" on page 1-29.
 - If no, this is not a recurring fault.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0190–007: After checking various things in previous steps, you are unable to reset the processor node.

1. From the control workstation node front panel display:
 - Power-off processor node.
 - Power-on processor node.
 - Check 3-digit LEDs for LED sequence indicating IPL.
2. Do the 3-digit LEDs change?
 - If yes, go to "Step 0190–008" on page 1-28.
 - If no, Node supervisor card not responding to commands.
 - Go to "Frame supervisor not responding (MAP 0110)" in *RS/6000 SP: System Service Guide*.

Thin Processor Node control (MAP 0190)

Step 0190–008: The 3–digit LEDs have changed.

1. Processor node is IPLing.
2. Do 3-digit LEDs eventually indicate completion of IPL sequence (i.e. blank or “uuu”)?
 - If yes, go to “Step 0190–009” on page 1-28.
 - If no, Processor node has problem IPLing.
 - If the 3 digit LEDs stop at constant 200, the problem is with SECURE signal. Go to “Step 0190–012” on page 1-29.
 - If the 3 digit LEDs do not stop at constant 200, go to "Diagnostics using Perspectives node status front panel display" table in MAP 0140 in *RS/6000 SP: System Service Guide* to continue service.

Step 0190–009: You have arrived at this step from “Step 0190–008,” where you found that the 3 digit LEDs eventually indicated completion of IPL sequences.

1. From node front panel display, click on “TTY” button to open a TTY console.
2. From the TTY console:
 - Select “Advanced Diagnostic Routines”
 - Select “System Verification”
 - Select “Base System”
3. Follow directions for the “Key Mode Switch Test”. Set the mode switch from the front panel of the processor node on the control workstation.
4. Does this test indicate a failure?
 - If yes, go to “Step 0190–012” on page 1-29.
 - If no, go to “Step 0190–010.”

Step 0190–010: The "Key Node Switch Test" does not indicate a failure.

1. From the control workstation, reset this processor node.
2. Does processor node reset?
 - If yes, go to “Step 0190–011.”
 - If no, problem with reset.
 - Go to “Step 0190–012” on page 1-29 to continue service with the next highest priority component.

Step 0190–011:

1. Node reset and mode switches functioning properly.
2. Was this a solid problem? (If the problem was cleared by power-on only, answer "No").
 - If yes, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, This is an intermittent problem. Please record following tracking information:
 - Node number
 - Date / Time fault reported

- Type of fault reported
- Action taken or component replaced
- Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0190–012: In previous steps, you have found that there is a problem with reset or mode switch function.

1. Power off processor node from the control workstation.
2. Place processor node in service position.
3. Remove processor node from frame.
4. Remove top cover of processor node.
5. Use the following table to prioritize component repair or replacement.

Table 1-11. Uniprocessor Thin Node service actions: repair and replacement priority table 1		
Priority	Component	Action
1	Cable N00-NS-P107 to N00-PL-P22	<ol style="list-style-type: none"> 1. Check for proper seating and continuity. See Table 1-12. If no problem is found, continue at Priority 2. 2. Repair or replace cable assembly as required. 3. Go to "Step 0190–013" to verify fix.
2	Node Supervisor Card	<ol style="list-style-type: none"> 1. Replace card. 2. Perform "Verification test for supervisor bus" in <i>RS/6000 SP: System Service Guide</i>. 3. Go to "Step 0190–013" to verify fix.
3	Planar Board	<ol style="list-style-type: none"> 1. Replace board. 2. Go to "Step 0190–013" to verify fix.
4	All replaced	Call next level of support.

6. Check the cable joining node supervisor card N00-NS-J107 to I/O planar N00-PL-J22 at the following points:

Table 1-12. Cable continuity check points		
Signal	From	To
Reset	N00-NS-P107 pin A12	N00-PL-P22 pin 7
Service	N00-NS-P107 pin A13	N00-PL-P22 pin 3
Secure	N00-NS-P107 pin B12	N00-PL-P22 pin 2

Step 0190–013: Component has been repaired or replaced.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. If not already done:
 - a. Verify that cables and components are properly seated.
 - b. Install processor node top cover.
 - c. Reinstall processor node in frame.
4. Put the circuit breaker at the front of the processor node in the On ('1') position.

Thin Processor Node control (MAP 0190)

5. Go to "Step 0190–009" on page 1-28 to continue service.

Step 0190–014: No response from one of the processor node TTYs.

1. Make sure processor node was IPLed in NORMAL mode.
2. From system file server, telnet into this processor node: **telnet** *nodename* Log in as "root".
3. Check to make sure that the TTY port on the processor node is correctly defined per customer requirements.
 - a. Check console configuration by issuing the command **smit console** in the processor node window. Use the menu options to check and/or reconfigure the console as required. If the console is not configured to use the TTY port, then the processor node will not print messages to the screen during IPL.
 - b. Check the TTY configuration by issuing the command **smit tty** in the processor node window. Use the menu options to check and/or reconfigure the "s1" TTY port as required. The proper TTY parameters are listed in *IBM RS/6000 SP: Administration Guide*.
4. Is the TTY port defined properly, and the console setup to use the TTY port?
 - If yes, go to "Step 0190–015."
 - If no, TTY not responding due to customer configuration.
 - a. Customer must configure these parameters.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0190–015: Problem due to hardware.

1. Close console TTY window (if already open).
2. Log into the node over the Ethernet: **telnet** *nodename*.
3. Enter this command: **chcons /dev/tty1**.
4. Use **diag** command to run regular (not advanced) diagnostics on "TTY0".
5. Does the hardware pass the diagnostics?
 - If yes, go to "Step 0190–016."
 - If no:
 - a. Replace I/O planar board.
 - b. Go to "Step 0190–017" on page 1-31.

Step 0190–016: The hardware passes the diagnostics; no problems were found.

1. Log into the node over the Ethernet: **telnet** *nodename*.
2. Enter the following command: **chcons /dev/tty0**.
3. From the control workstation, make sure the node front panel display is open.
4. Close TTY console at this time.
5. Have the customer remove the processor node from the active configuration, and power off the processor node.
6. Place processor node in service position.
7. Refer to the following table for priority of replacement or repair of components.

Table 1-13. Uniprocessor Thin Node service actions: repair and replacement priority table 2

Priority	Component	Action
1	Cable N00-NS-P104 to N00-PL-P16	<ol style="list-style-type: none"> 1. Check for proper seating. If no problem found, continue at Priority 2. 2. Repair or replace cable assembly as required. 3. Go to "Step 0190–017" on page 1-31 to verify fix.
2	Node Supervisor Card	<ol style="list-style-type: none"> 1. Replace card. 2. Perform "Verification test for supervisor bus" in <i>RS/6000 SP: System Service Guide</i>. 3. Go to "Step 0190–017" on page 1-31 to verify fix.
3	Planar Board	<ol style="list-style-type: none"> 1. Replace board. 2. Go to "Step 0190–017" on page 1-31 to verify fix.
4	All replaced	Call next level of support.

Step 0190–017: Component has been repaired or replaced.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. As processor node completes IPL, check the TTY console window.
4. From the control workstation node front panel display, put the processor node in SERVICE mode.
5. Put the circuit breaker at the front of the processor node in the On ('1') position.
6. Do you get any data on the TTY console screen?
 - If yes, go to "Step 0190–018."
 - If no, go to "Step 0190–016" on page 1-30 to service the next highest priority component.

Step 0190–018: Processor node IPLed in SERVICE mode.

1. From the TTY console:
 - Select "Advanced Diagnostic Routines"
 - Select "System Verification"
 - Select "Base System"
2. Does processor node pass all diagnostics?
 - If yes, problem resolved.
 - a. Reboot node in NORMAL mode.
 - b. Log into the node over the Ethernet: **telnet nodename**.
 - c. Enter the following command: **chcons /dev/tty0**.
 - d. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - Repair problem as indicated by diagnostics.
 - Use "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*, as necessary.

Thin Processor Node control (MAP 0190)

Step 0190–019: You have found a 3-digit LED problem.

1. Have the customer remove the processor node from the active configuration.
2. Power off the processor node.
3. Put the circuit breaker at the front of the processor node in the Off ('0') position.
4. Place processor node in service position.
5. Refer to the following table for priority of replacement or repair of components.

Table 1-14. Uniprocessor Thin Node service actions: repair and replacement priority table 3

Priority	Component	Action
1	Cable N00-NS-P106 to N00-PL-P23	<ol style="list-style-type: none">1. Check for proper seating. If no problem found, continue at Priority 2.2. Repair or replace cable assembly as required.3. Go to "Step 0190–020" to verify fix.
2	Node Supervisor Card	<ol style="list-style-type: none">1. Replace card.2. Perform "Verification test for supervisor bus" in <i>RS/6000 SP: System Service Guide</i>.3. Go to "Step 0190–020" to verify fix.
3	Planar Board	<ol style="list-style-type: none">1. Replace board.2. Go to "Step 0190–020" to verify fix.
4	All Replaced	Call next level of support.

Step 0190–020: Component has been repaired or replaced.

1. Remove processor node from service position.
2. Connect all cables at rear of processor node.
3. From the control workstation, power on this processor node.
4. From the control workstation, make sure the 3-digit LEDs for this processor node are displayed on the screen.
5. Check the 3-digit LEDs for the IPL sequence.
6. Do the 3-digit LEDs indicate the IPL sequence?
 - If yes, go to "Step 0190–021."
 - If no, go to "Step 0190–019" to service the next highest priority component.

Step 0190–021: The 3–digit LEDs indicate the IPL sequence.

1. From the TTY console:
 - Select "Advanced Diagnostic Routines"
 - Select "System Verification"
 - Select "Base System"
2. Does processor node pass all diagnostics?
 - If yes, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - a. Repair problem as indicated by diagnostics.

- b. Use "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*, as necessary.

Step 0190–022: Yellow or green LED on processor node is not functioning.

1. Have the customer remove the processor node from the active configuration and power off the processor node.
2. Put the circuit breaker at the front of the processor node in the Off ('0') position.
3. Perform "Node supervisor self-test" on page 3-10, ignoring PASS/FAIL results.
4. Do the yellow and green LEDs light at any time?
 - If yes, go to "Step 0190–024."
 - If no, go to "Step 0190–023"

Step 0190–023: The yellow and green LEDs do not light.

1. Place processor node in service position.
2. Replace LED display card. Perform "Node supervisor self-test" on page 3-10.
3. Does green LED light at any time?
 - If yes, problem resolved.
 - a. Remove processor node from service position.
 - b. Put the circuit breaker at the front of the processor node in the On ('1') position.
 - c. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - a. Replace the node supervisor card.
 - b. Perform "Node supervisor self-test" on page 3-10 to verify replacement.
 - c. Go to "Step 0190–024."

Step 0190–024: All LEDs are operating.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. Put the circuit breaker at the front of the processor node in the On ('1') position.
4. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Thin Processor Node dc short/open (MAP 0210)

Note: Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing them from the service position.

Step 0200–001: You found a problem in the processor node power distribution by checking resistance of +5 V dc, +12 V dc, and/or –12 V dc to ground.

1. Use the following table to determine the acceptable resistances for I/O Planar jack NOO-PL-J2.

Thin Processor Node dc short/open (MAP 0210)

Table 1-15. Uniprocessor Thin Node dc power diagram

Voltage	Measure From (positive lead)	To GND (negative lead)	Acceptable Range
+5 V dc	Pin 1 (red)	Pin 2 (black)	5 - 30 Ohms
+12 V dc	Pin 3 (yellow)	Pin 2 (black)	100 - 5000 Ohms
-12 V dc	Pin 9 (purple)	Pin 2 (black)	500 - 900 Ohms

2. Was resistance below acceptable range?

- If yes, go to “Step 0200–002.”
- If no, measured resistance is too high.
 - a. Check for one or more of the following conditions:
 - Open in planar power cable from node supervisor card N00-NS-J102 to I/O planar N00-PL-J2.
 - Open voltage plane in I/O planar caused by a shorted component.
 - b. Remove all adaptor cards, memory cards, fixed disk drives, and the CPU card from the I/O planar.
 - c. Inspect components for damage.
 - d. Remove I/O planar and inspect for damage.
 - e. Replace any damaged components found during inspection.
 - f. Go to “Step 0200–005” on page 1-35.

Step 0200–002:

1. Measured resistance is too low.
2. Are there any empty Micro Channel slots?
 - If yes, go to “Step 0200–005” on page 1-35.
 - If no, go to “Step 0200–003.”

Step 0200–003:

1. Micro Channel power specifications may be exceeded by card requirements.
2. Has customer recently added or exchanged Micro Channel adaptors?
 - If yes, go to “Step 0200–004.”
 - If no, go to “Step 0200–005” on page 1-35.

Step 0200–004: Customer has recently added or exchanged Micro Channel adapters.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. Remove the most recent adapters from this processor node.
4. Reinstall processor node.
5. Power on the processor node from the control console.
6. Does this resolve the problem?

- If yes, the adapter was causing the problem.
 - Call next level of support.
- If no, you have not resolved the problem.
 - Go to “Step 0200–005.”

Step 0200–005: Measured resistance still out of acceptable range.

1. Clip multimeter leads to the connector pins of N00-PL-J2 for the voltage that shows resistance out of range.
2. Remove all components listed in Table 1-16 until either all components have been removed or resistance enters acceptable range.

Note: Parts are ordered by probable cause of failure. ‘X’ indicates voltage is used.

<i>Table 1-16. Thin Processor Node dc component chart</i>				
#	Component	+5 V dc	+12 V dc	–12 V dc
1	CPU card (Thin node or thin node 2)	X		
2	Memory card (slot A)	X		
3	Memory card (slot B)	X		
4	Micro Channel card (slot 1)	X	X	X
5	Micro Channel card (slot 2)	X	X	X
6	Micro Channel card (slot 3)	X	X	X
7	Micro Channel card (slot 4)	X	X	X
8	Ethernet riser card	X	X	X
9	Fixed disk drive(s)	X	X	

3. Use the following table to determine the acceptable resistances for I/O Planar jack N00-PL-J2.

<i>Table 1-17. Uniprocessor Thin Node dc power diagram</i>			
Voltage	Measure From (positive lead)	To GND (negative lead)	Acceptable Range
+5 V dc	Pin 1 (red)	Pin 2 (black)	5 - 30 Ohms
+12 V dc	Pin 3 (yellow)	Pin 2 (black)	100 - 5000 Ohms
–12 V dc	Pin 9 (purple)	Pin 2 (black)	500 - 900 Ohms

4. Was the measured resistance within range after you replaced a component?
 - If yes, go to “Step 0200–008” on page 1-36.
 - If no, go to “Step 0200–006.”

Step 0200–006: You replaced a component and determined that the measured resistance is still outside acceptable range.

1. Remove the next highest priority component from Table 1-16.
2. Did resistance increase to acceptable range?
 - If yes:

Wide Processor Node environment (MAP 210)

- a. Replace component.
 - b. Reinstall all other original components.
 - c. Return to “Step 0200–005” on page 1-35 to verify the resistance.
- If no, go to “Step 0200–007.”

Step 0200–007: Resistance has not increased to acceptable range.

1. You have not located the component with the short.
2. Have all components in Table 1-16 on page 1-35 been removed?
 - If yes:
 - a. Replace the I/O planar board.
 - b. Reinstall all other original components.
 - c. Go to “Step 0200–006” on page 1-35 to verify the resistance.
 - If no, return to “Step 0200–006” on page 1-35 and remove next part.

Step 0200–008: If measured resistance returned to acceptable range after a component was replaced:

1. Reconnect planar power cable N00-PL-P2 at I/O planar board.
2. Remove processor node from service position.
3. Reconnect all cables at rear of the processor node.
4. Put the circuit breaker on the front of the processor node in the On (‘1’) position.
5. Does the processor node power on okay?
 - If yes, problem resolved.
 - Go to “End of call MAP (MAP 0650)” in *RS/6000 SP: System Service Guide*.
 - If no, call next level of support.

Uniprocessor Wide Node MAPs

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Wide Processor Node power (MAP 0220)	1-43
Wide Processor Node control (MAP 0230)	1-47
Wide Processor Node dc short/open (MAP 0240)	1-56

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Note: Refer to “Service position procedures” on page 3-14 for placing processor nodes in or removing them from the service position.

Step 0210–001: System monitor log reports “Warning”, “Shutdown”, or “Failure” message associated with processor node.

1. Does message indicate “Shutdown” or “Failure”?
 - If yes, go to “Step 0210–002” on page 1-37.
 - If no, message is only a warning:
 - If message occurs on more than one processor node, notify next level of support.

- If message only occurs on one processor node, no immediate service required. At this point, you have two options:
 - a. You can perform preventative maintenance by going to “Step 0210–001” on page 1-36. Treat the message as a “Shutdown” or “Failure” warning.
 - b. You can defer service until a later date.

Step 0210–002: You have detected a serious environmental condition in the processor node.

Note: If service action has just been completed on this processor node, check for loose cables or shorted conditions in the processor node.

Based on the text of the message, use the following table to continue service:

<i>Table 1-18. Uniprocessor Wide Node environmental conditions</i>	
Condition	Action
“...P48OK...”	Go to “Wide Processor Node power (MAP 0220)” on page 1-43.
“...shutdownP5m...” “...shutdownP4...” “...shutdownP5i...” “...shutdownP12...” “...shutdownN12...”	Go to “Step 0210–003.”
“...fanfail...”	Go to “Step 0210–007” on page 1-40.
“...shutdownTemp...”	Go to “Step 0210–009” on page 1-41.
“...memoryProtect...”	Go to “Step 0210–013” on page 1-43.

Step 0210–003: One or more of the following conditions exist:

- Voltage out of range: +4 V “shutdownP4”
 - Voltage out of range: +5 VM “shutdownP5m”
 - Voltage out of range: +5 VI “shutdownP5i”
 - Voltage out of range: +12 V “shutdownP12”
 - Voltage out of range: –12 V “shutdownN12”
 - Planar power problem: +4 V, +5 VM, +5 VI, +12 V, or –12 V
1. Place processor node in service position.
 2. Remove power compartment cover.
 3. Check cable conditions at node supervisor card N00-SV-J102 and power card N00-PC-J60.
 4. Check condition of cables, especially J60 pin 37 to J102 pin 11.
 5. Based on the warning message, use Table 1-19 on page 1-38 to check the appropriate connection.

Wide Processor Node environment (MAP 210)

Table 1-19. Uniprocessor Wide Node card connections

Voltage	Power Card - J60	Node Supervisor - J102
+4 V	N00-PC-P60 pin 3	N00-SV-P102 pin 29
+5 VM	N00-PC-P60 pin 1	N00-SV-P102 pin 27
+5 VI	N00-PC-P60 pin 5	N00-SV-P102 pin 31
+12 V	N00-PC-P60 pin 7	N00-SV-P102 pin 33
-12 V	N00-PC-P60 pin 10	N00-SV-P102 pin 35

6. Does the power control/sense cable appear to be okay?

- If yes, go to “Step 0210–004.”
- If no, problem with node supervisor control cable (N00-SV-P102).
 - Go to “Step 0210–007” on page 1-40.

Step 0210–004: A serious environmental condition has been detected in the processor node, and the power control/sense cable appears to be okay.

1. Disconnect cable at N00-SV-J102 and N00-PC-J60.
2. Based on the content of the warning message, use the information in the table below to disconnect the appropriate cable and check resistance between the cable pins.

Table 1-20. Uniprocessor Wide Node resistance table

Voltage	Cable	From (positive lead)	To GND (negative lead)	Acceptable Range (in ohms)
+4 V	N00-PC-P16A	Pin 4	Pin 10	6 - 25
+5 VM	N00-PC-P13A	Pin 4	Pin 10	1K - 5M
+5 VI	N00-PC-P40A N00-PC-P45 N00-PC-P65	Pin 10 Pin 4 Pin 4	Pin 1 Pin 3 Pin 3	10 - 30 100 - 500* 100 - 500*
+12 V	N00-PC-P40A N00-PC-P45 N00-PC-P65	Pin 6 Pin 1 Pin 1	Pin 1 Pin 2 Pin 2	800 - 100K 1K - 5K* 1K - 5K*
-12 V	N00-PC-P40A	Pin 3	Pin 1	1K - 20K*
Note: *Resistance range assumes DASD attached on this cable. With no DASD(s) attached, an open will be measured.				

3. Are all measured resistances within the acceptable ranges?

- If yes, go to “Step 0210–006” on page 1-39.
- If no, go to “Step 0210–005.”

Step 0210–005: Resistance between at least one set of pints is not in the acceptable range.

1. Leave cables where resistance was measured in “Step 0210–004” disconnected.
2. Disconnect other ends of cable from all devices.
 - The following list shows cable connections:

Cable (short detected)

N00-PC-P16A: CPU planar J16
 N00-PC-P13A: CPU planar J13, J14
 N00-PC-P40A: I/O planar J40, J41
 N00-PC-P45: DASD P3, DASD P4
 N00-PC-P65: DASD P1, DASD P2

3. After you disconnect the cable, check for short between voltage and GND pins. Use table "Step 0210–004" on page 1-38.
4. Is there a short in the disconnected cable?
 - If yes:
 - a. Replace cable.
 - b. Reconnect all cables inside the processor node.
 - c. Remove processor node from service position.
 - d. Reconnect all cables at rear of the processor node.
 - e. Put circuit breaker at front of processor node in On ('1') position.
 - f. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - a. Reconnect cable at locations shown in the list at the top of this step.
 - b. Go to "Wide Processor Node dc short/open (MAP 0240)" on page 1-56.

Step 0210–006: All resistances you measured in "Step 0210–004" on page 1-38 are within acceptable ranges. Use the table below to replace components.

Table 1-21. Uniprocessor Wide Node component replacement priority table	
Priority	Component
1	Node power card
2	Wide node supervisor card
3	Cable N00-SV-P102
4	Call next level of support

1. Replace the components listed in Table 1-21, one at a time.
2. Reconnect all cables inside processor node.
3. Remove processor node from service position.
4. Reconnect all cables at rear of the processor node.
5. Put circuit breaker at front of processor node in On ('1') position.
6. Wait 20 seconds, then check Environmental (Yellow) LED for flashing condition.
7. Is the Environmental (Yellow) LED flashing?
 - If yes:
 - a. Put circuit breaker in front of processor node in the Off ('0') position.
 - b. Place processor node in service position.
 - c. Remove power compartment cover.
 - d. Return to the beginning of this step to service next component.

Wide Processor Node environment (MAP 210)

- If no, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0210–007:

1. One or more of the following conditions exist:
 - Warning Fan: "fanwarning1", "fanwarning2", ..., "fanwarning5"
 - Shutdown Fan: "fanfail1", "fanfail2", ..., "fanfail5"
2. Place processor node in service position.
3. Use the following table to reseal or replace components:

Table 1-22. Uniprocessor Wide Node component service actions		
Priority	Component	Action
1	Fan 1, 2, 3, 4 or 5	<ol style="list-style-type: none">1. Check specified fan for blockage or loose cable connection.2. Fix any obvious problem(s). If none are found, continue at Priority 2.3. Continue at "Step 0210–008" on page 1-41.
2	Fan 1, 2, 3, 4 or 5	<ol style="list-style-type: none">1. Replace fan as described in Chapter 4, "FRU removals and replacements" on page 4-1.2. Continue at "Step 0210–008" on page 1-41.
3	Node supervisor card	<ol style="list-style-type: none">1. Replace card.2. Continue at "Step 0210–008" on page 1-41.
4	Node supervisor control cable	<ol style="list-style-type: none">1. Replace cable. Refer to Figure 1-3 on page 1-41, for cable connections.2. Continue at "Step 0210–008" on page 1-41.
5	All replaced	Call next level of support.

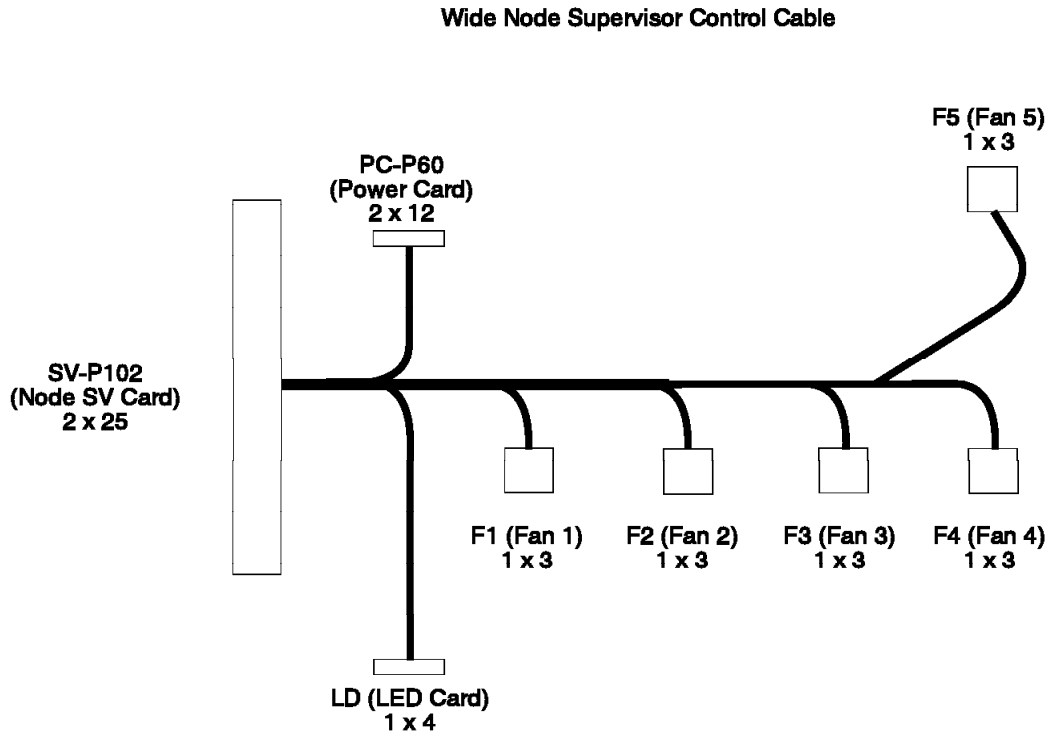


Figure 1-3. Wide Node supervisor control cable

Step 0210–008: Component replaced or reseated.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. Put circuit breaker at the front of processor node in the On ('1') position.
4. Check to see if the Environmental (yellow) LED is ON or FLASHING.
5. Is the Environmental (yellow) LED ON or FLASHING?
 - If yes:
 - a. Put circuit breaker at the front of the processor node in the Off ('0') position.
 - b. Go to "Step 0210–007" on page 1-40 to service next highest priority component.
 - If no, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0210–009: You have received a "shutdownTemp" warning. Although temperature is out of specified range, you have not detected any serious electrical current or fan speed problems.

1. Check for airflow blockage at air intakes and exhaust of the processor node and system frame.
2. Check air temperature around the frame, looking for sources of abnormally high temperatures (above 40°C or 104°F).
3. Is there an obvious airflow blockage or abnormally high temperature source near air intakes?
 - If yes, go to "Step 0210–012" on page 1-42.
 - If no, go to "Step 0210–010" on page 1-42.

Wide Processor Node environment (MAP 210)

Step 0210–010: There is no obvious airflow blockage or abnormally high temperature source near air intakes.

1. Problem in node supervisor card.
 - a. Place processor node in service position.
 - b. Replace node supervisor card.
 - c. Perform "Node supervisor self-test" on page 3-10.
2. Does card pass self-test?
 - If yes, go to "Step 0210–011."
 - If no:
 - a. Check cable connections to node supervisor card.
 - b. If there are any obvious problems such as a loose or broken cable:
 - 1) Fix obvious problems.
 - 2) Go to "Step 0210–011."
 - c. If there are no obvious problems, call next level of support.

Step 0210–011: Node supervisor card is okay.

1. Put circuit breaker at the front of the processor node in the On ('1') position.
2. Check to see if the Environmental (yellow) LED is ON or FLASHING.
3. Is Environmental (yellow) LED ON or FLASHING?
 - If yes:
 - a. Check cable connections to node supervisor card.
 - b. If there are any obvious problems (such as a loose or broken cable):
 - 1) Fix obvious problems.
 - 2) Return to the beginning of this step.
 - c. If there are no obvious problems, call next level of support.
 - If no, problem resolved.
 - a. Remove processor node from service position.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0210–012: You have found an obvious airflow blockage or abnormally high temperature source near air intakes.

1. Place processor node in service position.
2. Power off the processor node.
3. Remove blockage.
4. Reconnect all cables at rear of the processor node.
5. With Environmental (yellow) LED Off, power on the processor node.
6. Does the processor node IPL?
 - If yes, problem resolved:
 - a. Remove processor node from service position.

- b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
- If no, Processor has problem with IPL.
 - Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.

Step 0210–013: You have received a "memoryProtect" warning. Usually this warning only appears when invalid memory cards are installed in the processor node.

1. Have memory parts been changed since the last successful IPL in this processor node?
 - If yes:
 - a. Check memory card and SIMM part numbers in *Diagnostic Information for Micro Channel Bus Systems*, (SA38-0532) and *Adapters, Devices and Cable Information*, (SA38-0533) to ensure that they are compatible with the fastest Type 7013 machines.
 - b. If necessary, call next level of support.
 - If no, problem may be:
 - Base memory card.
 - CPU card.
 - I/O planar
 - Node supervisor control cable.
 - a. Replace parts, one at a time, until problem is corrected.
 - b. If you are able to correct problem:
 - 1) Problem resolved.
 - 2) Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - c. If you are not able to correct problem, call next level of support.

Wide Processor Node power (MAP 0220)

Note: Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing them from the service position.

Step 0220–001: From the system monitor, check the green Power LED for this processor node. Use the following table to interpret the three modes of the green Power LED:

Green Power	
Off	No 48 V dc power available at processor node.
Flashing	Power available at processor node, but RS/6000 logic is Off.
On	Power available at processor node, and RS/6000 logic is On.

1. Is green Power LED Off?
 - If yes, go to "Step 0220–005" on page 1-44.
 - If no, go to "Step 0220–002" on page 1-44.

Wide Processor Node power (MAP 0220)

Step 0220–002: The green Power LED is either on or flashing.

1. Processor node getting 48 V dc power.
2. Is green Power LED flashing?
 - If yes, go to “Step 0220–003” on page 1-44.
 - If no, green power LED is On, indicating no problem with power supply.
 - a. Verify that you have the proper processor node.
 - b. Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.
 - c. If this is the proper processor node, call the next level of support.

Step 0220–003: The green Power LED is flashing. This indicates that the processor node is getting power.

1. Power on RS/6000 logic from the virtual front panel on the control workstation.
2. Does the green Power LED light and stay lit?
 - If yes, go to “Step 0220–004.”
 - If no, processor node not responding to the command.
 - Go to "Frame supervisor not responding (MAP 0110)" in *RS/6000 SP: System Service Guide*.

Step 0220–004: The green Power LED lights and stays lit, indicating that RS/6000 logic is getting power.

1. Does processor node IPL successfully?
 - If yes, no problem detected.
 - a. Record reason for power-off condition.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, processor node has problem with IPL.
 - Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*.

Step 0220–005: The green power LED is Off.

1. Check circuit breaker at front of processor node.
2. Make sure that this circuit breaker in the On ('1') position.
3. Does the circuit breaker go (trip) to the Off ('0') position?
 - If yes, go to “Step 0220–006.”
 - If no, go to “Step 0220–008” on page 1-45.

Step 0220–006: When you put the circuit breaker at front of processor node in the On ('1') position, the switch returns to the Off ('0') position.

1. Place processor node in service position.
2. Check node power harness (at power card N00-PC-P1 and N00-PC-P2 and circuit breaker) inside processor node for any obvious problems which might cause a short.
3. Does node power harness appear okay?

- If yes, go to “Step 0220–007” on page 1-45.
- If no:
 - a. Fix obvious problems.
 - b. If necessary, replace node power harness.
 - c. Remove processor node from service position.
 - d. Reconnect all cables at rear of the processor node.
 - e. Go to “Step 0220–005” on page 1-44.

Step 0220–007: The node power harness appears to be okay.

1. Put circuit breaker in On ('1') position.
2. Using a multimeter, check for a short between either tab of circuit breaker and a dc converter heat sink screw on the power card.
3. Perform 'Actions' in the following table (one at a time) until 48 V short disappears.
4. If this 'Action' removes the short, replace corresponding part in the “Replace” column.

<i>Table 1-23. Component replacement sequence</i>		
Order	Action	Replace
1	Unplug P102 from node supervisor.	Node supervisor card.
2	Unplug P60 from power card.	Replace N00-PC-P60 cable.
3	Both unplugged.	Replace node power card.

5. Remove processor node from service position.
6. Reconnect all cables at rear of the processor node.
7. Go to “Step 0220–005” on page 1-44.

Step 0220–008: After you place the circuit breaker at front of processor node in the On ('1') position, the switch remains on.

1. From control workstation or processor node, check Power (green) LED for this node.
2. Is green Power LED Off?
 - If yes, go to “Step 0220–009.”
 - If no, Processor node problem resolved.
 - go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0220–009: The green Power LED is Off.

1. Check processor nodes on other dc power harness to see if any of them are on.
2. Make sure that the other processor node has its circuit breaker in the On ('1') position.
3. Check to see if the green Power LED is On or Flashing.
4. Processor nodes receive 48-volt power through one of four power harnesses. The sets of processor nodes are as follows:

Wide Processor Node power (MAP 0220)

PDU-BH-P1: Processor nodes 1, 2, 3, 4
PDU-BH-P2: Processor nodes 5, 6, 7, 8
PDU-BH-P3: Processor nodes 9, 10, 11, 12
PDU-BH-P4: Processor nodes 13, 14, 15, 16

5. Is the Power (green) LED on any other processor node On or Flashing?

- If yes, go to "Step 0220-010."
- If no, go to "Main power (MAP 0450)" in *RS/6000 SP: System Service Guide*.

Step 0220-010: You find that the green Power LED on at least one other processor node is On or Flashing.

1. Check all other processor nodes on the same dc power harness as the failing processor node to check for the same symptom:

- Circuit breaker on but Power (green) LED not lit.

2. Is this the only processor node showing this symptom?

- If yes, Check cable connection at processor node tailgate N00-BH-J8 for a good connection.
 - a. If there is a good connection, go to "Step 0220-011."
 - b. If the connection is bad, fix cable connection problem.
 - Go to "Step 0220-008" on page 1-45.
- If no, Problem with 48 V dc power distribution.
 - Go to "Open in 48V dc distribution (MAP 0560)" in *RS/6000 SP: System Service Guide*.

Step 0220-011: You have arrived at this step from "Step 0220-010," where you established that there was a good connection at processor node tailgate N00-BH-J8.

1. Put circuit breaker at front of processor node in the Off ('0') position.

2. Place processor node in service position.

3. Put circuit breaker at front of processor node in the On ('1') position.

4. Unplug node 48 V dc harness from node power card at N00-PC-P2 (black wire).

5. Using a digital multimeter, check for continuity from node tailgate N00-BH-J8 pin 1 to N00-PC-P2 (black wire).

6. Is there continuity?

- If yes, go to "Step 0220-013" on page 1-47.
- If no, go to "Step 0220-012."

Step 0220-012: In "Step 0220-011," you found that there was no continuity from node tailgate N00-BH-J8 pin 1 to N00-PC-P2 (black wire).

1. Check continuity between two tabs of processor node circuit breaker.

2. Is there continuity?

- If yes, Problem with node 48 V dc harness inside processor node.
 - a. Replace the node 48 V dc harness N00-PC-P2 inside this processor node.
 - b. Go to "Step 0220-014" on page 1-47 to verify fix.
- If no, problem with circuit breaker.

- a. Replace processor node circuit breaker.
- b. Replug N00-PC-P2.
- c. Go to "Step 0220-014" to verify fix.

Step 0220-013: In "Step 0220-011" on page 1-46, you found that there was continuity from node tailgate N00-BH-J8 pin 1 to N00-PC-P2 (black wire).

1. Unplug power service cable at node supervisor card N00-SV-J102 and node power card N00-PC-J60.
2. Check cable continuity between N00-SV-P102 pin 39 and N00-PC-P60 pin 15.
3. Is there continuity?
 - If yes:
 - a. Replace the node power card.
 - b. Make sure to replug all cables, including the node power harness.
 - c. Go to "Step 0220-014" to verify fix.
 - If no:
 - a. Replace cable N00-SV-P102.
 - Refer to Figure 1-3 on page 1-41 for cable connections.
 - b. Go to "Step 0220-014" to verify fix.

Step 0220-014: In order to verify the fixes in the last several steps, take the following actions:

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. Put circuit breaker at front of processor node in the On ('1') position.
4. Check if the green Power LED is Off.
5. Is the green Power LED OFF?
 - If yes, Problem with the 48 V dc power distribution to this processor node.
 - Go to "Open in 48V dc distribution (MAP 0560)" in *RS/6000 SP: System Service Guide*.
 - If no, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Wide Processor Node control (MAP 0230)

Attention: The processor nodes must be removed from active configuration before continuing. If processor nodes are off, continue; otherwise, ask customers to initiate shutdown procedure and power-off processor nodes. Powering off a processor node in a parallel environment will cause all jobs to flush from the queue and switch initialization to rerun. The customer may also choose to defer maintenance until all jobs are completed.

Attention: If you service a processor node that features either the High Performance Switch (HiPS) or the Scalable POWERparallel Switch (SPS), the entire switch network will be effected. This can be avoided by making sure that the processor node has already been powered off (or fenced), or that the switch data cable has been disconnected.

Wide Processor Node control (MAP 0230)

Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing them from the service position.

Refer to "Viewing Switch Partitions" in *RS/6000 SP: SP Switch Service Guide* for locating, fencing, or unfencing nodes within a switch partition.

Step 0230–001: A problem in the processor node has been detected by customer or CE. Use the following table to continue service:

Table 1-24. Wide Node control diagnostics	
Condition	Action
<ul style="list-style-type: none">3-digit LEDs displayed but missing segments or remain blank	Go to "Step 0230–019" on page 1-54.
<ul style="list-style-type: none">Node will not resetMode switch problem—problem setting NORMAL, SECURE, or SERVICE.	Go to "Step 0230–002."
<ul style="list-style-type: none">No response from TTY console	Go to "Step 0230–014" on page 1-52.
<ul style="list-style-type: none">Yellow or green LEDs on node will not light.	Go to "Step 0230–022" on page 1-55.

Step 0230–002: Either the node will not reset or there is a problem with the mode switch.

1. Check with customer to make sure this processor node is not in the current active configuration.
2. If processor node is *not* operational and actively working at this time, continue service.
3. If the processor node *is* operational and actively working, schedule a time convenient for the customer.
4. From the control workstation, open the node front panel display.
5. Make note of the mode switch position for this processor node.
6. Set mode switch to something other than that recorded above.
7. If not already there, set the mode switch to SERVICE.

Note: Do NOT recycle node power until reset fault is verified.

8. Does the mode switch fail to toggle?
 - If yes, go to "Step 0230–007" on page 1-49.
 - If no, go to "Step 0230–003."

Step 0230–003: You are able to toggle the mode switch.

1. Problem not related to mode switch.
2. Was mode originally in SERVICE position as noted in "Step 0230–002"?
 - If yes, go to "Step 0230–005" on page 1-49.
 - If no, go to "Step 0230–004" on page 1-49.

Step 0230–004: In “Step 0230–002,” you found that the mode switch was not in the SERVICE position.

1. Customer may have tried to reset processor node in SECURE mode. Reset will only take effect in NORMAL or SERVICE modes.
2. From the control workstation, reset this processor node.
3. Does processor node reset?
 - If yes, no problem found.
 - a. Inform customer that the processor node will not reset if the mode switch is in the SECURE position.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, problem with reset.
 - Go to “Step 0230–007.”

Step 0230–005: In “Step 0230–002” on page 1-48, you found that the mode switch was in the SERVICE position.

1. From the control workstation, reset the processor node.
2. Does the processor node reset?
 - If yes, go to “Step 0230–006.”
 - If no, problem with reset.
 - Go to “Step 0230–007.”

Step 0230–006: The mode switch was originally in the SERVICE position, and you were able to reset the processor node. This indicates that an intermittent problem may be occurring.

1. Record the following:
 - Node number
 - Date / Time fault reported
 - Type of fault reported.
2. Check logs to see if this fault has been previously recorded.
3. Is this a recurring fault?
 - If the logs indicate that this fault has occurred before:
 - a. Treat this fault as a solid failure.
 - b. Go to “Step 0230–012” on page 1-51.
 - If this is not a recurring failure, go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0230–007: Previous steps indicate problem with reset.

1. From the control workstation node front panel display:
 - Power-off processor node.
 - Power-on processor node.
 - Check 3-digit LEDs for LED sequence indicating IPL.

Wide Processor Node control (MAP 0230)

2. Do the 3-digit LEDs change?

- If yes, go to "Step 0230–008."
- If no, node supervisor card not responding to commands.
 - Go to "Frame supervisor not responding (MAP 0110)" in *RS/6000 SP: System Service Guide*.

Step 0230–008:

1. Processor node is IPLing.

2. Do 3-digit LEDs eventually indicate completion of IPL sequence (i.e. blank or "uuu")?

- If yes, go to "Step 0230–009."
- If no, processor node has problem IPLing.
 - a. If 3-digit LEDs stop at constant 200, problem with SECURE signal.
 - Go to "Step 0230–012" on page 1-51 to continue service.
 - b. If 3-digit LEDs do not stop at constant 200, go to the "Diagnostics using Perspectives node status front panel display" table in MAP 0140 in *RS/6000 SP: System Service Guide* to continue service.

Step 0230–009: You have arrived at this step from "Step 0230–008," where you found that the 3-digit LEDs eventually indicated completion of IPL sequence (i.e. blank or "uuu").

1. From node front panel display, click on "TTY" button to open a TTY console.

2. From the TTY console:

- Select "Advanced Diagnostic Routines".
- Select "System Verification".
- Select "Base System".

3. Following directions for the "Key Mode Switch Test", set the mode switch on the front panel of the processor node.

4. Does this test indicate a failure?

- If yes, go to "Step 0230–012" on page 1-51.
- If no, go to "Step 0230–010."

Step 0230–010: The "Key Mode Switch Test" did not indicate a failure.

1. From the control workstation, reset this processor node.

2. Does processor node reset?

- If yes, go to "Step 0230–011" on page 1-51.
- If no, problem with reset.
 - Go to "Step 0230–012" on page 1-51 to continue isolation.

Step 0230–011: The “Key Mode Switch Test” in “Step 0230–009” did not indicate a failure. You were able to reset the processor node.

1. Node reset and mode switches functioning properly.
2. Was this a solid problem (If the problem was cleared by power-on only, answer 'No')?
 - If yes, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, this is an intermittent problem.
 - a. Please record following tracking information:
 - Node number
 - Date / Time fault reported
 - Type of fault reported
 - Action taken or component replaced
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0230–012: Problem with reset or mode switch function.

1. From the control workstation, power off processor node.
2. Place processor node in service position.
3. Use the following prioritized table to continue service:

Table 1-25. Reset and mode switch service priorities		
Priority	Component	Action
1	Cable N00-SV-PS39 to N00-PL-P39	1. Check for proper seating and opens/shorts. See Table 1-26 on page 1-52. If no problem is found, continue at Priority 2. 2. Repair or replace cable assembly as required. 3. Go to “Step 0230–013” on page 1-52 to verify fix.
2	Cable N00-PL-P40 to N00-PC-P40 and N00-PC-P41	1. Check for proper seating and opens/shorts. See Table 1-26 on page 1-52. If no problem is found, continue at Priority 3. 2. Repair or replace cable assembly as required. 3. Go to “Step 0230–013” on page 1-52 to verify fix.
3	Wide Node Supervisor Card	1. Replace card. 2. Perform "Verification test for supervisor bus" in <i>RS/6000 SP: System Service Guide</i> . 3. Go to “Step 0230–013” on page 1-52 to verify fix.
4	I/O Planar Board	1. Replace board. 2. Go to “Step 0230–013” on page 1-52 to verify fix.
5	All replaced	Call next level of support.

Node supervisor card N00-NS-JS39 to I/O planar N00-PL-J39 cable check points:

Wide Processor Node control (MAP 0230)

Table 1-26. Cable continuity check points

Signal	From	To
Reset	N00-SV-PS39 pin A12	N00-PL-P39 pin 7
Service	N00-SV-PS39 pin A13	N00-PL-P39 pin 3
Secure	N00-SV-PS39 pin B12	N00-PL-P39 pin 2

Step 0230–013: Component has been repaired or replaced.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. Put the circuit breaker at the front of the processor node in the On ('1') position.
4. Go to "Step 0230–008" on page 1-50 to continue service.

Step 0230–014: You did not get response from a processor node TTY console.

1. Make sure processor node was IPLed in NORMAL mode.
2. From system file server, telnet into this processor node:
telnet nodename
3. Log in as "root".
4. Have the customer check to make sure that the TTY port on the processor node is correctly defined.
 - a. Check console configuration by issuing the following command in the processor node's window:

smit console

Use the menu options to check and/or reconfigure the console as required. If the console is not configured to use the TTY port, then the processor node will not print messages to the screen during IPL.

- b. Check the TTY configuration by issuing the following command in the processor node's window:

smit tty

Use the menu options to check and/or reconfigure the "s1" TTY port as required. The proper TTY parameters are listed in *IBM RS/6000 SP: Administration Guide*.

5. Is the TTY port defined properly, and the console setup to use the TTY port?
 - If yes, go to "Step 0230–015."
 - If no, TTY not responding due to customer configuration.
 - a. Customer must configure these parameters.
 - b. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Step 0230–015: Problem due to hardware.

1. If the console TTY window is open, close it now.
2. Log into the node over the Ethernet:

telnet nodename

3. Enter the following command:

chcons /dev/tty1

4. Use **diag** command to run regular (not advanced) diagnostics on “TTY0”.
5. Do the diagnostics pass (no problem found)?
 - If yes, go to “Step 0230–016.”
 - If no:
 - a. Replace I/O planar board.
 - b. Go to “Step 0230–017.”

Step 0230–016: If you find no problems and the diagnostics pass:

1. Log into the node over the Ethernet:
telnet nodename
2. Enter the following command:
chcons /dev/tty0
3. From the control workstation, make sure the node front panel display is open.
4. Close TTY console.
5. Have the customer remove the processor node from the active system configuration and power off the processor node.
6. Put the circuit breaker at the front of the processor node in the Off ('0') position.
7. Place processor node in service position.
8. Refer to Table 1-27 for priority of replacement or repair of components.

Table 1-27. Component repair or replacement priority table

Priority	Component	Action
1	Cable N00-SV-PS37 to N00-PL-P37	1. Check for proper seating. If no problem found, continue at Priority 2. 2. Repair or replace cable assembly as required. 3. Go to “Step 0230–017” to verify fix.
2	Cable N00-PC-P40 to N00-PL-P40 and N00-PL-P41	1. Check for proper seating. If no problem found, continue at Priority 3. 2. Repair or replace cable assembly as required. 3. Go to “Step 0230–017” to verify fix.
3	Wide Node Supervisor Card	1. Replace card. 2. Perform "Verification test for supervisor bus" in <i>RS/6000 SP: System Service Guide</i> . 3. Go to “Step 0230–017” to verify fix.
4	I/O Planar Board	1. Replace board. 2. Go to “Step 0230–017” to verify fix.
5	All replaced	Call next level of support.

Step 0230–017: Component has been repaired or replaced.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. As processor node completes IPL, check the TTY console window.
4. From the control workstation node front panel display, put the processor node in SERVICE mode.

Wide Processor Node control (MAP 0230)

5. Put the circuit breaker at the front of the processor node in the On ('1') position.
6. Do you get any data on the TTY console screen?
 - If yes, go to "Step 0230–018."
 - If no, go to "Step 0230–016" on page 1-53 to service next highest priority component.

Step 0230–018: Processor node IPLed in SERVICE mode.

1. From the TTY console:
 - Select "Advanced Diagnostic Routines"
 - Select "System Verification"
 - Select "Base System"
2. Does processor node pass all diagnostics?
 - If yes, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no:
 - a. Repair problem as indicated by diagnostics.
 - b. Use "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide*, as necessary.

Step 0230–019: You discovered a 3-digit LED problem.

1. Have the customer remove the processor node from the active system configuration and power off the processor node.
2. Put the circuit breaker at the front of the processor node in the Off ('0') position.
3. Place processor node in service position.
4. Refer to the following table for priority of replacement or repair of components.

Table 1-28. 3-digit LED problem diagnosis		
Priority	Component	Action
1	Cable N00-SV-PS39 to N00-PL-P39	1. Check for proper seating. If no problem found, continue at Priority 2. 2. Repair or replace cable assembly as required. 3. Go to "Step 0230–020" on page 1-55 to verify fix.
2	Cable N00-PC-P40 to N00-PL-P40 and N00-PL-P41	1. Check for proper seating. If no problem found, continue at Priority 3. 2. Repair or replace cable assembly as required. 3. Go to "Step 0230–020" on page 1-55 to verify fix.
3	Wide Node Supervisor Card	1. Replace card. 2. Perform "Verification test for supervisor bus" in <i>RS/6000 SP: System Service Guide</i> . 3. Go to "Step 0230–020" on page 1-55 to verify fix.
4	I/O Planar Board	1. Replace board. 2. Go to "Step 0230–020" on page 1-55 to verify fix.
5	All Replaced	Call next level of support.

Step 0230–020: Component has been repaired or replaced.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. From the control workstation, power on this processor node.
4. From the control workstation, make sure the 3-digit LEDs for this processor node are displayed on the screen.
5. Check the 3-digit LEDs for the IPL sequence.
6. Do the 3-digit LEDs indicate the IPL sequence?
 - If yes, go to “Step 0230–021.”
 - If no, go to “Step 0230–019” on page 1-54 to service next highest priority component.

Step 0230–021: The 3-digit LEDs indicate the IPL sequence.

1. From the TTY console:
 - Select “Advanced Diagnostic Routines”
 - Select “System Verification”
 - Select “Base System”
2. Does processor node pass all diagnostics?
 - If yes, problem resolved.
 - Go to “End of call MAP (MAP 0650)” in *RS/6000 SP: System Service Guide*.
 - If no:
 - a. Repair problem as indicated by diagnostics.
 - b. Use “Processor node diagnostics and descriptions (MAP 0130)” in *RS/6000 SP: System Service Guide*, as necessary.

Step 0230–022: Yellow or green LED on processor node is not functioning.

1. Have the customer remove the processor node from the active system configuration and power off the processor node.
2. Put the circuit breaker at the front of the processor node in the Off (‘0’) position.
3. Perform “Node supervisor self-test” on page 3-10, ignoring PASS/FAIL results.
4. Check yellow and green LEDs at front and rear of processor to see if each LED lights at some point.
5. Does each of the four LEDs light at any time?
 - If yes, go to “Step 0230–024” on page 1-56.
 - If no, go to “Step 0230–023.”

Step 0230–023: At least one of the four LEDs does not light.

1. Place processor node in service position.
2. Repeat “Node supervisor self-test” on page 3-10.
3. Check to see if same color LED is always Off in front and rear.
4. Are LEDs of same color always Off in rear?

Wide Processor Node dc short/open (MAP 0240)

- If yes:
 - a. Replace the node supervisor card.
 - b. Perform "Node supervisor self-test" on page 3-10 to verify replacement.
 - c. Go to "Step 0230–024."
- If no:
 - a. Replace LED display card.
 - b. Perform "Node supervisor self-test" on page 3-10.
 - c. If at any time both LEDs light, problem resolved.
 - Go to "Step 0230–024."
 - d. If both LEDs do not light at any time:
 - 1) Perform "Node supervisor self-test" on page 3-10 to verify replacement.
 - 2) Go to "Step 0230–024."

Step 0230–024: All LEDs are operating.

1. Remove processor node from service position.
2. Reconnect all cables at rear of the processor node.
3. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.

Wide Processor Node dc short/open (MAP 0240)

Note: Refer to "Service position procedures" on page 3-14 for placing processor nodes in or removing nodes from service position.

Step 0240–001: You detected a problem in processor node power distribution by checking resistances of +4 V dc, +5 V dc, +12 V dc, and/or -12 V dc to ground.

1. Based on the message, use the information in the tables below to disconnect the appropriate cable and check resistance between the cable pins.

Table 1-29. Resistance table

Voltage	Cable	From (positive lead)	To GND (negative lead)	Acceptable Range (in ohms)
+4 V	N00-PC-P16A	Pin 4	Pin 10	6 - 25
+5 VM	N00-PC-P13A	Pin 4	Pin 10	1K - 5M
+5 VI	N00-PC-P40A N00-PC-P45 N00-PC-P65	Pin 10 Pin 4 Pin 4	Pin 1 Pin 3 Pin 3	10 - 30 100 - 500* 100 - 500*
+12 V	N00-PC-P40A N00-PC-P45 N00-PC-P65	Pin 6 Pin 1 Pin 1	Pin 1 Pin 2 Pin 2	800 - 100K 1K - 5K* 1K - 5K*
-12 V	N00-PC-P40A	Pin 3	Pin 1	1K - 20K*
Note: *Resistance range assumes DASD(s) attached on this cable. With no DASD(s) attached, an open will be measured.				

Table 1-30. Cable connections

Connector	Component
N00-PC-P16A N00-PC-P13A	CPU planar
N00-PC-P40A	I/O planar
N00-PC-P45 N00-PC-P65	DASD 3 / DASD 4 DASD 1 / DASD 2

2. Was resistance below acceptable range?

- If yes, measured resistance is too low.
 - Use the following table to continue service based on the cable connector where the short was detected:

Table 1-31. Short service actions

Connector	Component	Action
N00-PC-P16A N00-PC-P13A	CPU planar	Go to "Step 0240–003" on page 1-58.
N00-PC-P40A	I/O planar	Go to "Step 0240–004" on page 1-58.
N00-PC-P45 N00-PC-P65	DASD 3 / DASD 4 DASD 1 / DASD 2	Go to "Step 0240–008" on page 1-59.

- If no, go to "Step 0240–002."

Step 0240–002: Measured resistance is too high.

1. Check for one or more of the following conditions:

- Open in power cable.
- Open in voltage distribution caused by a shorted component. Refer to list in "Step 0240–001" on page 1-56 for suspect components.

2. Remove the suspect components and inspect for damage.

3. check the following list for other suspect parts:

- Micro Channel adapter cards
- Memory cards

4. Replace any damaged components found during inspection.

5. Recheck resistance in Table 1-29 on page 1-56.

6. Is resistance in the acceptable range?

- If yes, problem resolved.
 - Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
- If no:
 - a. Replace the appropriate component using Table 1-30.
 - b. Go to "Step 0240–009" on page 1-59 to verify fix.

Wide Processor Node dc short/open (MAP 0240)

Step 0240–003:

1. Problem involves the CPU planar.
2. Clip multimeter leads to the connector pins for the voltage that shows resistance out of range.
3. Remove memory cards (one at a time) until all components have been removed or resistance enters acceptable range.
4. Did the short disappear during the process of removing the memory cards?
 - If yes, Problem was in memory cards.
 - a. Replace the memory card that is causing the short.
 - b. Go to “Step 0240–009” on page 1-59.
 - If no:
 - a. Replace the CPU planar.
 - b. Go to “Step 0240–009” on page 1-59 to verify fix.

Step 0240–004: Problem involves I/O planar.

1. Are there any Micro Channel slots empty?
 - If yes, go to “Step 0240–007.”
 - If no, go to “Step 0240–005.”

Step 0240–005: Card requirements may exceed Micro Channel specifications.

1. Has customer recently added or exchanged Micro Channel adapters?
 - If yes, go to “Step 0240–006.”
 - If no, go to “Step 0240–007.”

Step 0240–006: The customer recently added or exchanged Micro Channel adapters.

1. Remove the most recent adapters from this processor node.
2. Remove processor node from service position.
3. Reconnect all cables at rear of the processor node.
4. Power on processor node from control workstation.
5. Does this fix the problem?
 - If yes, this adapter was causing the problem.
 - Call the next level of support.
 - If no, problem still exists.
 - Go to “Step 0240–007.”

Step 0240–007: There is still a problem with the I/O Planar.

1. Make sure processor node is in service position.
2. Clip multimeter leads to the connector pins for the voltage that shows resistance out of range.
3. Remove Micro Channel adapters one-at-a-time until all adapters have been removed or resistance enters acceptable range.

4. Does the short disappear when you remove the Micro Channel adapters?

- If yes, problem is in Micro Channel adapters.
 - a. Replace the adapter that is causing the short.
 - b. Go to "Step 0240–009" to verify fix.
- If no:
 - a. Replace the I/O planar.
 - b. Go to "Step 0240–009."

Step 0240–008: Problem involves DASDs.

1. Clip multimeter leads to the connector pins for the voltage that shows resistance out of range.
2. Unplug the DASDs one-at-a-time until both DASD have been removed or resistance enters acceptable range.
3. Did removing the DASDs make the short disappear?
 - If yes, replace the DASD that is causing the short.
 - Go to "Step 0240–009" to verify fix.
 - If no:
 - a. Replace DASD power cable N00-PC-P45 or N00-PC-P65.
 - b. Go to "Step 0240–009" to verify fix.

Step 0240–009: Part was replaced.

1. Go back to "Step 0240–001" on page 1-56 and check resistance again.
2. Is resistance in the acceptable range?
 - If yes, problem resolved.
 - a. Remove processor node from service position
 - b. Reconnect all cables at rear of the processor node.
 - c. Put circuit breaker at front of processor node in the On ('1') position.
 - d. Go to "End of call MAP (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, problem not resolved.
 - Call next level of support.

Wide Processor Node dc short/open (MAP 0240)

Chapter 2. Locations

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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).
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 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 2-1 on page 2-3, Figure 2-2 on page 2-4, and Figure 2-4 on page 2-6, 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 2-1 shows a front view of the RS/6000 SP frame locations. "Frame (FRA)" on page 2-6 describes the assembly designations for the RS/6000 SP frame.

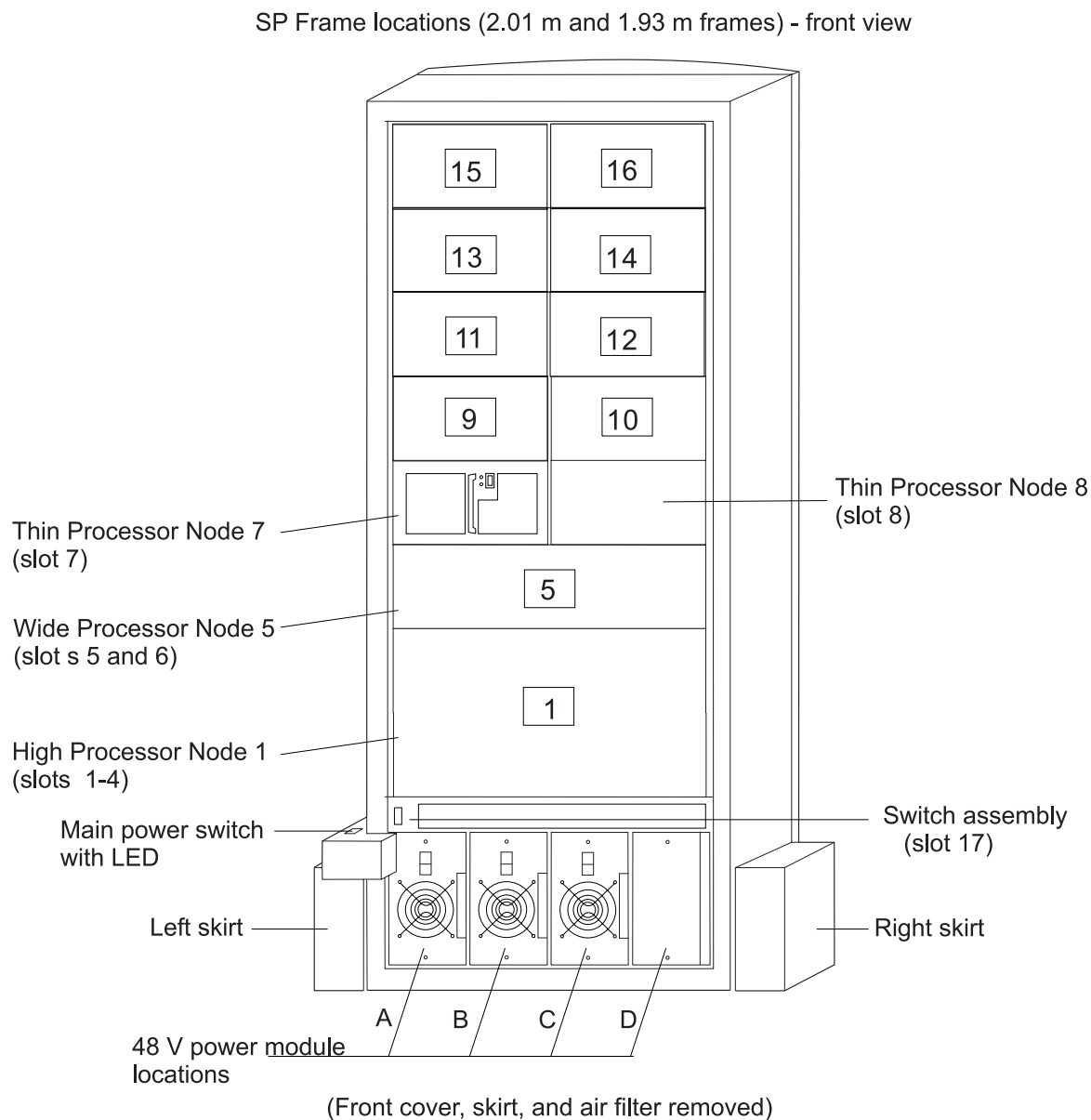


Figure 2-1. Front view of frame locations. See notes below.

Figure 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 up to N16.
4. A High node or SMP High node takes up 2 shelf positions (slots). It is identified by the least odd number position of the occupied slots.

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

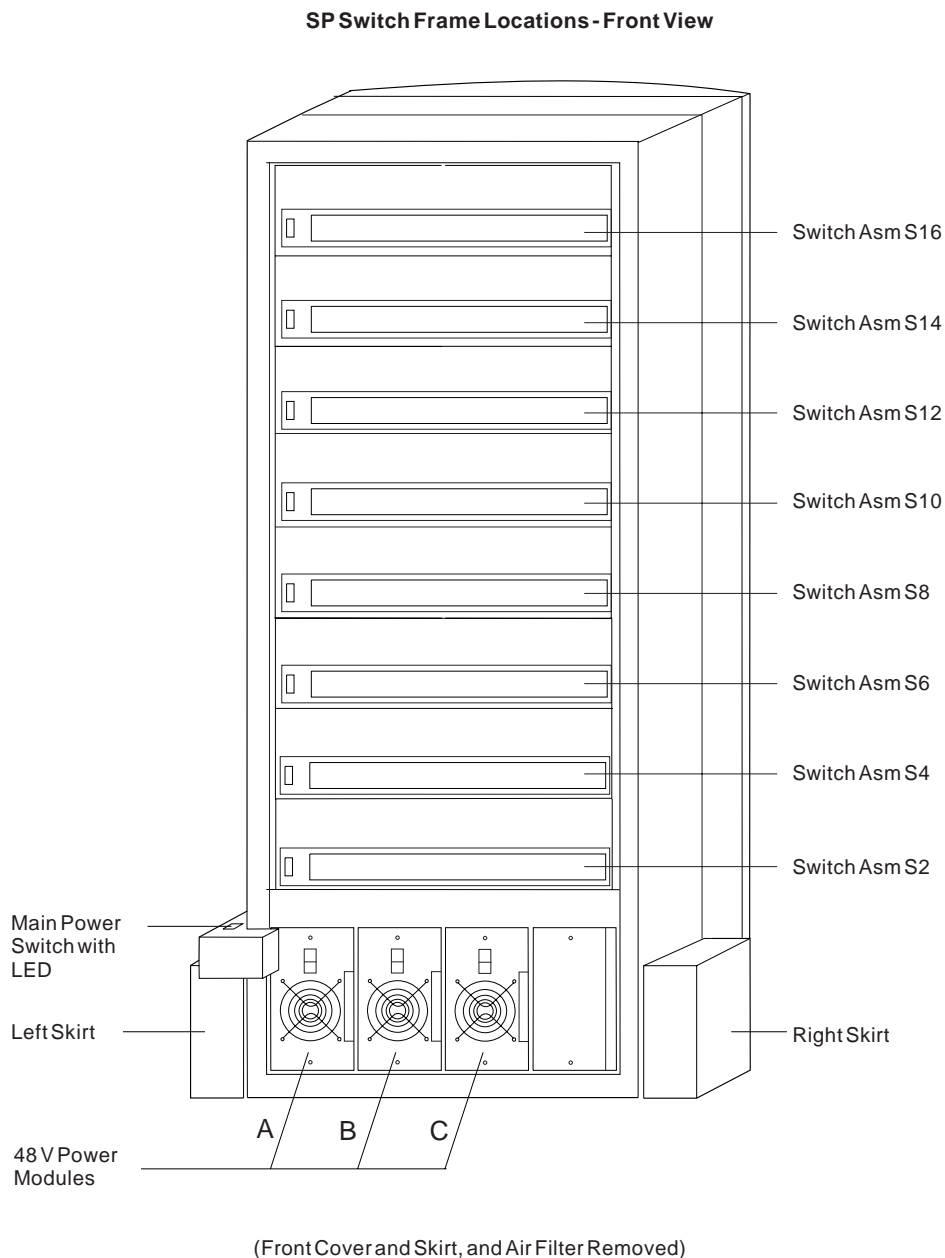


Figure 2-2. Front view of multi-switch frame locations

Figure 2-3 on page 2-5 shows a front view of the Model 3AX (49-inch) frame.

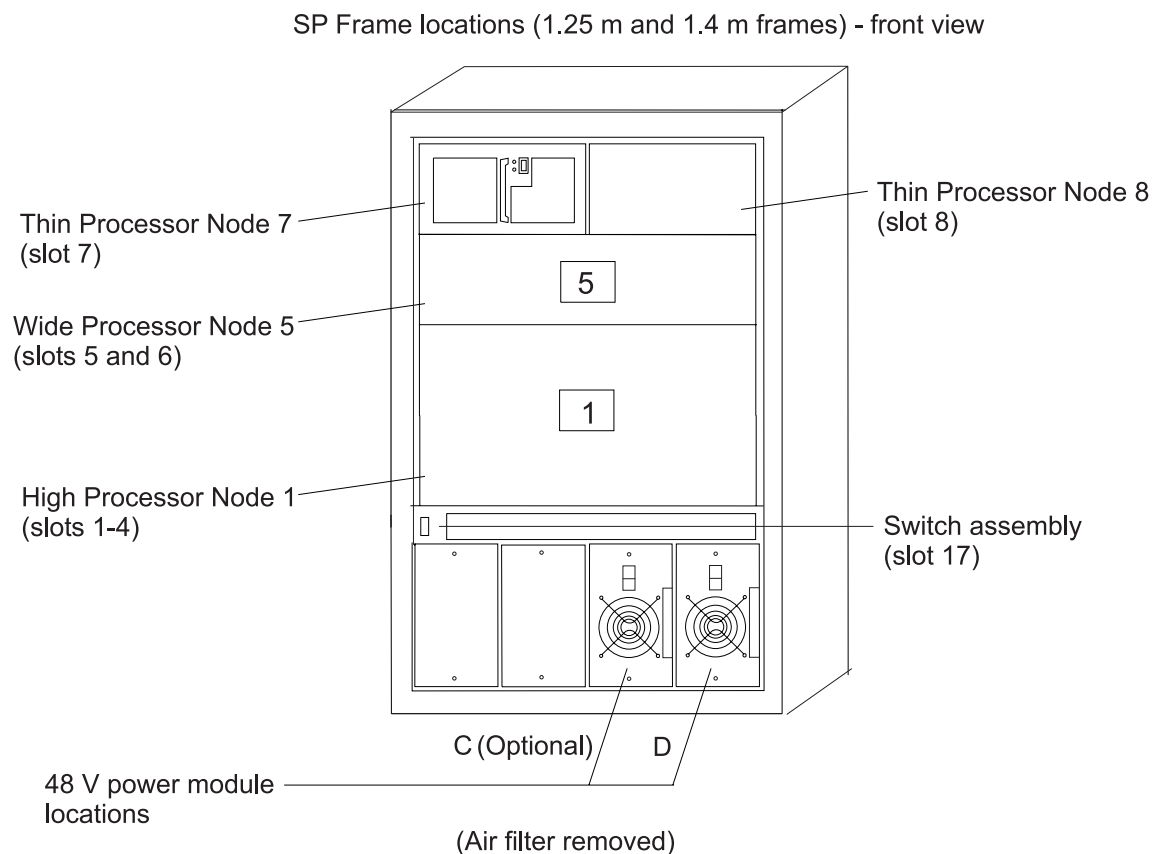


Figure 2-3. Front view of 49-inch frame locations. See notes below.

Figure 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 up to N8.
4. 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").
5. There are no skirts on the 49-inch frame.
6. A High node or SMP High node takes up 2 shelf positions (slots). It is identified by the least odd number position of the occupied slots.
7. The switch assembly is not available in the 1.4 m frame.

Figure 2-4 on page 2-6 shows a rear view of the RS/6000 SP frame locations.

SP Frame Locations - Rear View

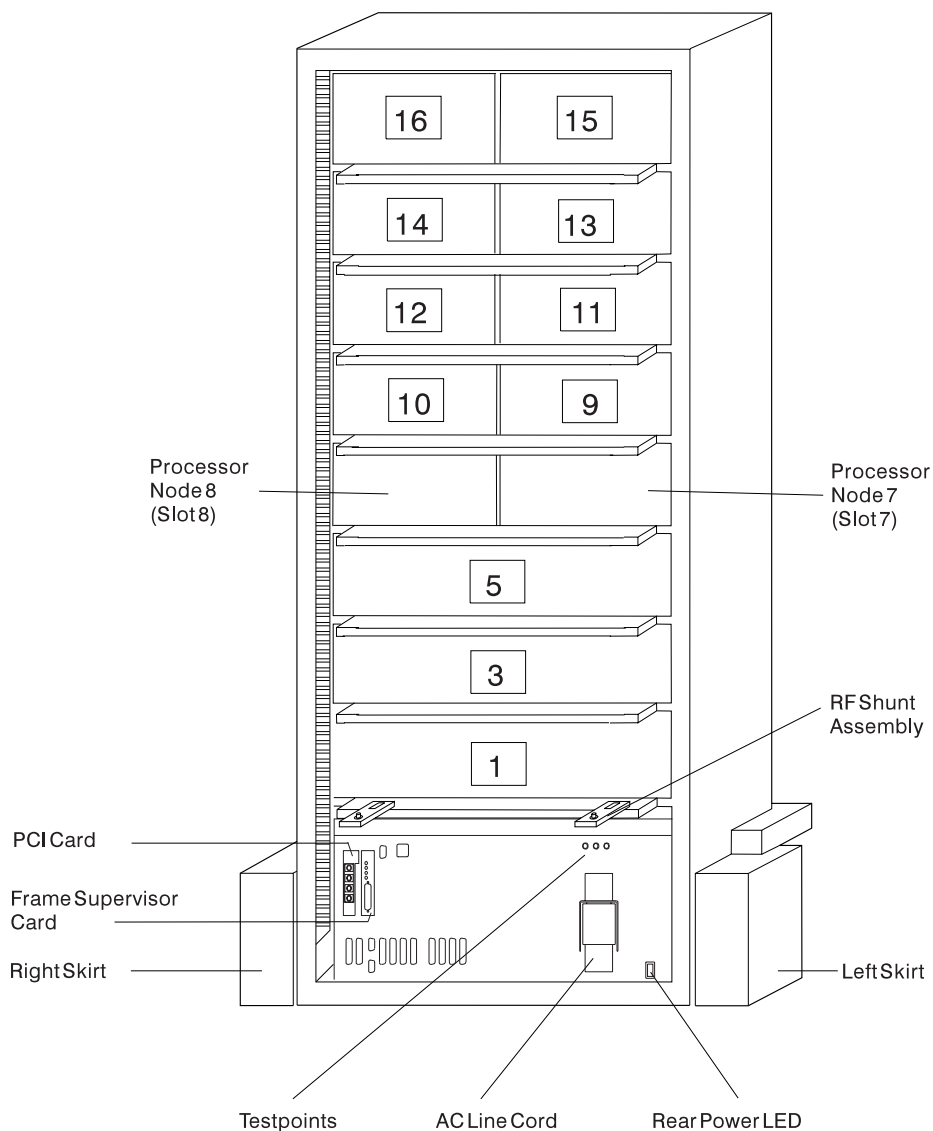


Figure 2-4. Rear view of frame locations

Note: See notes under Figure 2-1 on page 2-3 for processor node/switch assembly numbering.

Frame locations

Figure 2-1 on page 2-3 shows a front view of the RS/6000 SP frame locations, with numbered processor nodes, and the three phase SEPBU.

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

Thin Processor Node locations

Figure 2-5 on page 2-8 shows a top view of a RS/6000 SP Thin Node, Figure 2-6 on page 2-9 shows a top view of a RS/6000 SP Thin Node 2, and Figure 2-7 on page 2-10 shows a top view of a RS/6000 SP 120 or 160 MHz Thin Node. "Thin Processor Node (NXX)" on page 2-10 describes the thin processor node component designations.

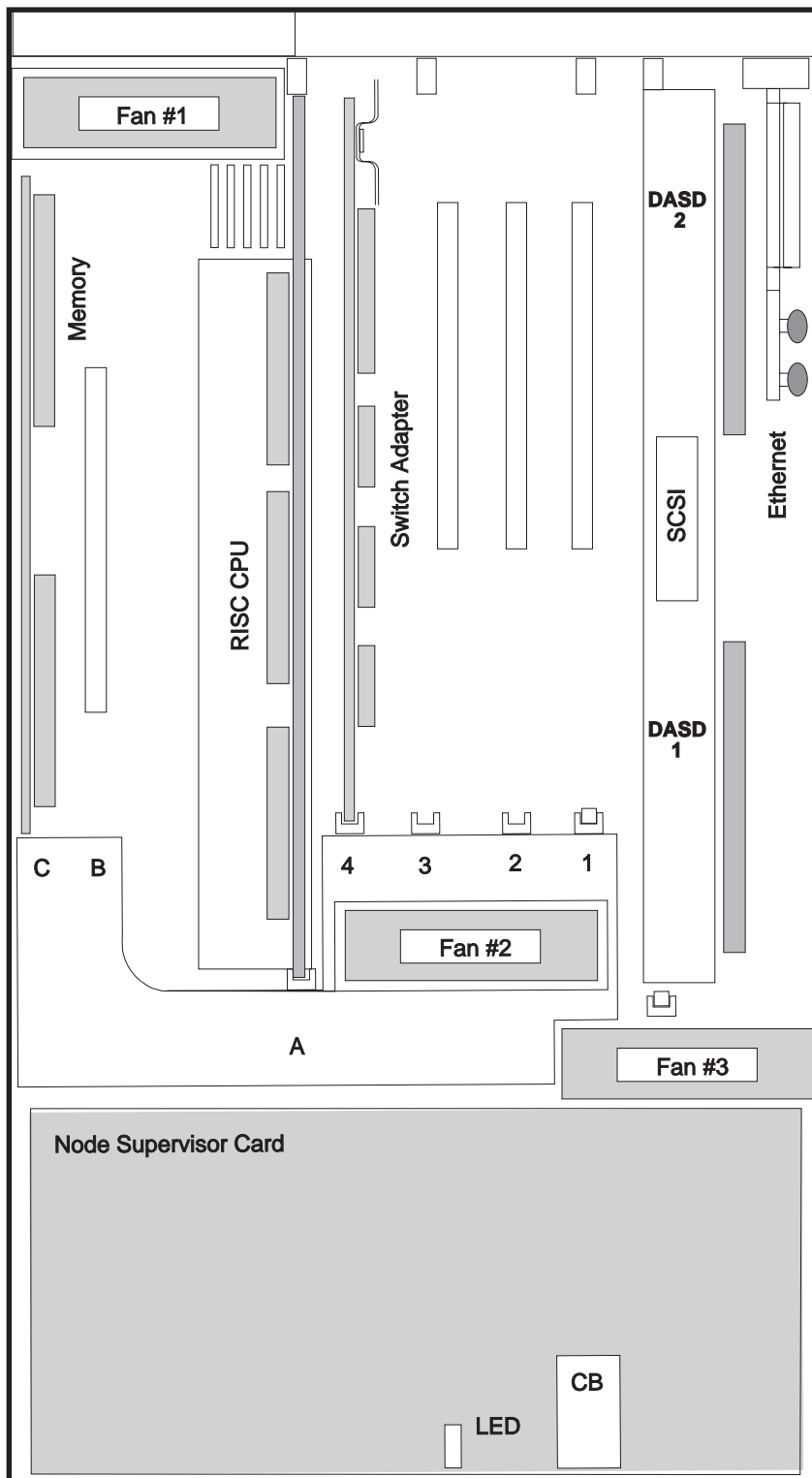
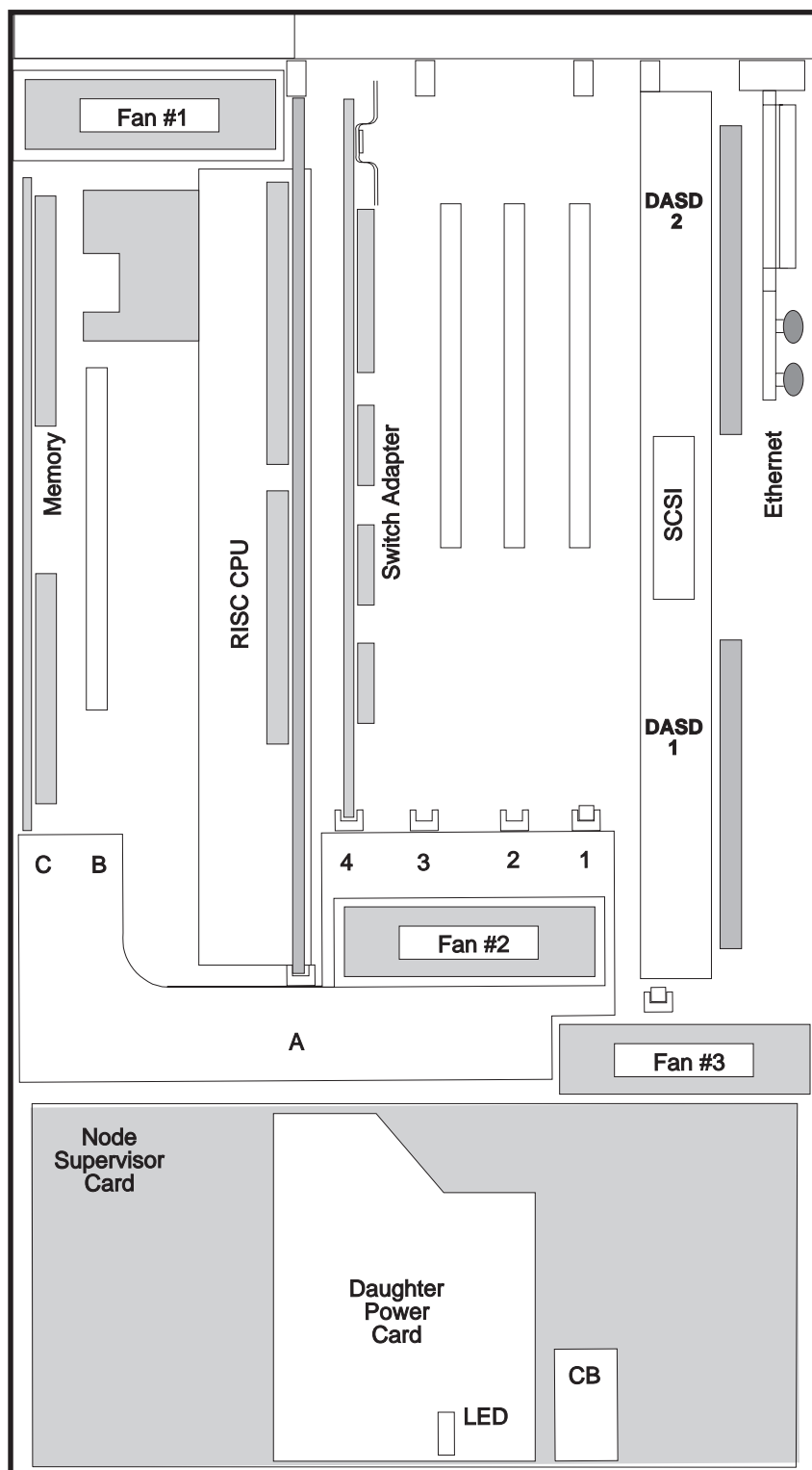


Figure 2-5. Top view of a RS/6000 SP Thin Processor Node



Note: For locations C and A on the Thin Node 2, AIX calls out H for C and D for A.

Figure 2-6. Top view of a RS/6000 SP Thin Processor Node 2

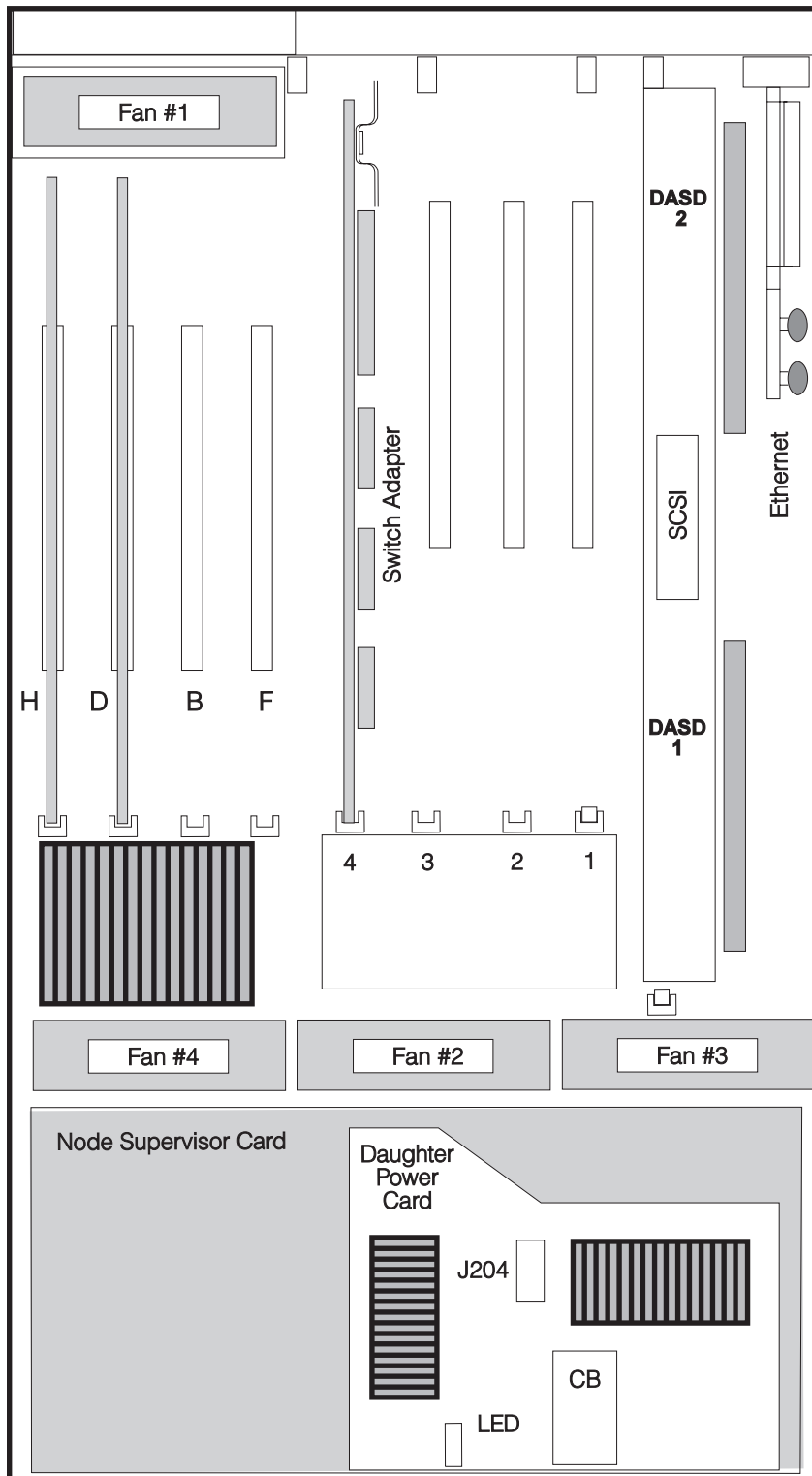


Figure 2-7. Top view of a RS/6000 SP 120 or 160 MHz Thin Processor Node

Thin Processor Node (NXX): This list shows the designations for the Thin 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 2-8 on page 2-12 shows the locations of connectors for a RS/6000 SP thin processor node:

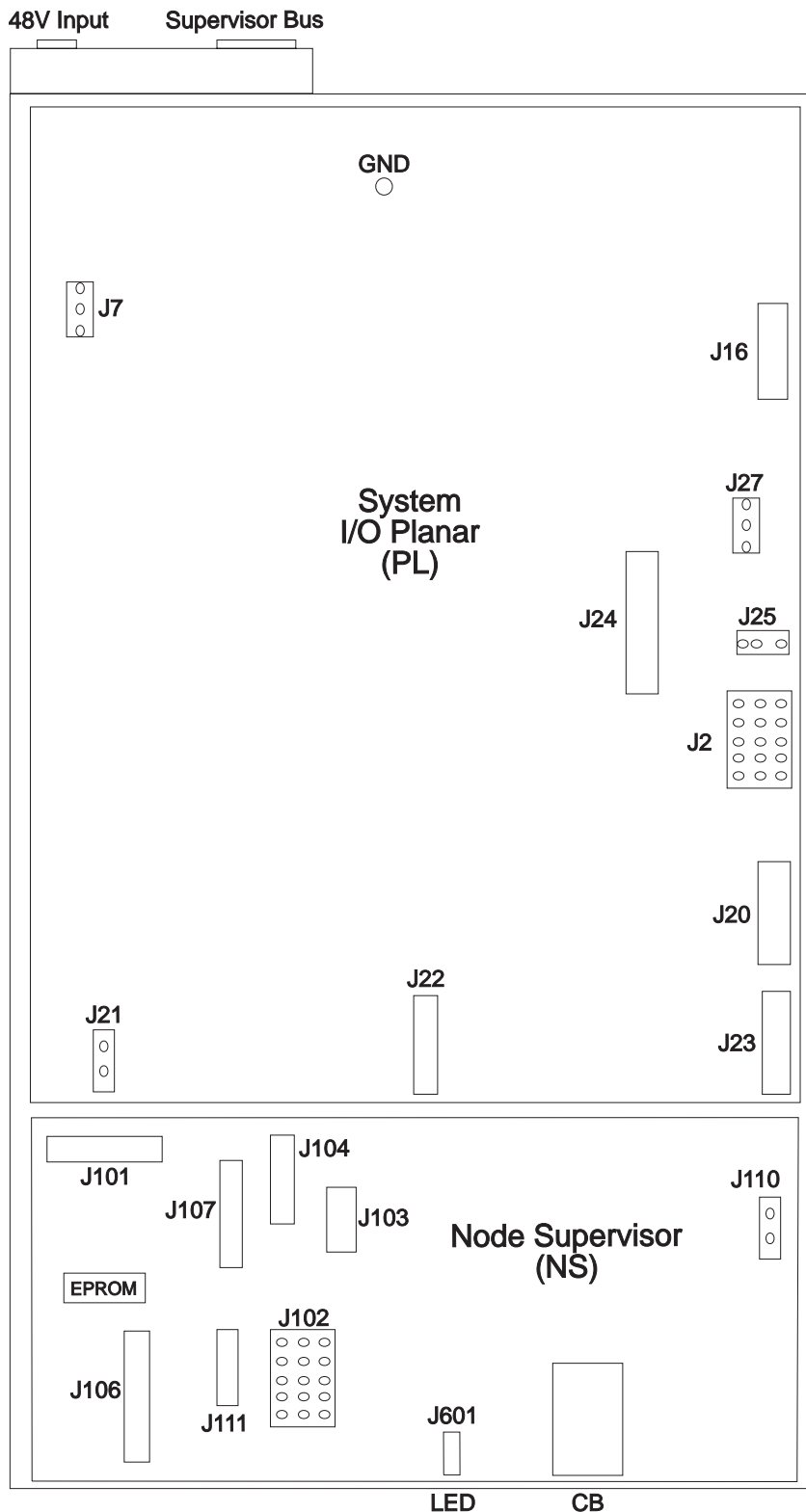


Figure 2-8. Connector locations in RS/6000 SP Thin Processor Node

Figure 2-9 on page 2-13 shows the locations of connectors for a RS/6000 SP 120 or 160 MHz Thin Node:

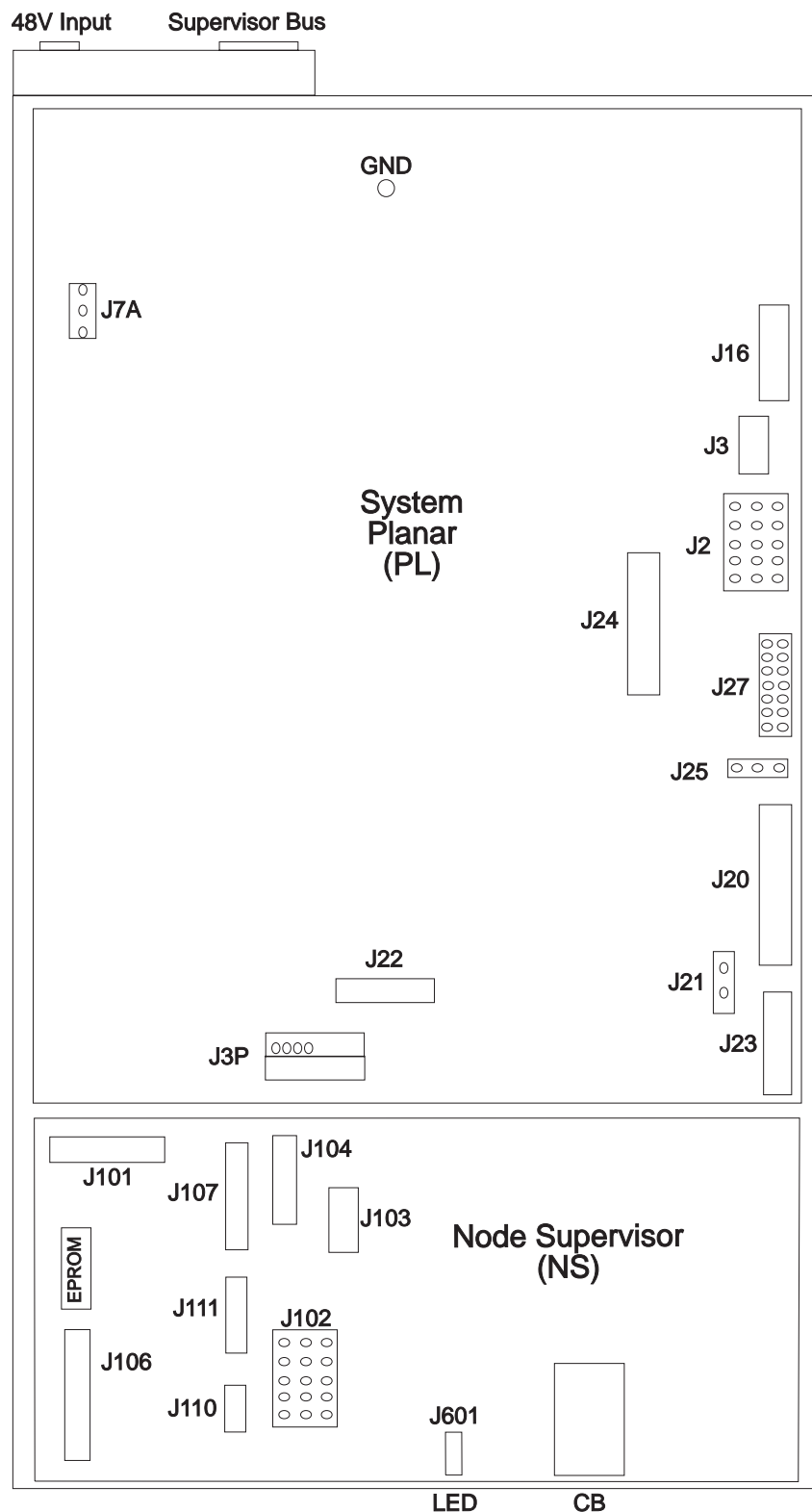


Figure 2-9. Connector locations in RS/6000 SP 120 and 160 MHz Thin Processor Node

Table 2-1 on page 2-14 describes the locations of the processor node cabling for the connectors shown in Figure 2-8 on page 2-12:

<i>Table 2-1. Thin Node connector descriptions</i>	
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: <ul style="list-style-type: none"> • 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 2-10 shows memory SIMM, cache-memory SIMM, and jack locations on the Thin Node 2 CPU card. Figure 2-11 shows memory SIMM locations on the 120/160 MHz Thin Node memory card. Figure 2-12 on page 2-15 shows memory SIMM locations on the 66 MHz Thin Node CPU card.

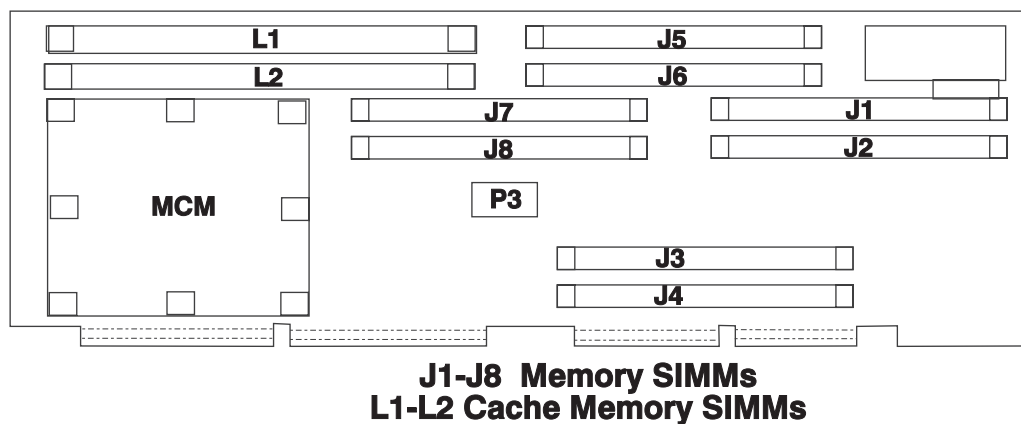


Figure 2-10. Thin Processor Node 2 CPU card locations

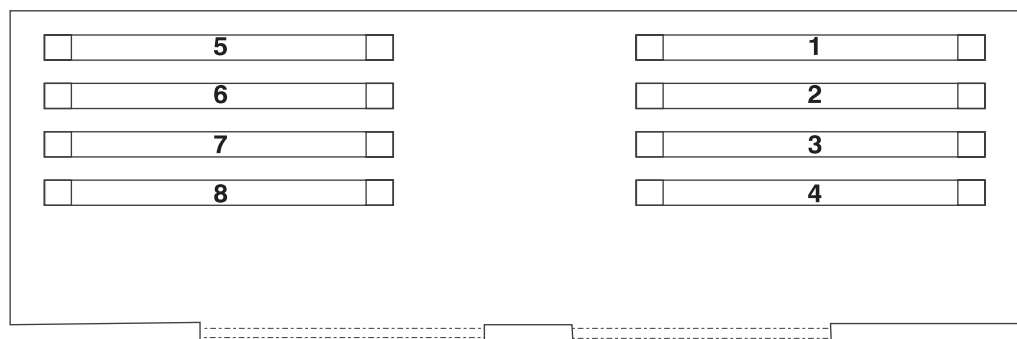


Figure 2-11. 120/160 MHz Thin Processor Node memory card SIMM card locations

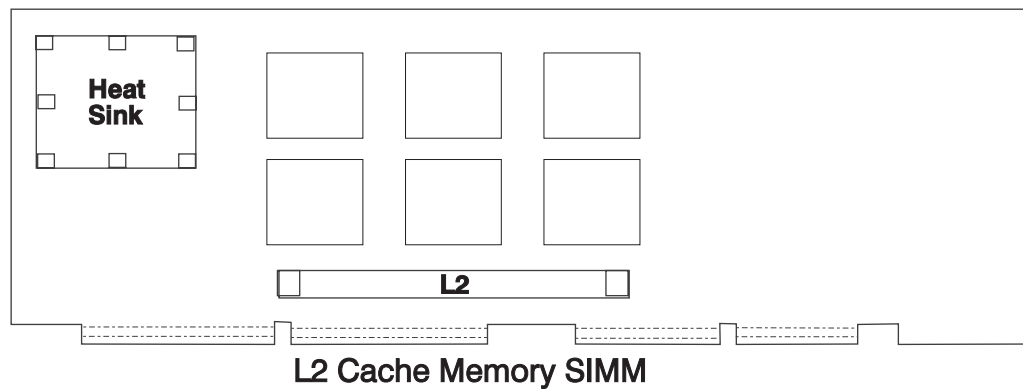


Figure 2-12. 66 MHz Thin Processor Node (with L2 cache) CPU card locations

Wide Processor Node locations

Figure 2-13 on page 2-16 shows a top view of a RS/6000 SP Wide Node:

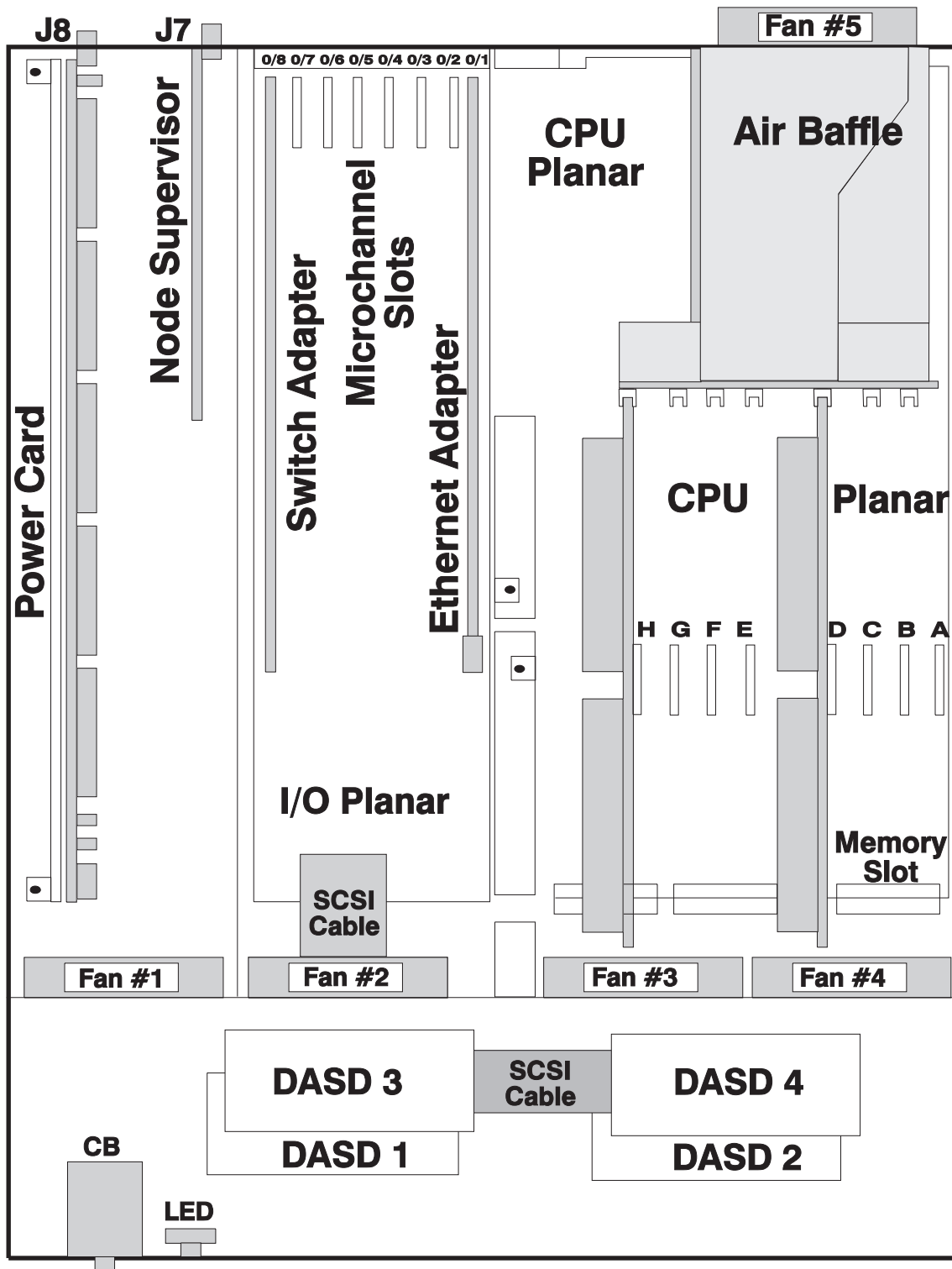


Figure 2-13. Top view of Wide Processor Node

Figure 2-14 on page 2-17 shows a top view of a RS/6000 SP 135 MHz wide processor node:

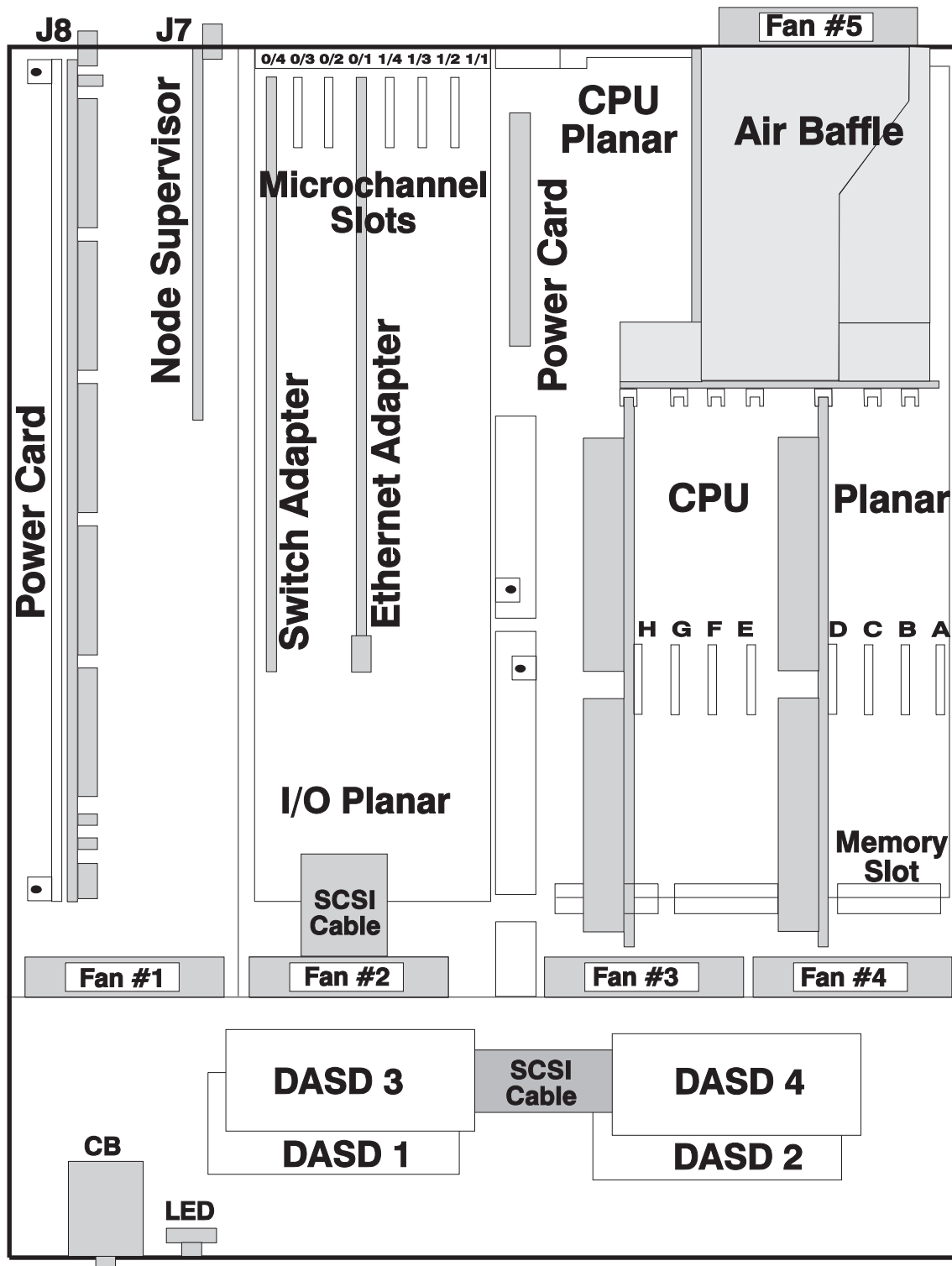


Figure 2-14. Top view of 135 MHz Wide Processor Node

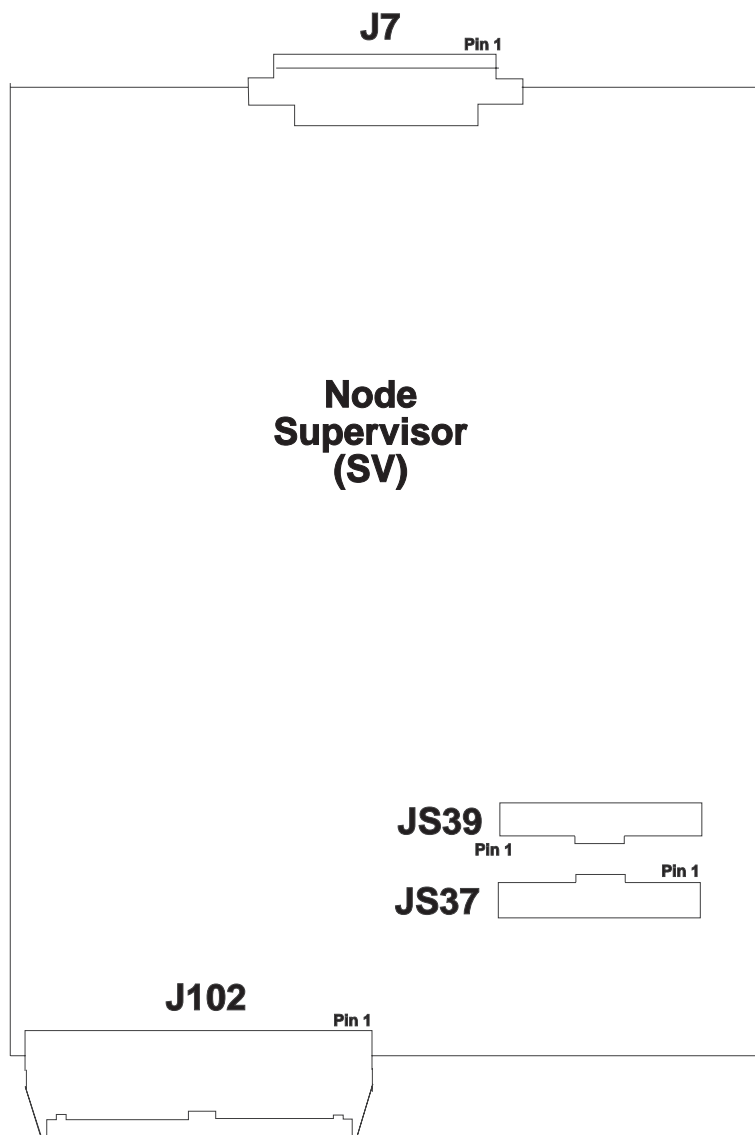


Figure 2-15 (Part 1 of 4). Wide Node connector locations

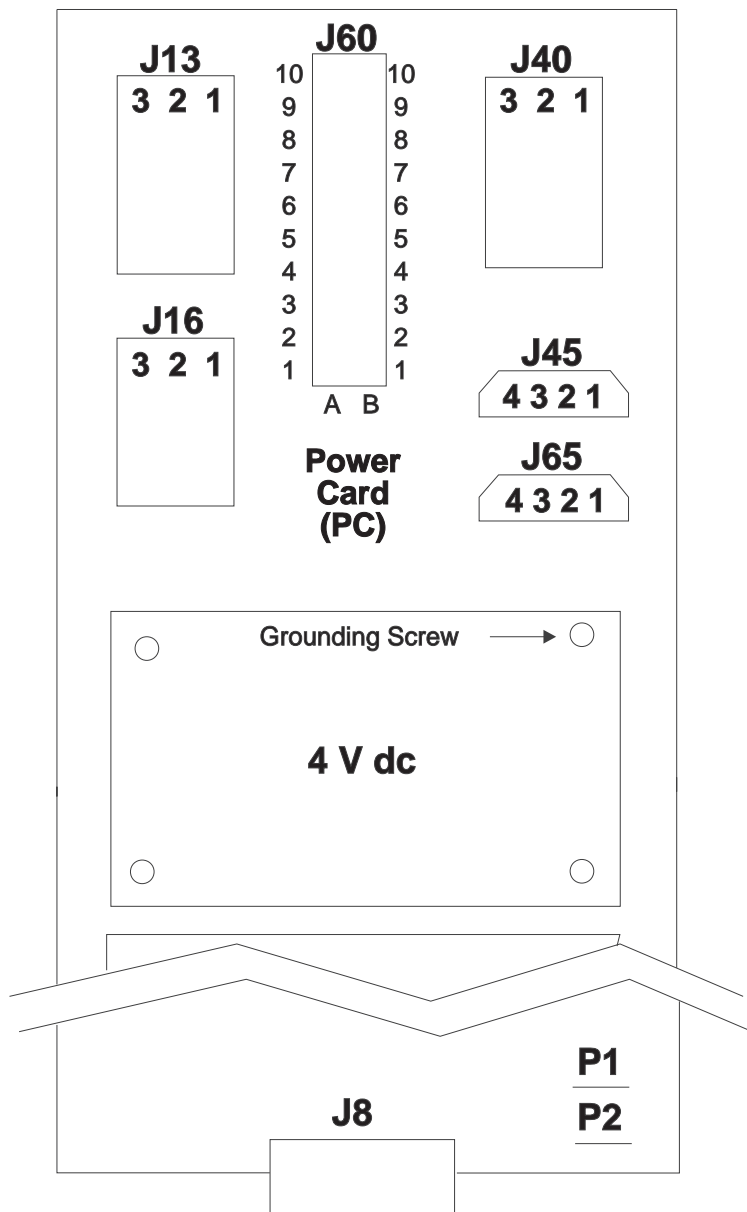


Figure 2-15 (Part 2 of 4). Wide Node connector locations

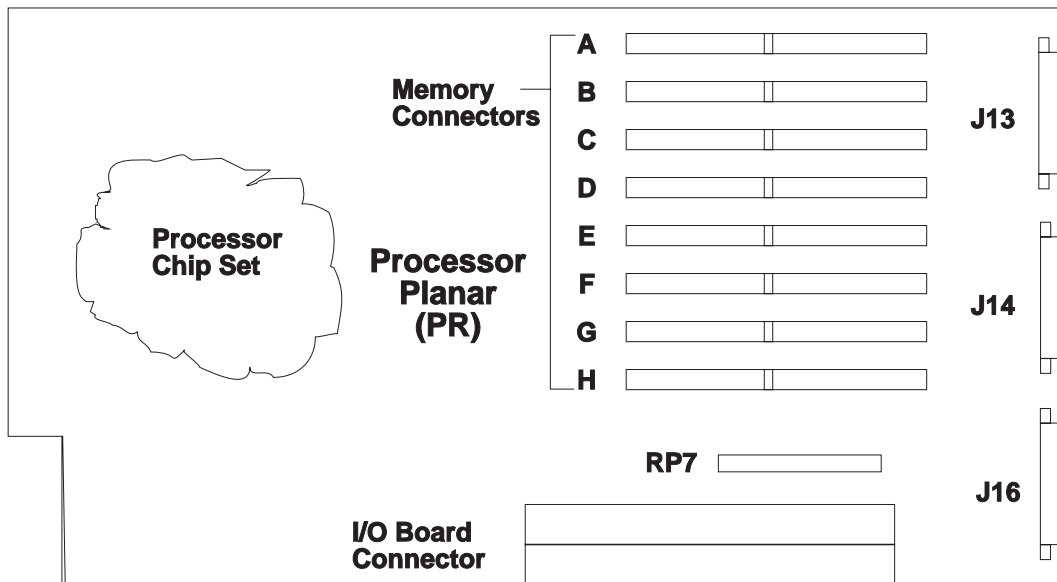


Figure 2-15 (Part 3 of 4). Wide Node connector locations

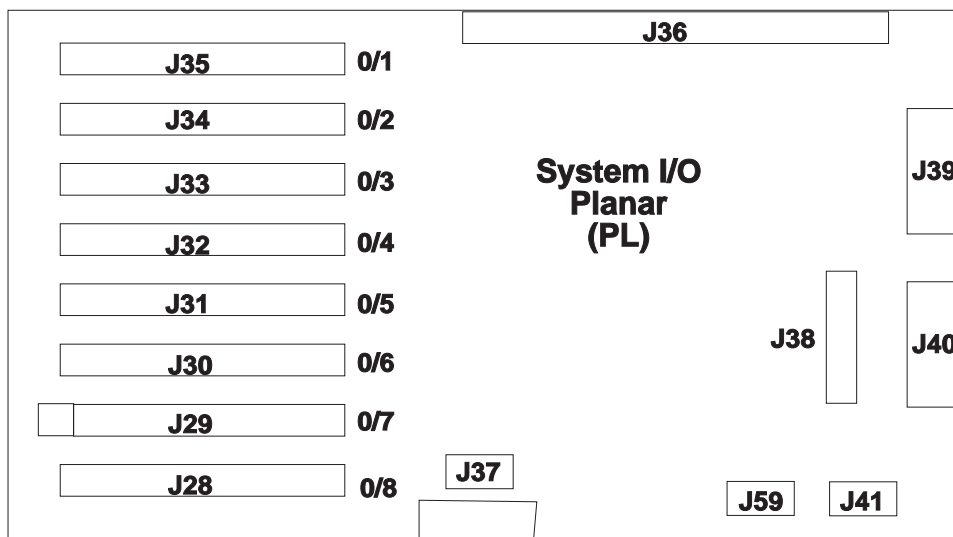


Figure 2-15 (Part 4 of 4). Wide Node connector locations

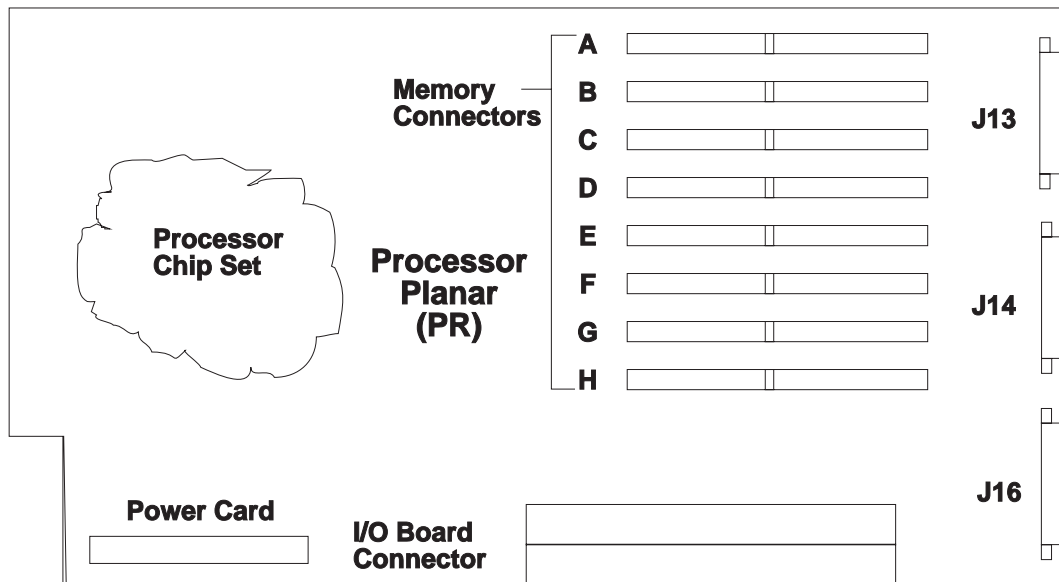


Figure 2-16 (Part 1 of 2). 135 MHz Wide Node connector locations

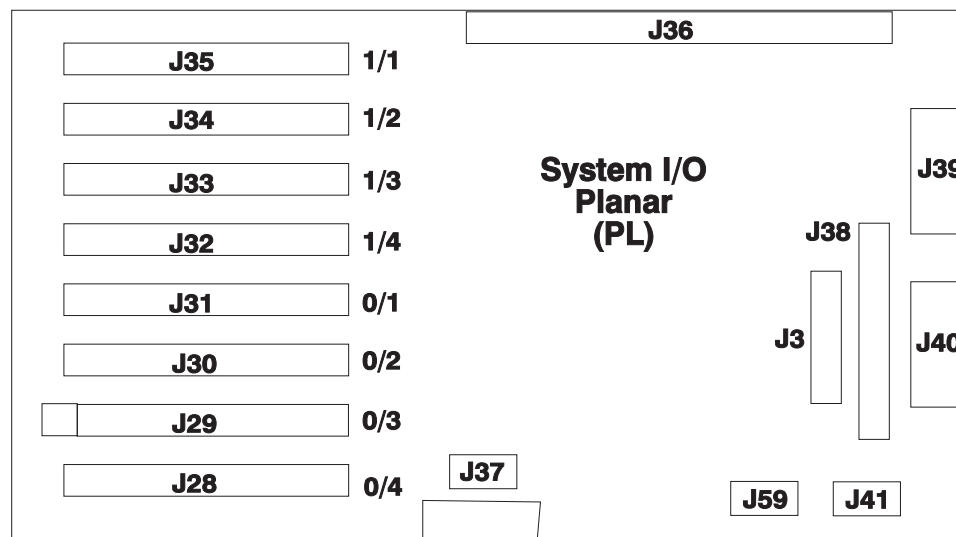


Figure 2-16 (Part 2 of 2). 135 MHz Wide Node connector locations

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

Connector details

Figure 2-17 shows RS/6000 SP component connector details.

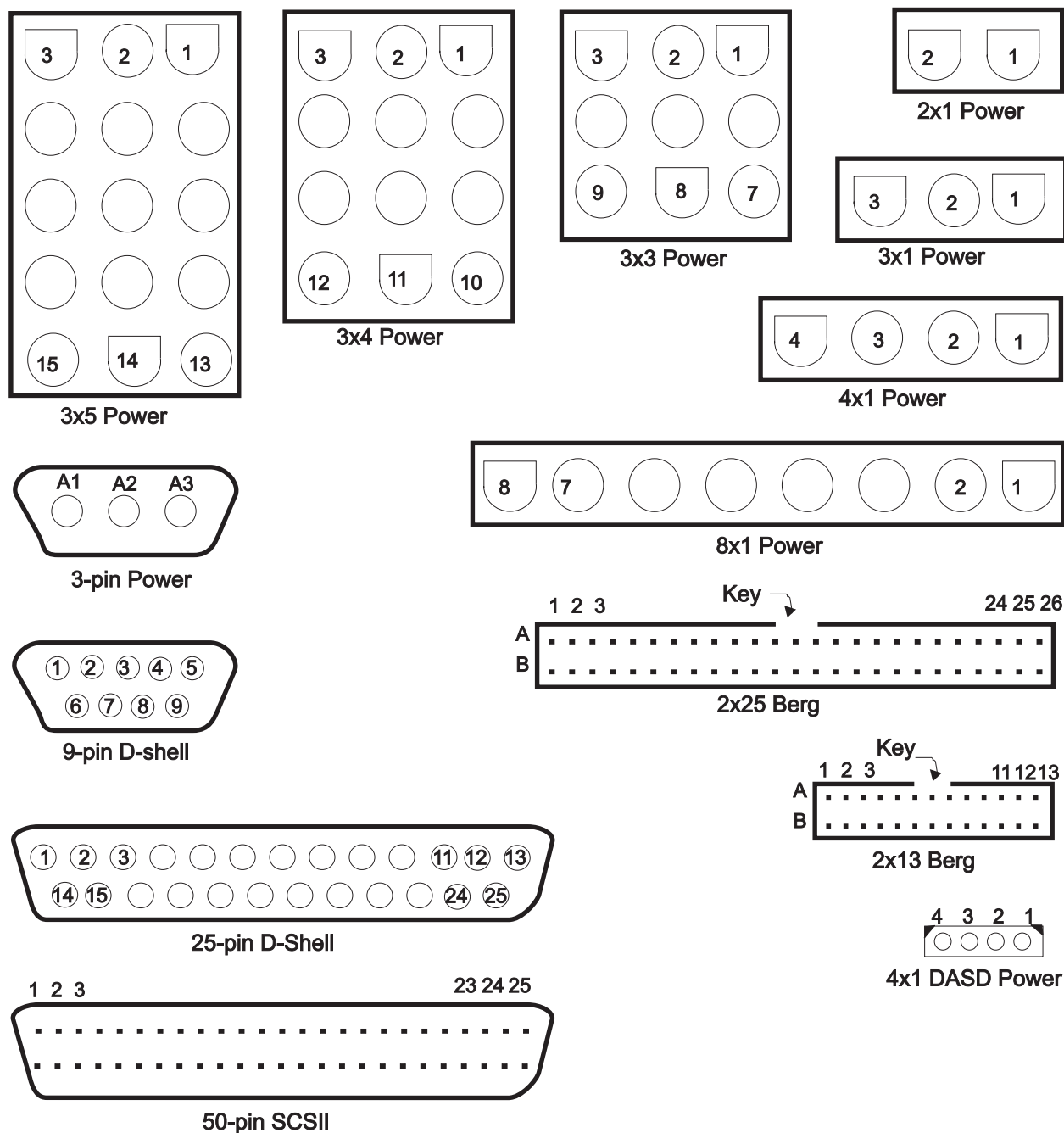


Figure 2-17. RS/6000 SP connector details (as seen at receiving ends, not at cable ends)

Cable routing

Figure 2-18 on page 2-23 and Figure 2-19 on page 2-23 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.

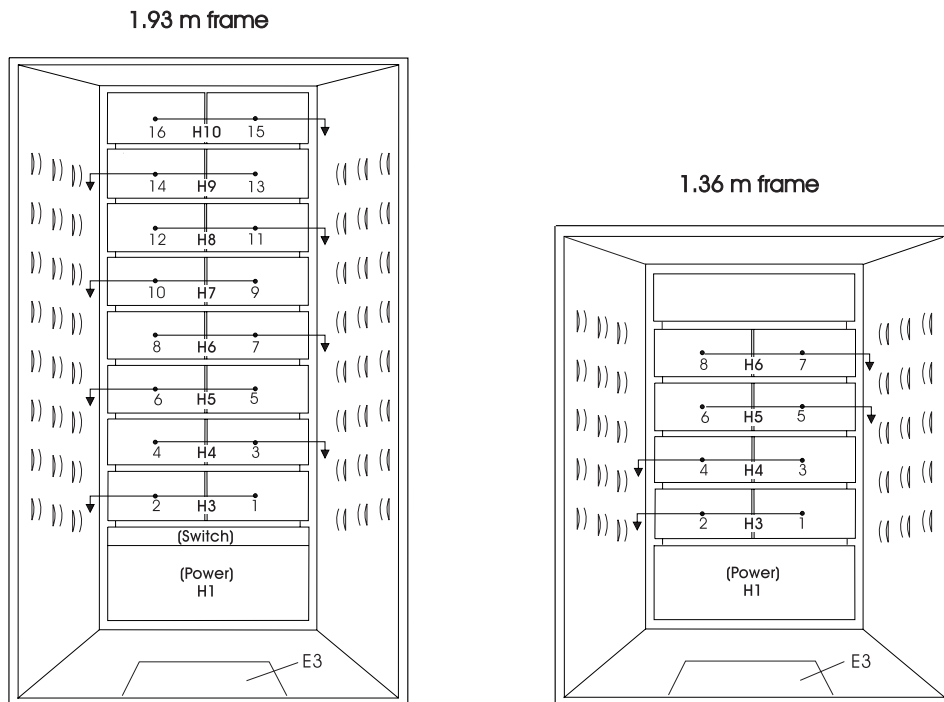


Figure 2-18. Frame cabling routing path in rear of RS/6000 SP frame — 1.93 m frame

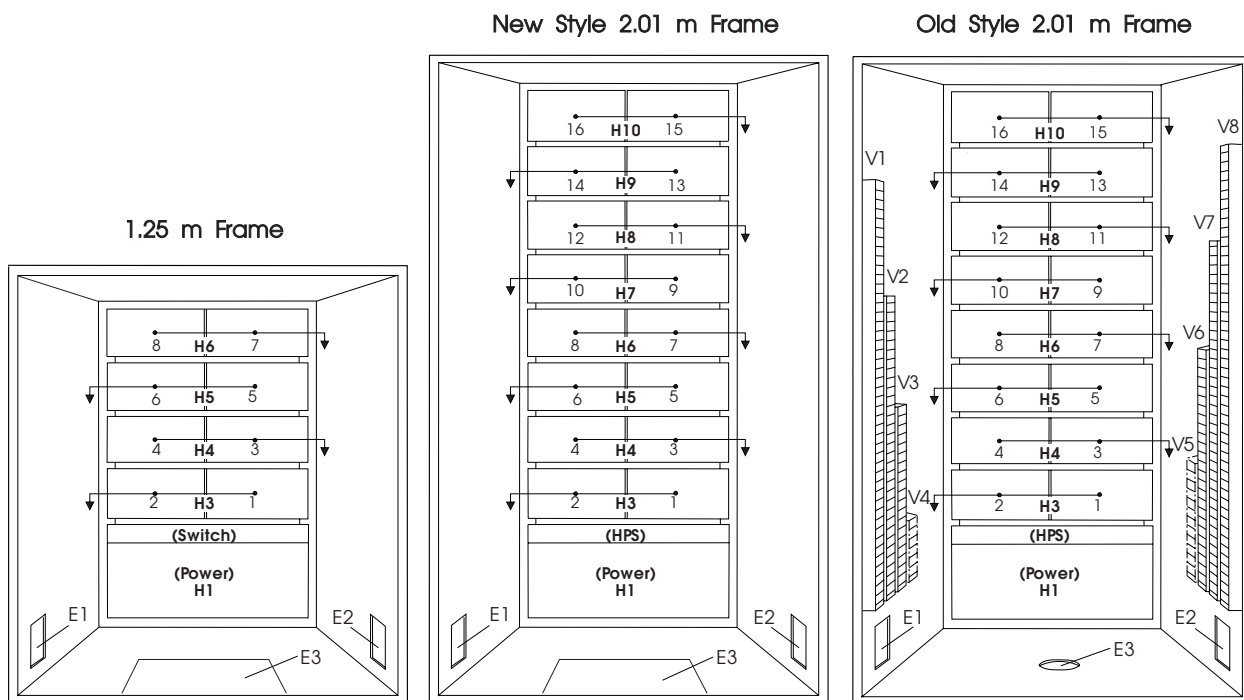


Figure 2-19. Frame cabling routing path in rear of RS/6000 SP frame — 2.01 m frame

Note: For a multi-switch frame (F/C 2030/1), refer to Figure 2-18.

Table 2-2 shows external cable routing in a RS/6000 SP frame populated with 16 processor nodes. (Refer to “Cable routing” on page 2-23 to see the routing paths.)

<i>Table 2-2. External cable routing</i>					
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

Chapter 3. Service procedures

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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 3-2 or "Basic stand-alone mode (from network boot)" on page 3-2 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 Hardware Perspectives screen, select the processor node
- b. Click "Actions" on the tool bar
- c. 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
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 3-5.
 - 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 3-1

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 Hardware Perspectives screen, select the 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 3-5.

Note: The command should be:

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

3. Make sure the TTY console is closed

4. From the Hardware Perspectives 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 "Apply" button
5. Open TTY console by clicking on the "Open TTY" button from the "Actions" tool bar 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 3-5 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 "svr" 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 nodes: 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 nodes from network device (two methods)” on page 3-6, 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:

<i>Table 3-1. Selectable processor node boot responses</i>	
<i>response</i>	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: <ul style="list-style-type: none"> • 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 nodes from network device (two methods)

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

Method one: network boot method

1. From the SP Perspectives Launch Pad, select "Hardware Perspectives"
2. Click on the processor node (or nodes) you are going to boot from a network
3. Click on "Actions" button on the tool bar
4. Verify the nodes selected, then click on the "Apply" button
5. IPL from network device begins

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 (or nodes)
2. From the SP Perspectives Launch Pad, select "Hardware Perspectives"
3. Click on the processor nodes you are going to network boot
4. From the "Actions" button, select "Change Key Switch" and "Secure", then click on "Apply" button
5. From the "Actions" button, select "LCD and LED Display"
6. From the "Actions" button, select "Power on...." for the node
7. From the "Actions" button, select "Open TTY" for the node
8. When the LEDs reach **200**
 - a. Select "Change Key Switch" from the "Actions" button on the tool bar
 - b. Change the key to "Service" and click the "Apply" button
 - c. Then **immediately** click on "Actions", "Power off, Reset...". Select "Reset" then click on "Apply" button.
9. The LEDs should show **1xx**, then proceed to **26x**.
10. 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.
11. Enter "1" to "Select BOOT (Startup) Device".
12. 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 Node: **Ethernet: Built-In**
 - Wide Node: **Ethernet: Slot 0/1, BNC connector (1-pin)**
13. 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.
14. When you have completed this menu, enter "99" to return to the main menu.
15. 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.
16. From the "MAIN MENU", enter "4" to "Exit Main Menu and Start System (BOOT)".
17. From the node front panel, put the processor node in NORMAL mode by clicking on the "Normal" button.
18. From the "STARTING SYSTEM (BOOT)" menu, press ENTER to continue.
19. 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 **sphrdwradd** 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:

```
sphrdwradd 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 3-9.

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, Chapter 1, “Maintenance analysis procedures (MAPs)” on page 1-1 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_MSG101
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.

Node 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

Verification tests using Perspectives

This section gives you the basic information needed to check the supervisor cards on a single node, frame, or switch.

Node supervisor verification

From the Hardware Perspectives window:

1. The Hardware Perspective should open with a node pane displayed. If it does not, or if you would like to open an additional node pane:
 - a. Click the "Add Pane" icon on the tool bar
 - The Add Pane dialog box opens
 - b. From the "Pane Type" pulldown, select "Nodes"
 - c. Select your choice of adding the pane to the current window or to a new window
 - d. If desired, enter a new pane title
 - e. Click "OK" to open the pane and close the dialog box
2. In the Node pane, click the icon of the node you want to verify
3. Click the "Notebook" icon on the tool bar
 - When the Notebook window opens, make certain that the "Node Status" tab is selected
4. The "Node failure:" attribute displays the status of the node supervisor
 - "No" displayed in a **green** box indicates that the node supervisor **has not failed** and the supervisor is responding
 - "Yes" displayed in a **red** box indicates that the node supervisor has failed and it **is not responding**

Note: Clicking "Help" in the Notebook window's lower right corner displays attribute descriptions.

Frame supervisor verification

From the Hardware Perspectives window:

1. Unless you have saved display settings, the Hardware Perspective does not open with a frame pane displayed. To open a frame pane:
 - a. Click the "Add Pane" icon on the tool bar
 - The Add Pane dialog box opens
 - b. From the "Pane Type" pulldown, select "Frames and Switches"
 - c. Select your choice of adding the pane to the current window or to a new window
 - d. If desired, enter a new pane title
 - e. Click "OK" to open the pane and close the dialog box
 - You may repeat these steps to add additional frame panes
2. In the Frame and Switch pane, click the icon of the frame you want to verify
3. Click the "Notebook" icon on the tool bar
 - When the Notebook window opens, make certain that the "Frame Status" tab is selected
4. The "Controller responds:" attribute displays the status of the frame supervisor
 - "OK" displayed in a **green** box indicates that the frame supervisor **is responding**
 - "No response" displayed in a **red** box indicates that the frame supervisor **is not responding**

Note: Clicking "Help" in the Notebook window's lower right corner displays attribute descriptions.

Switch supervisor verification

From the Hardware Perspectives window:

1. Unless you have saved display settings, the Hardware Perspective does not open with a switch pane displayed. To open a switch pane:
 - a. Click the "Add Pane" icon on the tool bar
 - The Add Pane dialog box opens
 - b. From the "Pane Type" pulldown, select "Frames and Switches"
 - c. Select your choice of adding the pane to the current window or to a new window
 - d. If desired, enter a new pane title
 - e. Click "OK" to open the pane and close the dialog box
 - You may repeat these steps to add additional switch panes
2. In the Frame and Switch pane, click the icon of the switch you want to verify
 - A switch icon is displayed next to the frame icon **only if** a switch is installed in the frame
3. Click the "Notebook" icon on the tool bar
 - When the Notebook window opens, make certain that the "Switch Status" tab is selected
4. The "Node failure:" attribute displays the status of the **switch** supervisor.
 - "No" displayed in a **green** box indicates that the switch supervisor **has not failed** and the supervisor is responding to communication from the frame supervisor.

- "Yes" displayed in a **red** box indicates that the switch supervisor has failed and it **is not responding** to the frame supervisor.

Note: Clicking "Help" in the Notebook window's lower right corner displays attribute descriptions.

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 3-15 before returning to the procedure that directed you here.

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.

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 lose its 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. From the SP Perspectives Launch Pad, select "Hardware Perspectives"
 - b. Click on the processor node (or nodes) you are going to boot from a network
 - c. Click on "Actions" button on the tool bar
 - d. Verify the nodes selected, then click on the "Apply" button
 - e. IPL from network device begins

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

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 Perspectives to power off the node and then power it back on.
 The node will now boot from the device that you specified in step 7 with the correct time.

Installing firmware updates on SP nodes

???IS THIS AVAILABLE FOR UNIPROCESSOR NODES????

Firmware updates (for example, IPL ROS updates for SP nodes or system and service processor firmware updates for xxx 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 executed 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.

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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 xv 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 Node component, the *7013 POWERstation and POWERserver: Installation and Service Guide* (SA23-2622) for the Wide Node component, or the *7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide* (SA23-2743) for the 604 or 604e High Node.

Handling static-sensitive devices

Attention: Adapters, planars, disk drives, supervisor cards and memory cards are sensitive to static electricity 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.

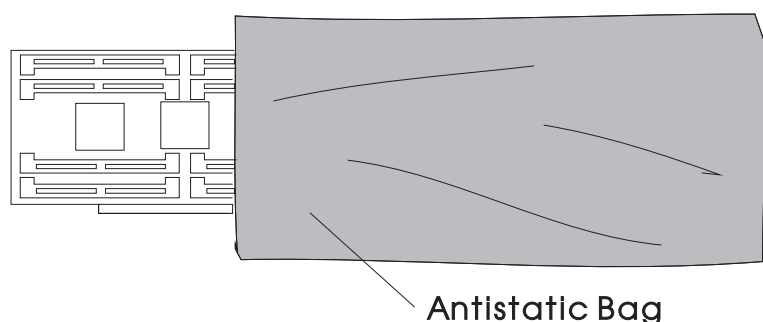


Figure 4-1. Handling an anti-static device

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 xv for more details.) Do not touch the pins or circuitry on these components.

Removing a Thin 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 Node from the frame:

1. Ensure that the processor node is offline (shutdown) 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.

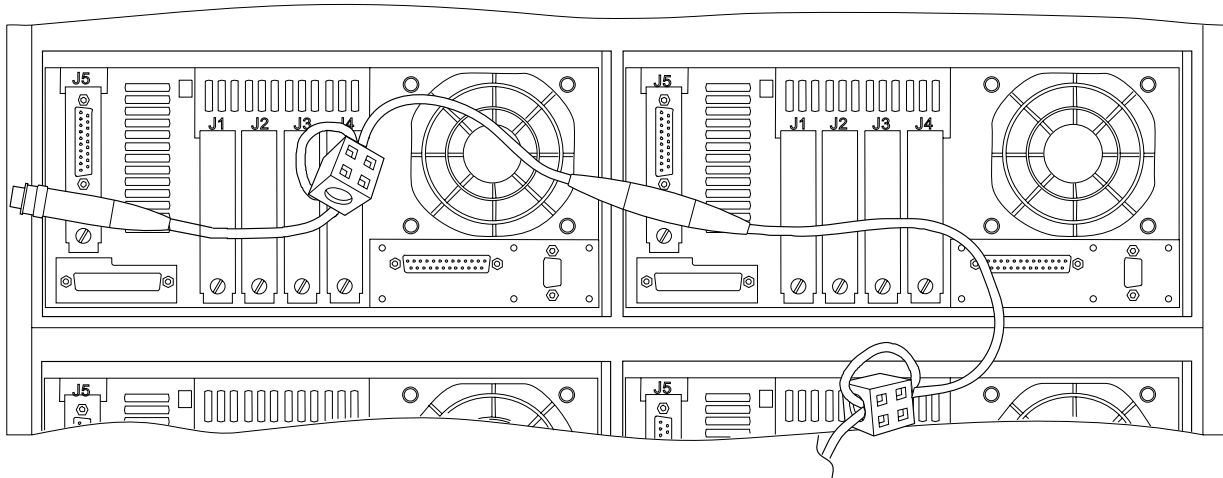


Figure 4-2. Removing a Thin Node from frame

4. When removing the 48-volt cable connector at J8, place protective cover, part number 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.

Procedures for Thin Processor Nodes

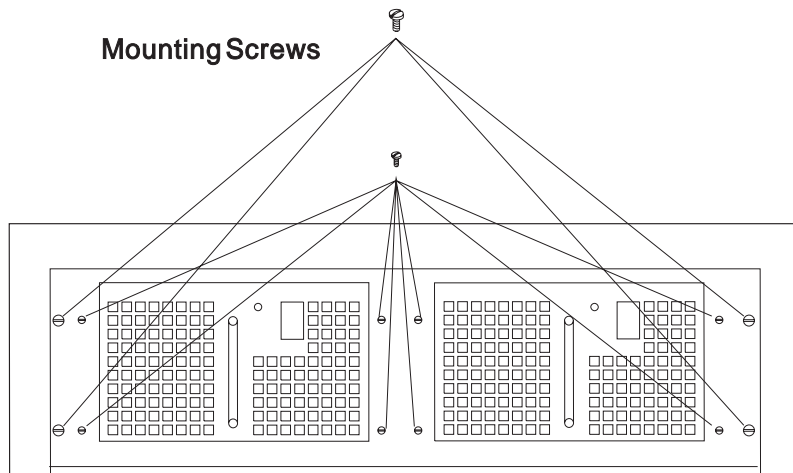


Figure 4-3. Thin Node from front of frame

Replacing a Thin Node

Perform the following procedures to replace a Thin 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, part number 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 4-2, then perform these procedures to remove a node supervisor card:

1. Refer to "Removing a Thin Node" on page 4-3 to remove the RS/6000 SP Thin 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 4-7.
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.

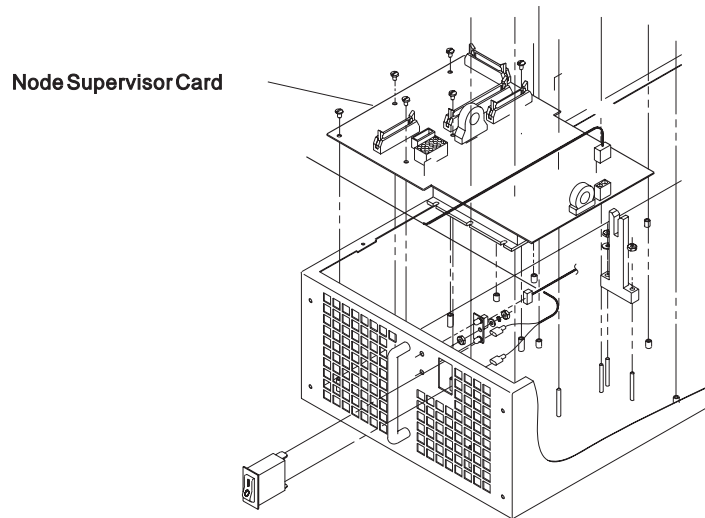


Figure 4-4. Removing the Thin Node supervisor card

Replacing the supervisor card

Refer to “Handling static-sensitive devices” on page 4-2, 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 4-7.
8. Reinstall the processor node top cover and tighten the six captive screws.
9. Refer to “Replacing a Thin Node” on page 4-4 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 4-2, then perform these procedures to remove the Thin 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 Node” on page 4-3 to remove the RS/6000 SP Thin 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.

Procedures for Thin Processor Nodes

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. .
 - 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.

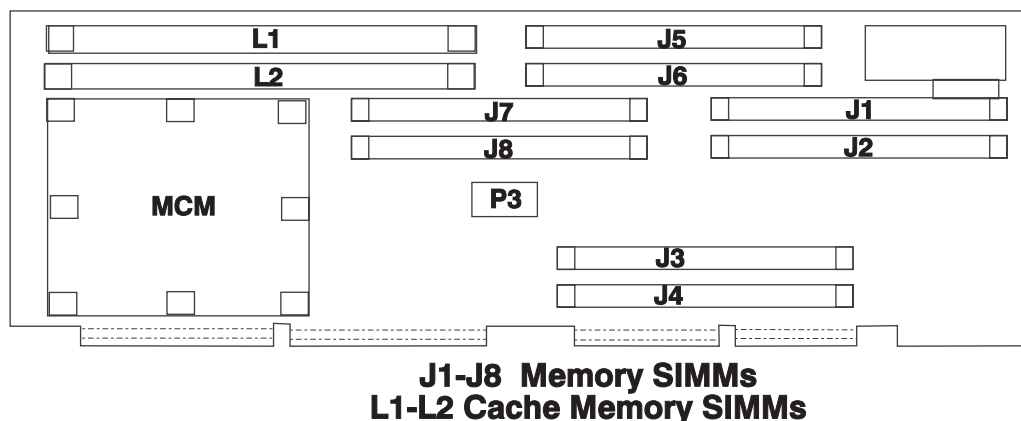


Figure 4-5. Thin Node 2 CPU card locations

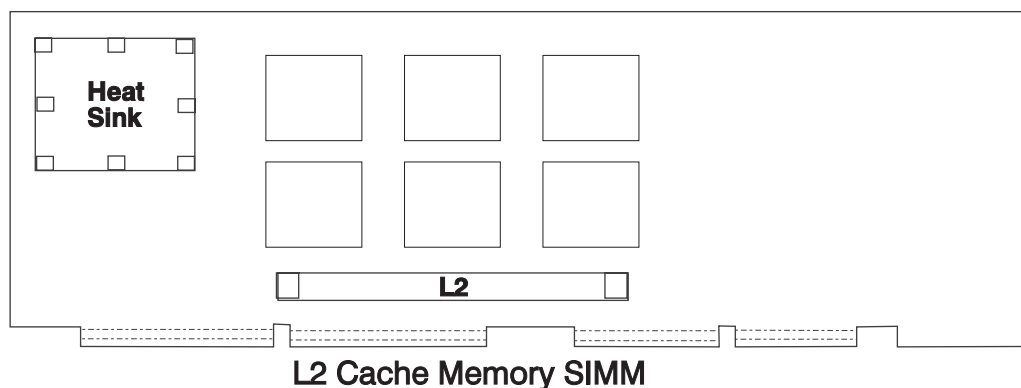


Figure 4-6. 66 MHz Thin Node (with L2 cache) CPU card locations

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 Node" on page 4-4 to reinstall the processor node.

Removing the daughter power card

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove the Thin 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.

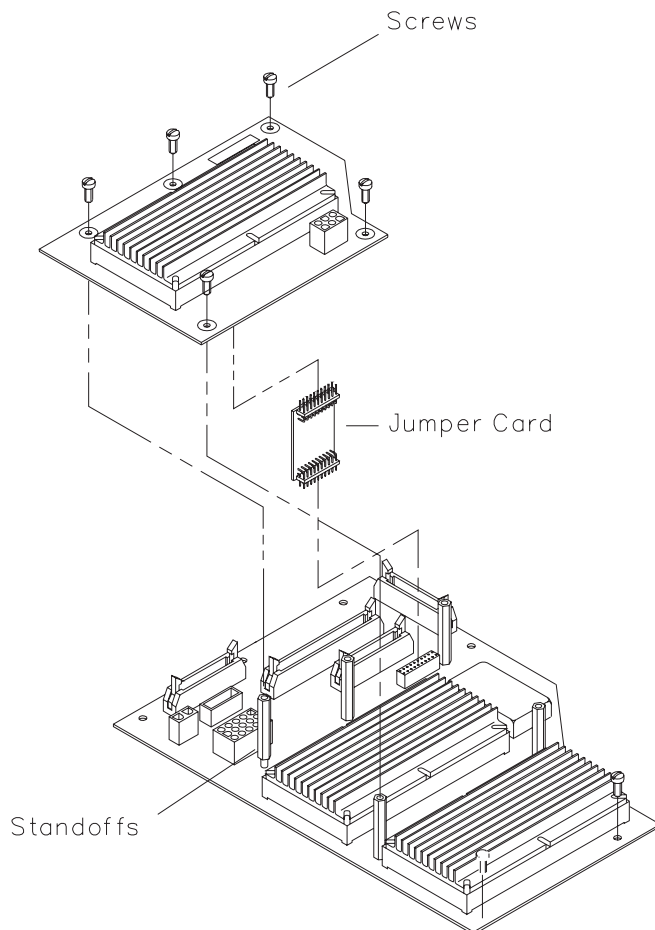


Figure 4-7. Removing the Thin Node daughter power card

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 4-2, then perform these procedures to remove the I/O planar card:

1. Refer to “Removing a Thin Node” on page 4-3 to remove the RS/6000 SP Thin 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.

Procedures for Thin Processor Nodes

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.

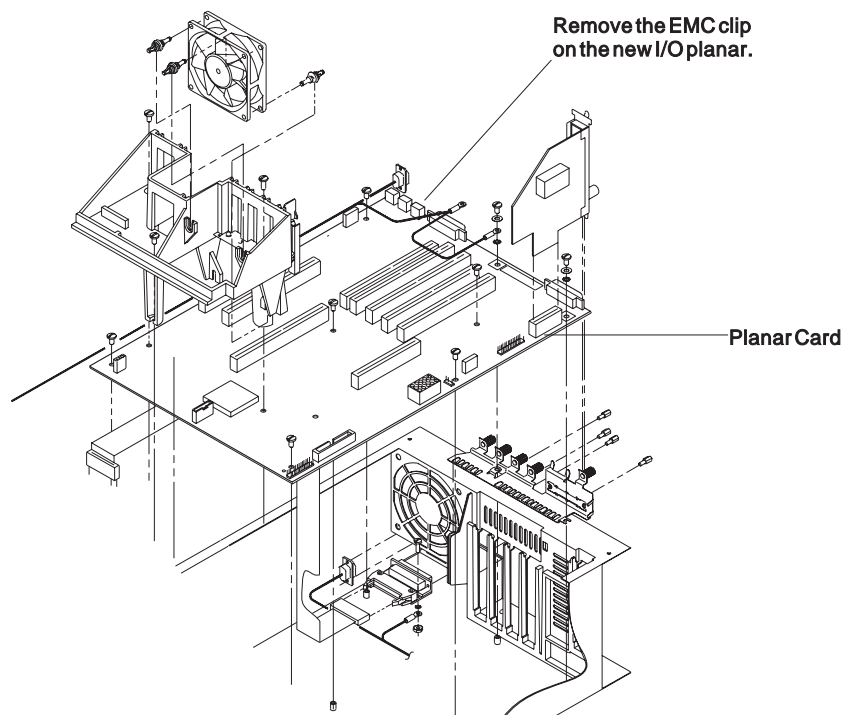


Figure 4-8. I/O planar card components

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 3-15 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 Node” on page 4-4 to replace the RS/6000 SP thin processor node.

Removing the 120/160 MHz Thin Node planar card

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove the planar card from the 120 and 160 MHz Thin Nodes:

1. Refer to “Removing a Thin Node” on page 4-3 to remove the RS/6000 SP Thin 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 4-19.
5. Remove the card guide assembly. Refer to “Removing the 120 or 160 MHz Thin Node card guide bracket” on page 4-11.
6. Remove the DASD (SCSI-attached), but leave the DASDs in the DASD bracket. Refer to “Removing the 120 or 160 MHz Thin Node DASD” on page 4-17.
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.

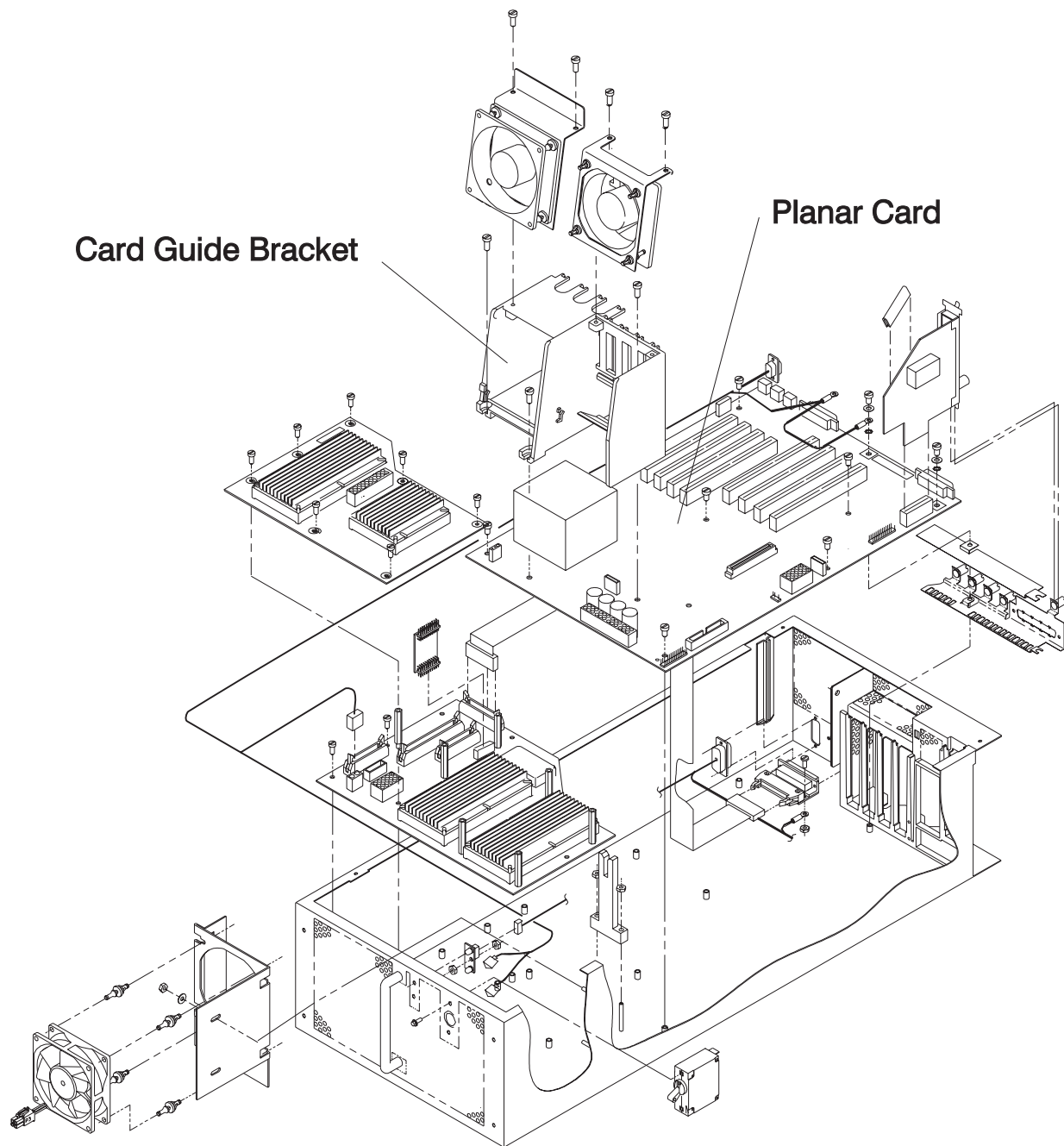


Figure 4-9. Removing the 120/160 MHz Thin Node planar card

Replacing the 120/160 MHz Thin 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 Node DASD” on page 4-18
7. Reinstall the fan 1 assembly. Refer to “Replacing fan 1” on page 4-20
8. Reinstall card guide assembly. Refer to “Replacing the 120 or 160 MHz Thin Node card guide bracket” on page 4-12.
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 Node” on page 4-4 to replace the RS/6000 SP thin processor node.

Removing the 120 or 160 MHz Thin Node card guide bracket

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove the card guide bracket from the 120 or 160 MHz Thin Node:

1. Refer to “Removing a Thin Node” on page 4-3 to remove the RS/6000 SP Thin Node.
2. Refer to “Removing the 120 or 160 MHz Thin Node fan 4” on page 4-23 to remove fan 4.
3. Remove the three screws holding the bracket to the planar.
4. Remove the card guide bracket.

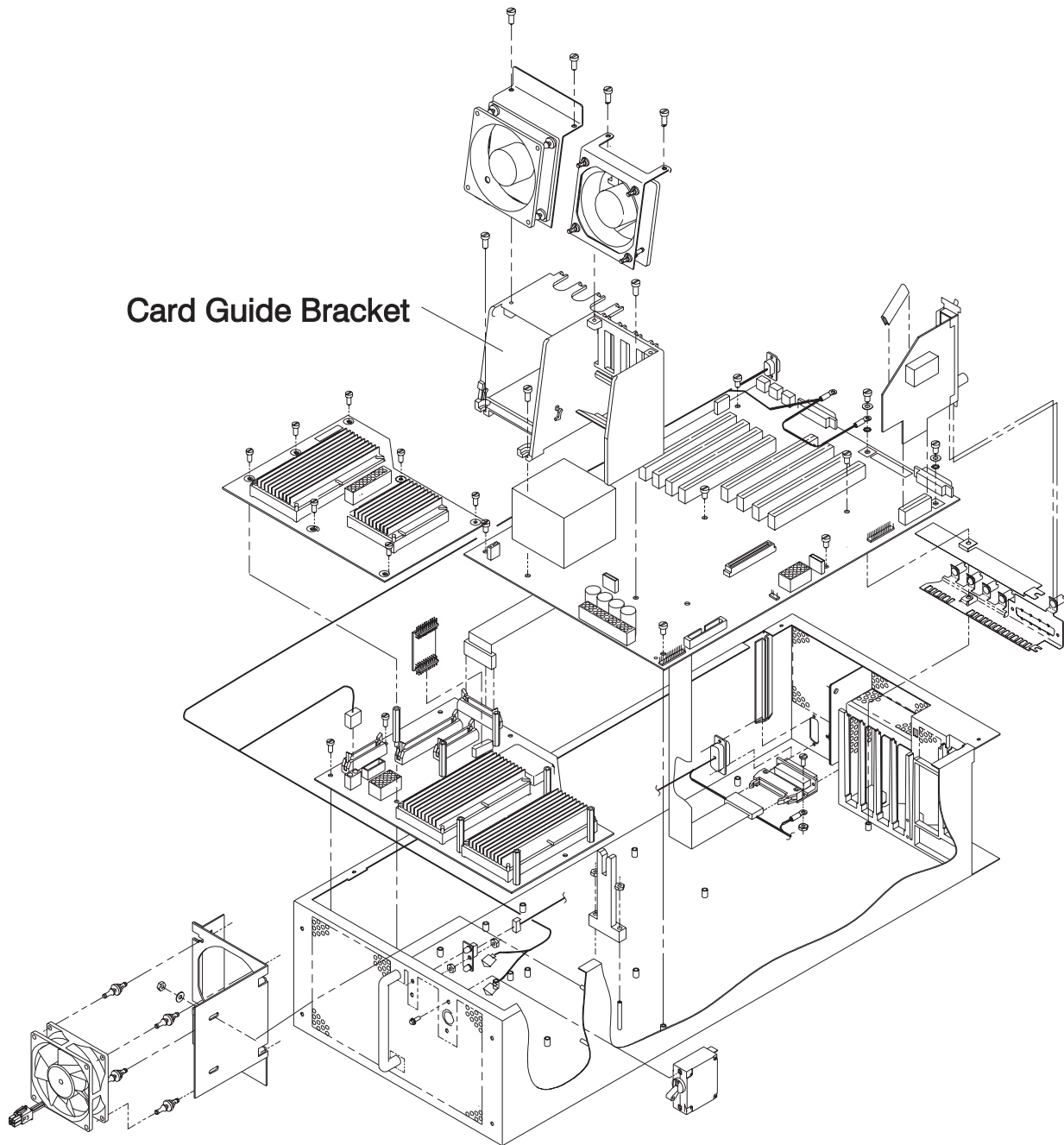


Figure 4-10. Removing the 120 or 160 MHz Thin Node card guide bracket

Replacing the 120 or 160 MHz Thin 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 Node fan 4" on page 4-23 to replace fan 4.
4. Refer to "Replacing a Thin Node" on page 4-4 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 4-2, 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 Node” on page 4-3, 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 it 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 Node” on page 4-4, to replace the RS/6000 SP thin processor node.

Removing the DASD

Refer to “Handling static-sensitive devices” on page 4-2, 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
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7. Enter **shutdown -F** to shutdown the processor node.

1. Refer to "Removing a Thin Node" on page 4-3 to remove the RS/6000 SP Thin 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. Some DASD have four standoffs and washers installed under the DASD. If this applies, 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.

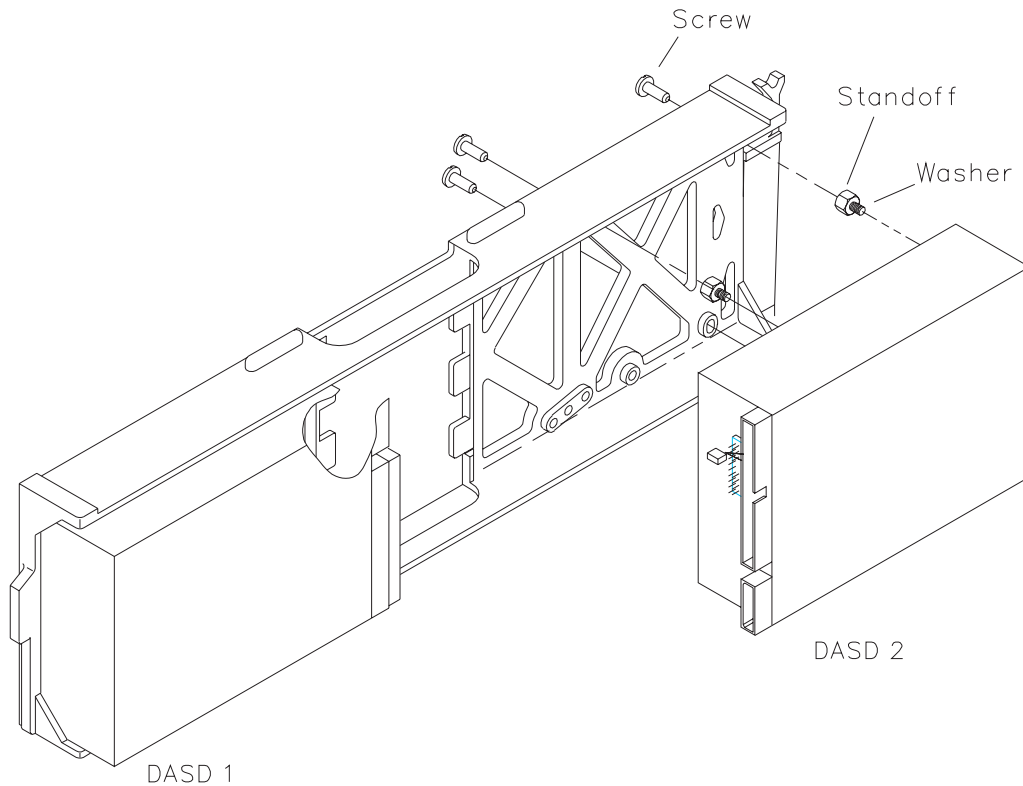


Figure 4-11. Removing the Thin Node DASD

Replacing the DASD

Perform these steps to replace the Thin Node DASD:

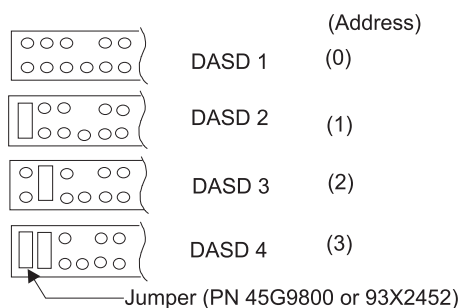
1. Install any address jumper(s) at the appropriate positions.

Note: If the replacement DASD is the same part number as the original, install jumpers in the original positions; otherwise, use Figure 4-12 on page 4-16.

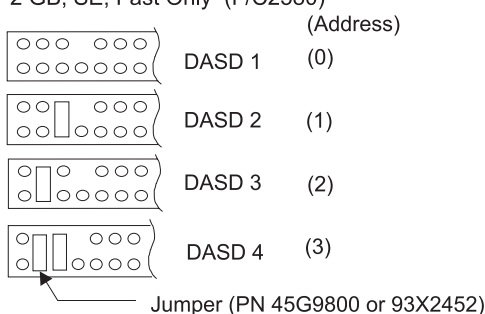
2. Ensure all required DASD jumpers are installed. Refer to "1.1GB, 2.2GB, 4.5GB, 9.1GB (50-pin and 60-pin) Single Ended Disk Drives", in the *Adapters, Devices, and Cable Information for Micro-Channel Bus Systems*, SA38-0533, for the required jumper information.
3. If washers and standoffs were removed from the old DASD, install washers (1 thick or 3 thin) then standoffs into the holes in the underside of the DASD. For a 4GB 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 Node" on page 4-4, to replace the RS/6000 SP thin processor node.

Procedures for Thin Processor Nodes

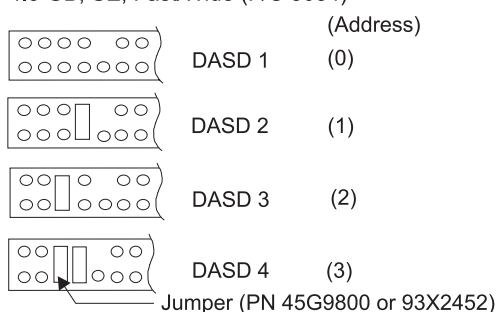
1 GB, SE, Fast Only (F/C 2555)
2 GB, SE, Fast Only (F/C 2580)



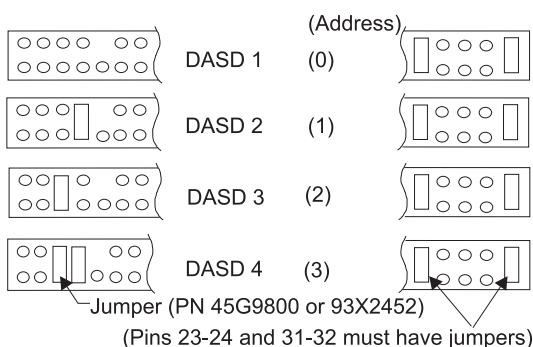
2.2 GB, SE, 50-Pin, Fast Only (F/C3031)
1 GB, SE, Fast Only (F/C2555)
1 GB, SE, Fast Only (F/C2555)
2 GB, SE, Fast Only (F/C2580)



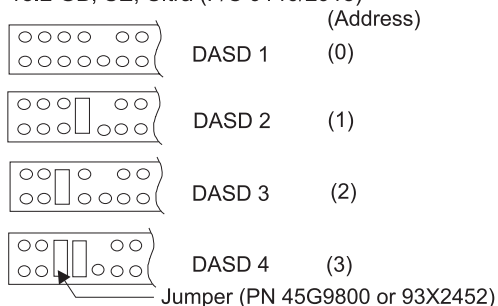
1.1 GB, SE, Fast/Wide (F/C 3032)
2.2 GB, SE, Fast/Wide (F/C 3033)
4.5 GB, SE, Fast/Wide (F/C 3034)



4.5 GB, Fast/Wide (F/C 3000)
9.1 GB, Fast/Wide (F/C 3010)



9.1 GB, SE, Ultra (F/C 2908/2909)
18.2 GB, SE, Ultra (F/C 9146/2918)



4.5 GB, Ultra (F/C 2900/2904)

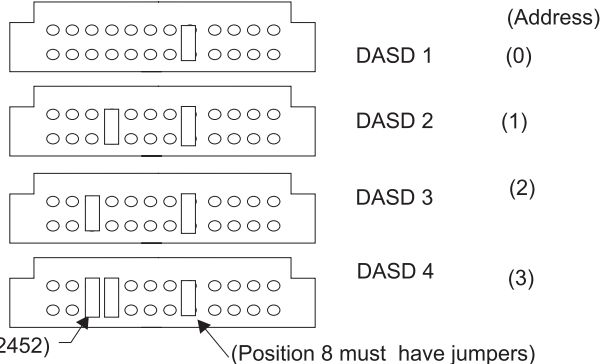


Figure 4-12. Setting the DASD address (Note: F/C 2904, 2909, and 2918 are mirror DASD)

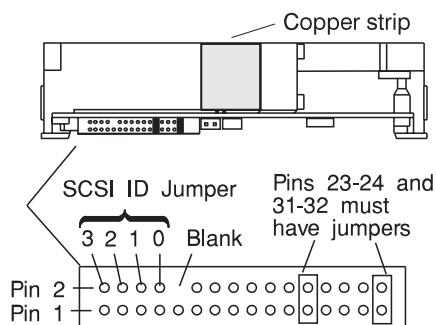


Figure 4-13. 4.5 GB DASD (F/C 3000) jumper locations

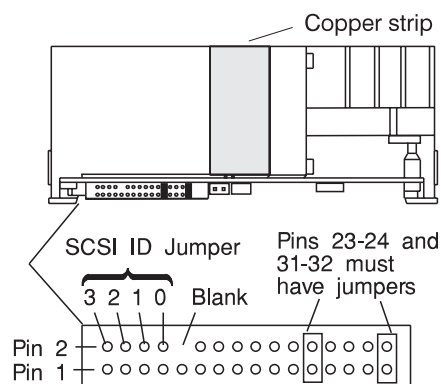


Figure 4-14. 9.1 GB DASD (F/C 3010) jumper locations

Removing the 120 or 160 MHz Thin Node DASD

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove a DASD from a 120 or 160 MHz Thin 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 **lspsv** 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 **lspsv** 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 Node” on page 4-3 to remove the RS/6000 SP Thin 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.

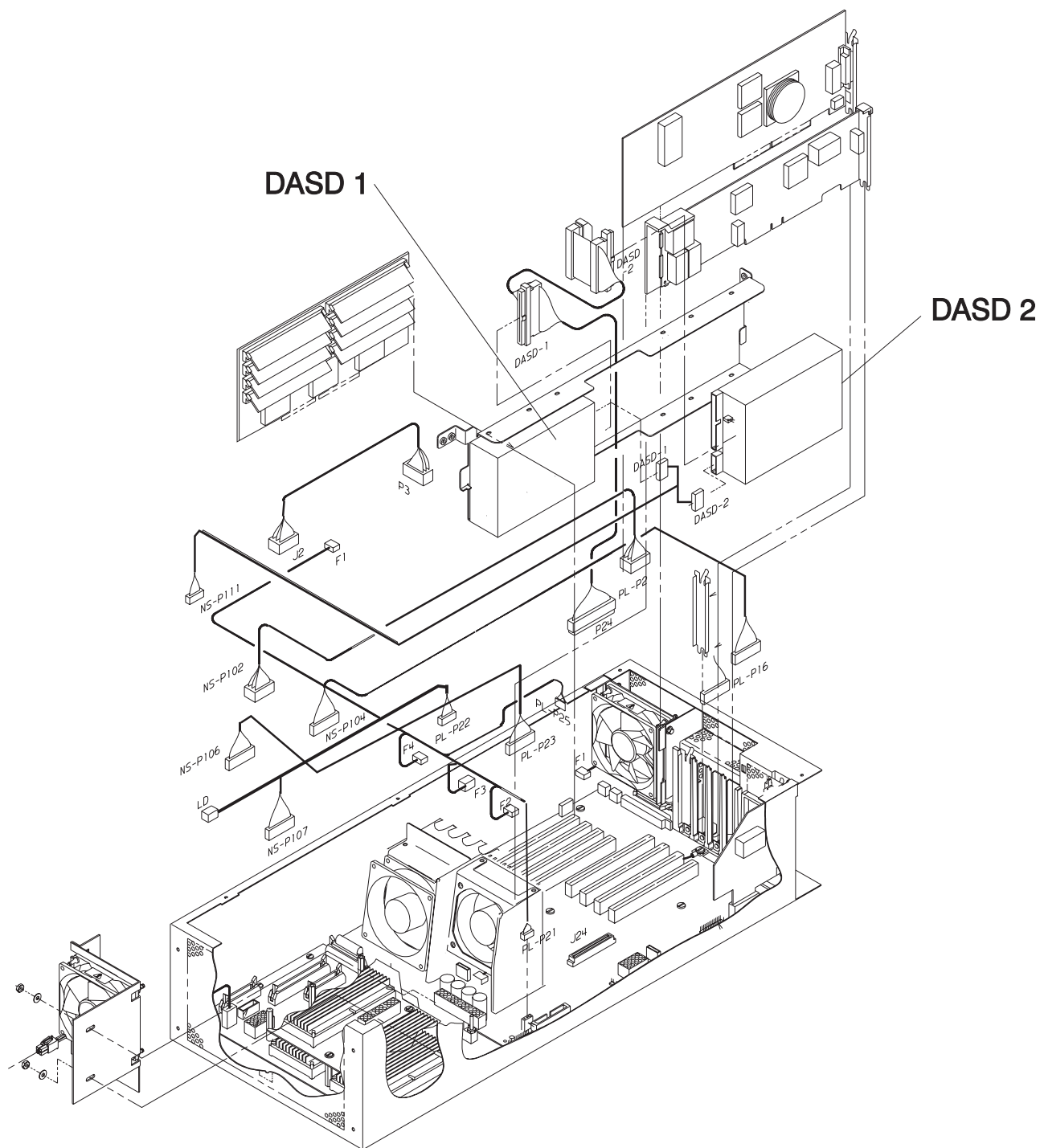


Figure 4-15. Removing the 120 or 160 MHz Thin Node DASD

Replacing the 120 or 160 MHz Thin Node DASD

Perform these steps to replace the 120 or 160 MHz Thin 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 4-12 on page 4-16.

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 Node" on page 4-4, to replace the node.

Removing fan 1

Refer to "Handling static-sensitive devices" on page 4-2, then perform these procedures to remove Fan 1:

1. Refer to "Removing a Thin Node" on page 4-3, 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.

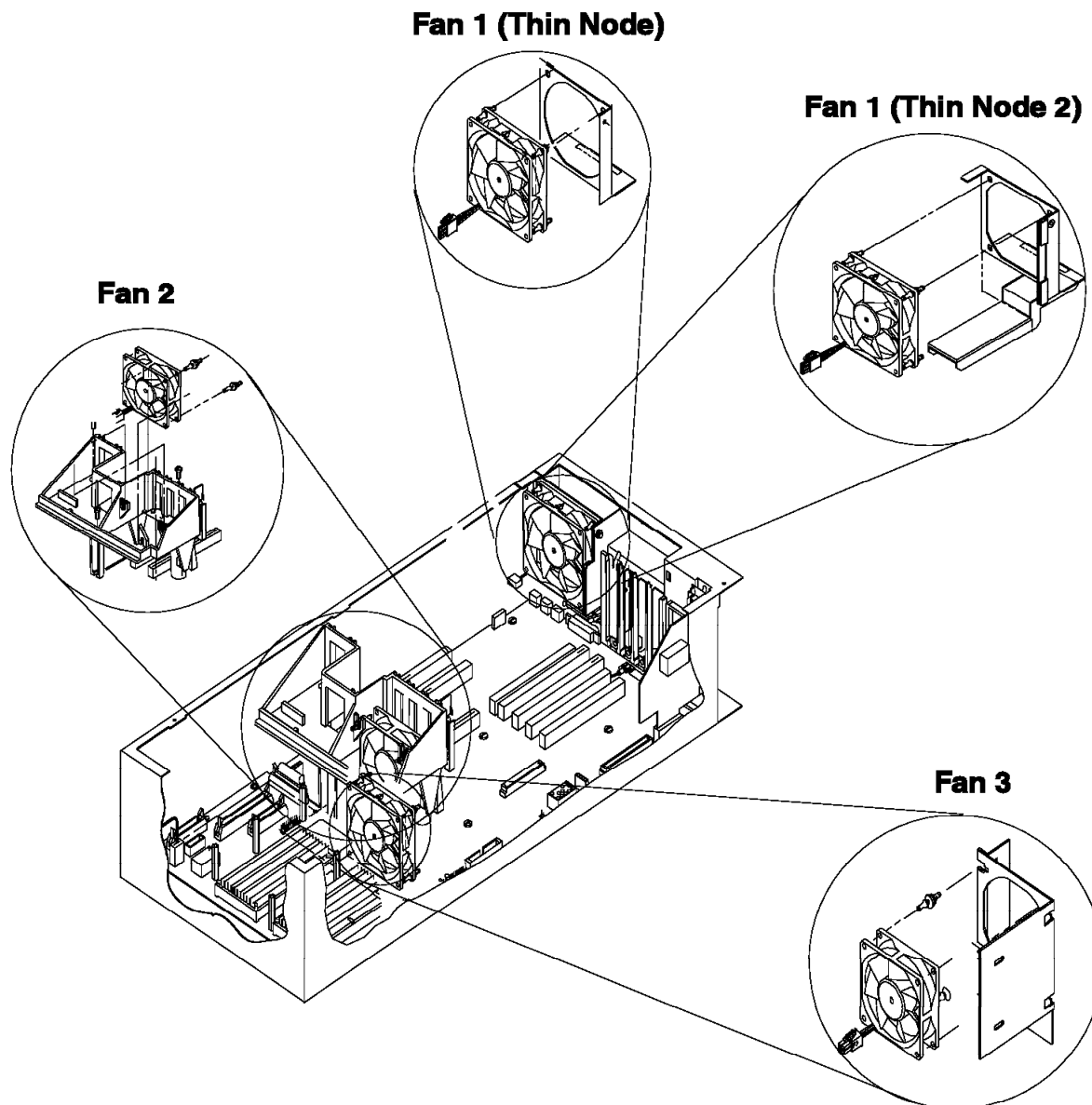


Figure 4-16. Fans 1, 2, 3 assembly

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 4-16, 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 Node" on page 4-4, to replace the RS/6000 SP thin processor nodes.

Removing fan 2

Refer to “Handling static-sensitive devices” on page 4-2, 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 Node” on page 4-3 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 Node” on page 4-4, to replace the RS/6000 SP thin processor nodes.

Removing fan 3

1. Refer to “Removing a Thin Node” on page 4-3, 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 Node” on page 4-4, to replace the RS/6000 SP thin processor nodes.

Removing the 120 or 160 MHz Thin Node fan 2

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove Fan 2 from the 120 or 160 MHz Thin Node:

1. Refer to “Removing a Thin Node” on page 4-3 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 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 Node" on page 4-4, to replace the RS/6000 SP thin processor nodes.

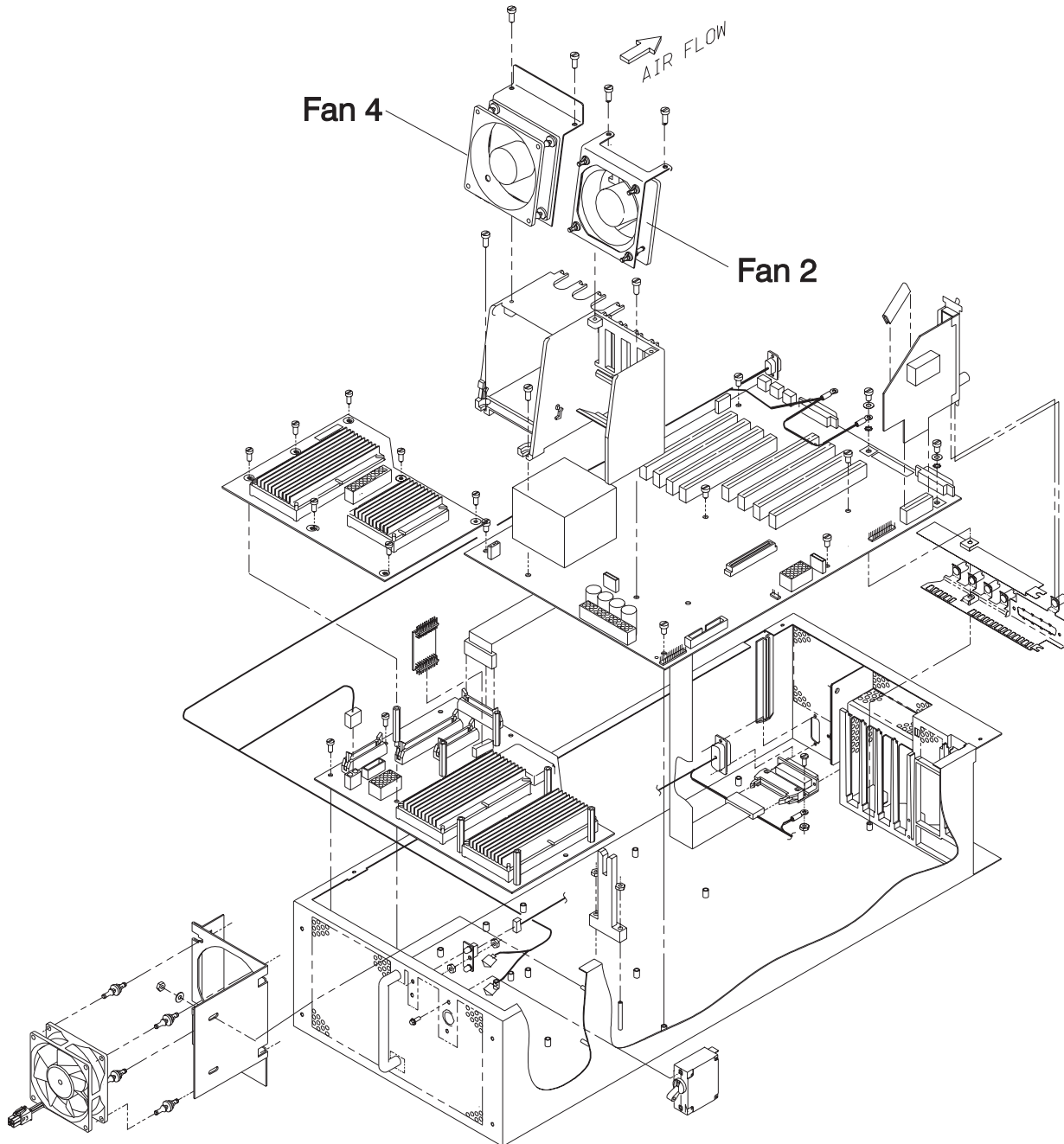


Figure 4-17. Removing the 120 or 160 MHz Thin Node fans 2 and 4

Removing the 120 or 160 MHz Thin Node fan 4

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove Fan 4 from the 120 or 160 MHz Thin Node:

1. Refer to “Removing a Thin Node” on page 4-3 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 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 Node” on page 4-4, 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 xv for more details.) Do not touch the pins or circuitry on these components.

Opening a Wide Node

Note: The RS/6000 SP processor nodes do not have to be removed from the frame for service. The Wide Node will slide out on rails and lock into place for easy access to components.

If required, use step ladder part number 46G5947 or step stool part number 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 Nodes above shoulder height.

Perform the following procedures to slide the Wide 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) (part number 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) and powered off from the control workstation.

Procedures for Wide Processor Nodes

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 Node.

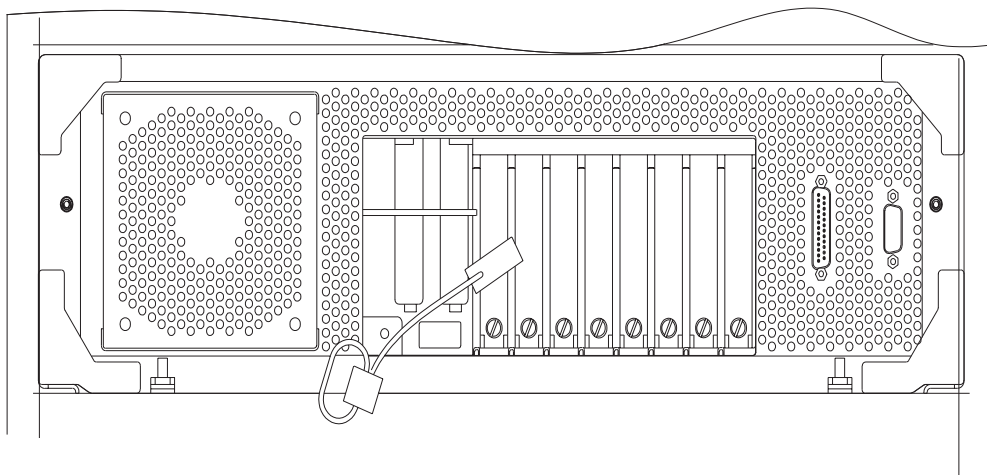


Figure 4-18. Opening a Wide Node drawer

5. When removing the 48-volt cable connector at J8, place protective cover part number 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 (part number 93G1058) on each side of the processor node drawer.
10. Return to the procedure that directed you here.

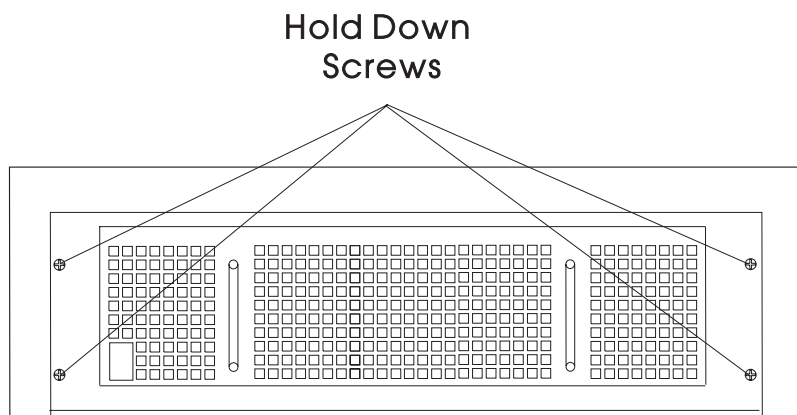


Figure 4-19. Wide Node from front of frame

Closing a Wide Node

Perform the following procedures to close a Wide Node back into the frame:

1. Remove the stiffeners (part number 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 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 part number 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 covers (part number 04H9439) from the nodes 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 4-2, then perform these procedures to remove a Wide Node supervisor card:

1. Refer to "Opening a Wide Node" on page 4-23 to slide out the processor node.
2. Remove the power compartment cover by loosening the two screws.
3. From the rear of the Wide 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.

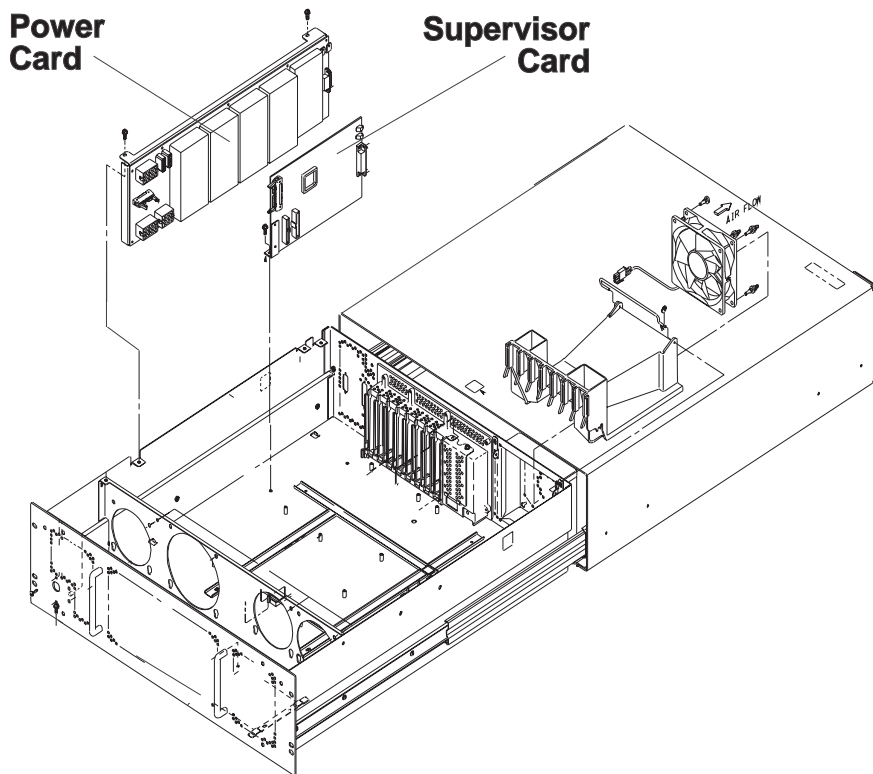


Figure 4-20. Wide Node supervisor card and power card

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 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 Node” on page 4-25 to slide in the processor node.

Removing the power card

Perform these procedures to remove a Wide Node power card:

1. Refer to “Opening a Wide Node” on page 4-23 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 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 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 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 Node" on page 4-25 to slide in the processor node.

Removing the 135 MHz Wide Node V dc convert daughter card

Perform these procedures to remove a 135 MHz Wide Node V dc convert daughter card:

1. Refer to "Opening a Wide Node" on page 4-23 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.

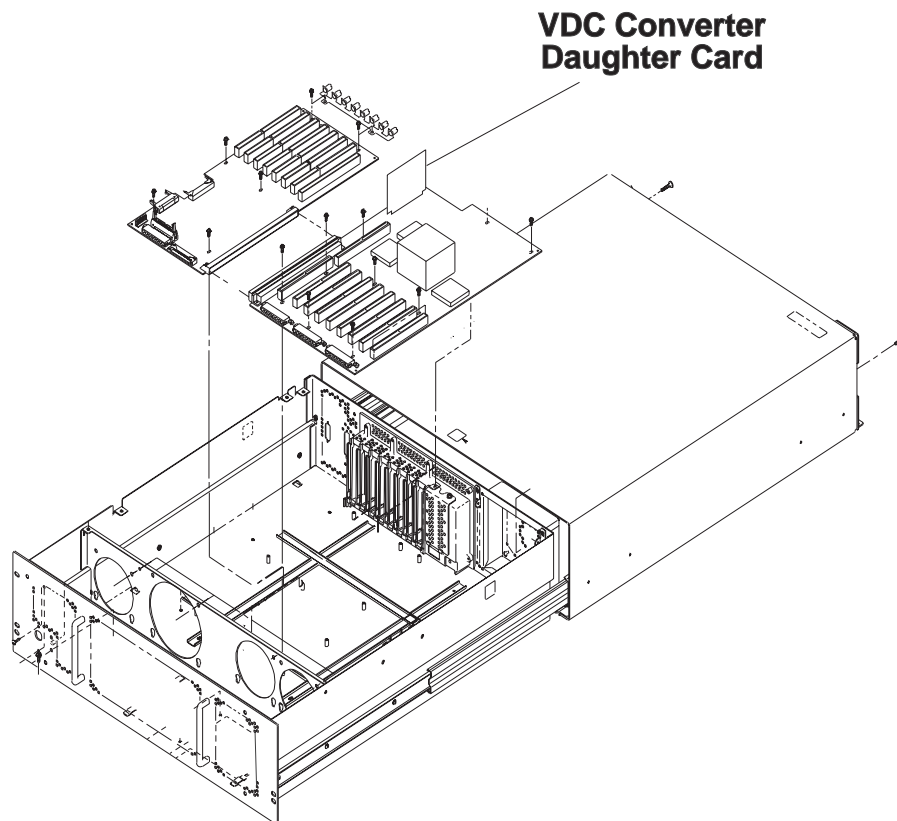


Figure 4-21. Removing the 135 MHz Wide Node V dc convert daughter card

Replacing the 135 MHz Wide 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 Node" on page 4-25 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 4-2, 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 Node” on page 4-23 to slide out the processor node.
2. If this is a 135 MHz Wide Node, refer to “Removing the 135 MHz Wide Node V dc convert daughter card” on page 4-27.
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.

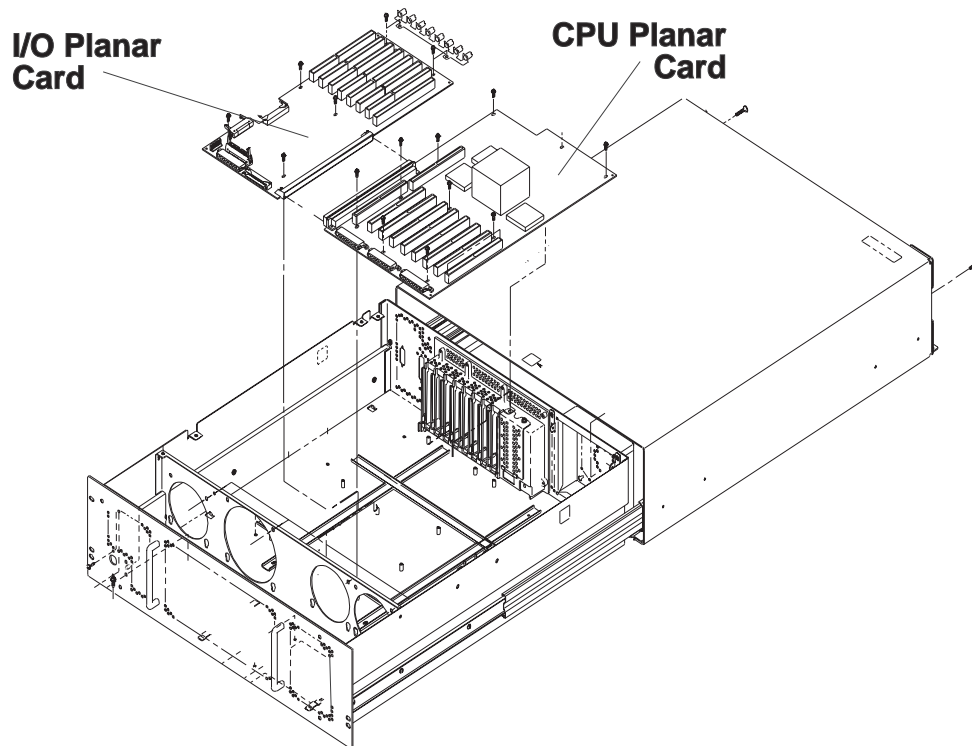


Figure 4-22. Wide Node CPU and I/O planar cards

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 Node V dc convert daughter card” on page 4-27.
9. Refer to “Closing a Wide Node” on page 4-25 to slide in the processor node.

Removing the memory card

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove the Wide Node memory card:

1. Refer to “Opening a Wide Node” on page 4-23 to slide out the processor node.
2. Remove memory card retainer.
3. Remove the card by pulling on the top edge of the card.

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 Node” on page 4-25 to slide in the processor node.

Removing the Micro Channel adapters

Refer to “Handling static-sensitive devices” on page 4-2, 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 Node” on page 4-23 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 it 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 Node” on page 4-25 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 4-2, 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 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.

Note: The top DASD shelf has to be removed to access the bottom DASD.

1. Refer to "Opening a Wide Node" on page 4-23 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.

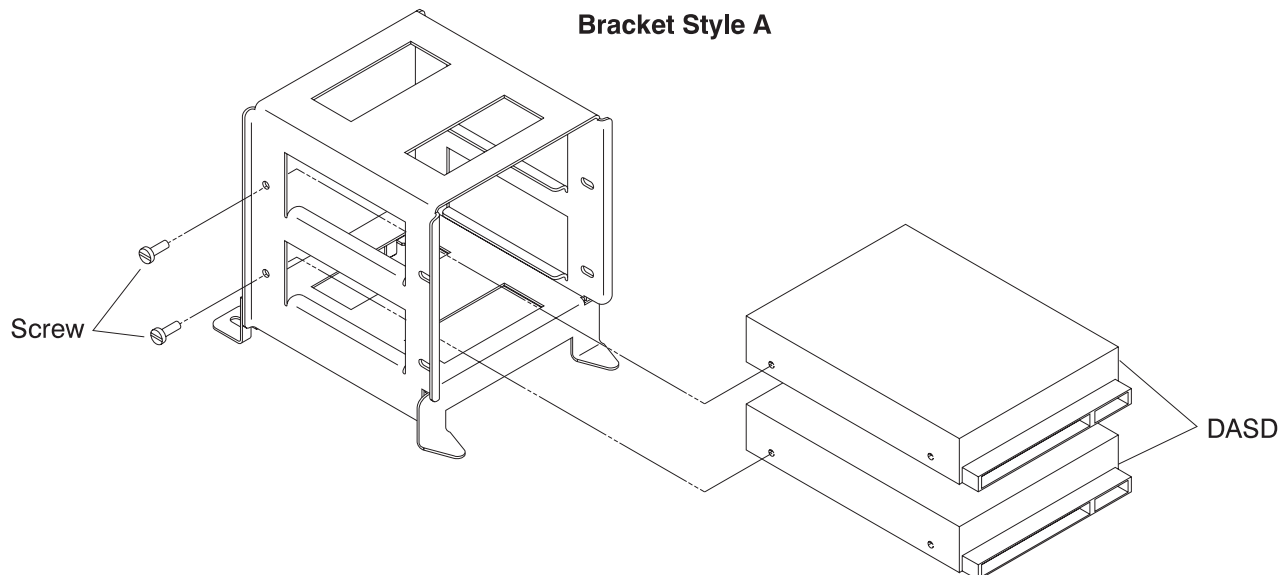


Figure 4-23. Removing the Wide Node DASD (bracket style A)

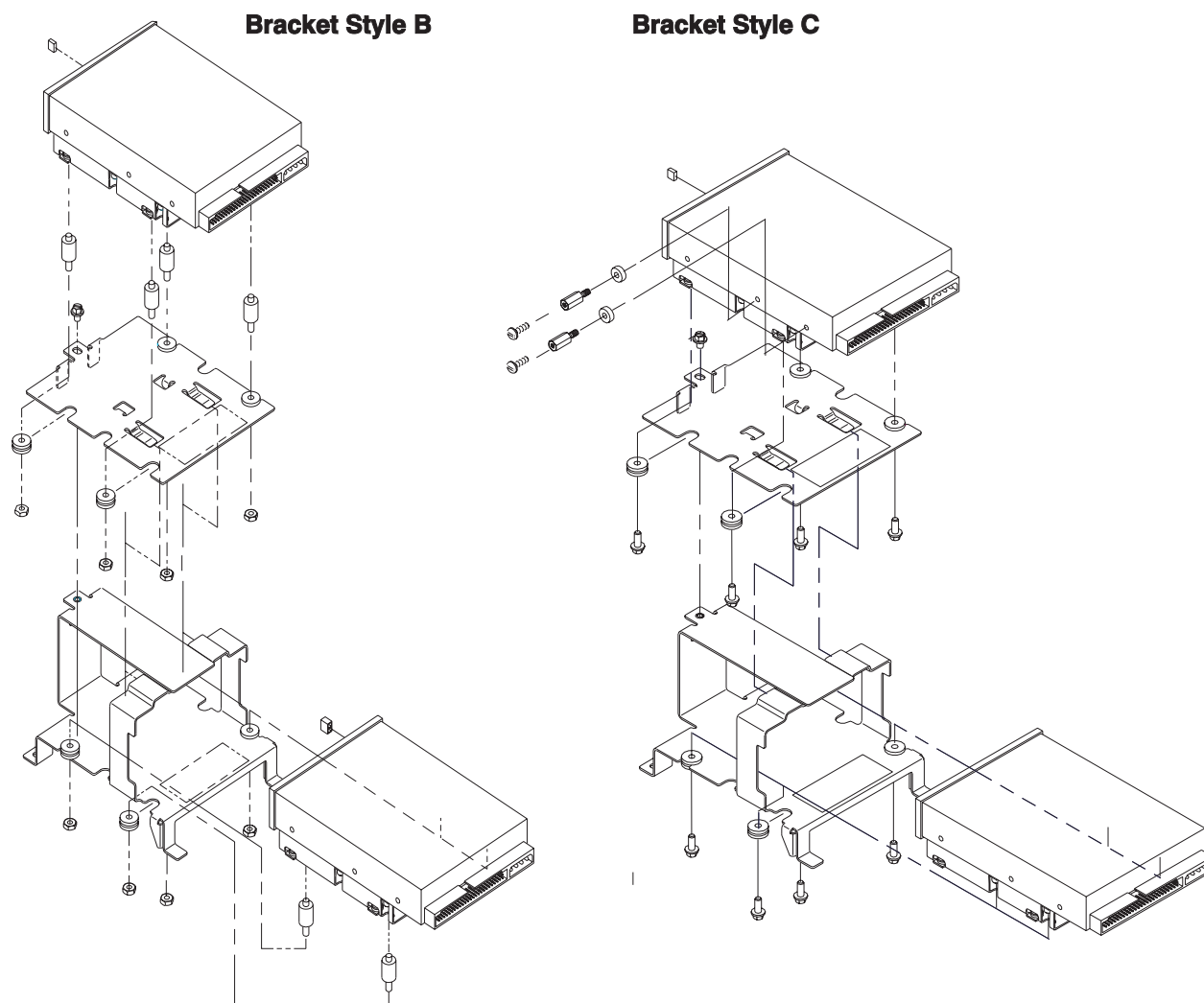


Figure 4-24. Removing the Wide Node DASD (bracket style B and C)

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 4-12 on page 4-16.

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 Node" on page 4-25 to slide in the processor node.

Removing fan 1

Perform these procedures to remove Fan 1:

1. Refer to “Opening a Wide Node” on page 4-23.
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 Node” on page 4-25.

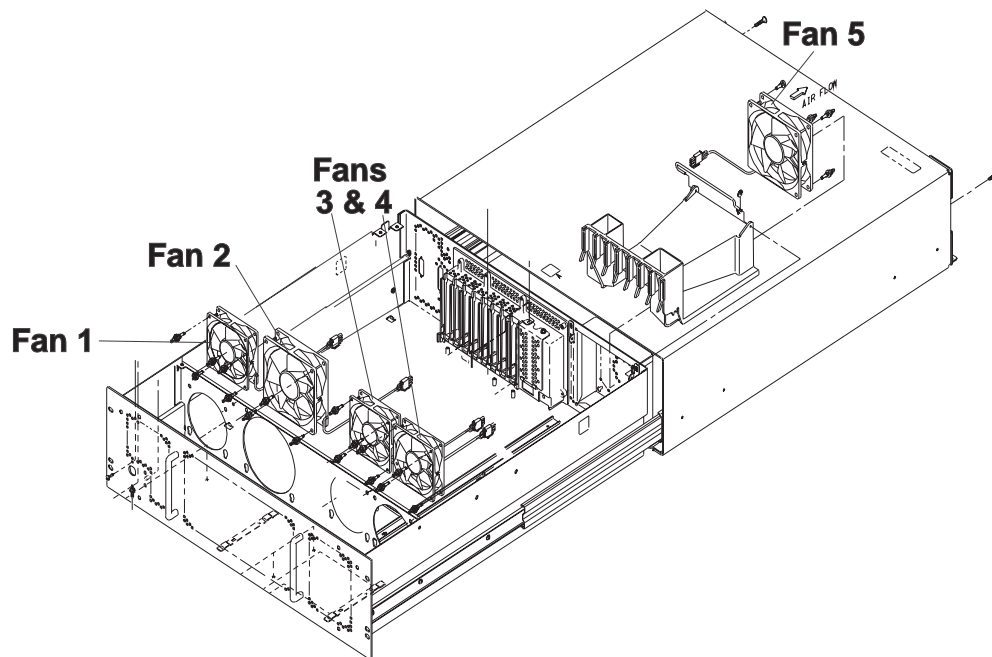


Figure 4-25. Wide Node fans

Removing fan 2

Perform these procedures to remove Fan 2:

1. Refer to “Opening a Wide Node” on page 4-23 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 Node” on page 4-25.

Removing fans 3 or 4

Refer to “Handling static-sensitive devices” on page 4-2, then perform these procedures to remove Fan 3 or Fan 4:

1. Refer to “Opening a Wide Node” on page 4-23.
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 Node” on page 4-25.

Removing fan 5

Perform these procedures to remove Fan 5:

1. Refer to “Opening a Wide Node” on page 4-23.
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

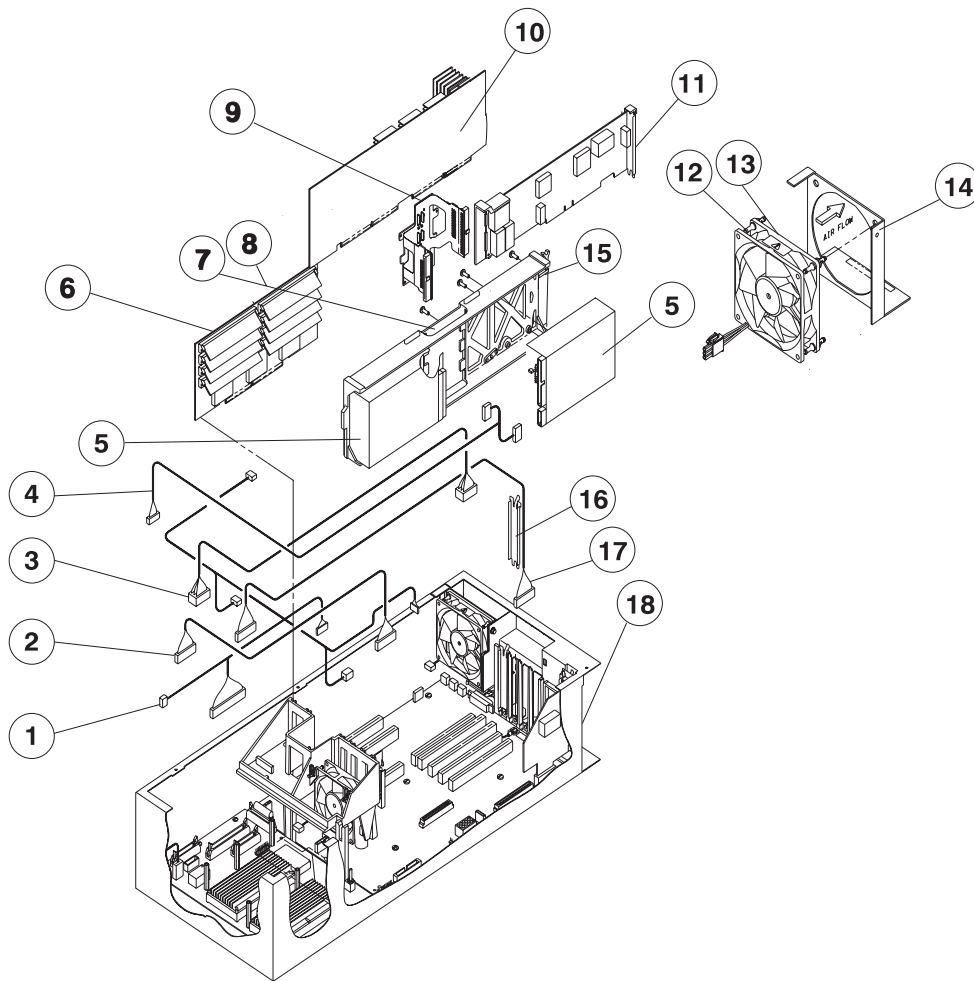
1. Transfer shock mounts from old fan to new fan before reinstalling.
2. Reinstall new fan with wires to the bottom and the airflow indicator pointing to the rear of the chassis.
3. Connect the fan plug.
4. Lower air baffle back into place.
5. Refer to “Closing a Wide Node” on page 4-25.

Chapter 5. Parts catalog

This chapter presents the Parts Catalog listing of RS/6000 SP Uniprocessor Thin or Wide Node parts and FRUs, with corresponding figures containing indexed descriptions.

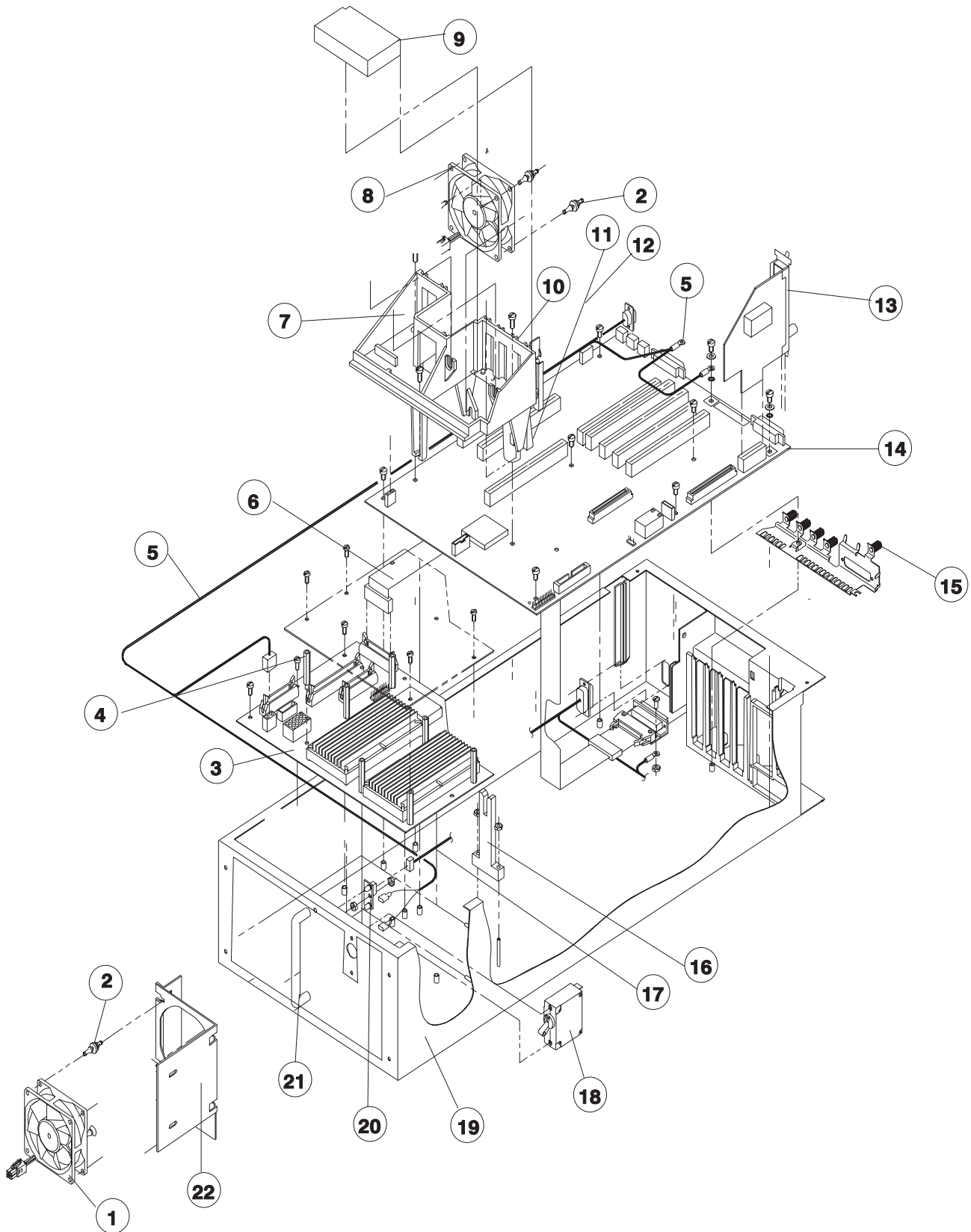
120/160 MHz Thin Node asm (F/C 2008/2022) (view 1)	5-12
120/160 MHz Thin Node asm (F/C 2008/2022) (view 2)	5-14
120/160 MHz Thin Node asm (F/C 2008/2022) (view 3)	5-16
62/66 MHz Thin Node asm (F/C 2001/2002) (view 1)	5-2
62/66 MHz Thin Node asm (F/C 2001/2002) (view 2)	5-4
62/66 MHz Thin Node asm (F/C 2001/2002) (view 3)	5-6
66 MHz Thin Node 2 asm (F/C 2004) (view 1)	5-8
66 MHz Thin Node 2 asm (F/C 2004) (view 2)	5-10
66/77/135 MHz Wide Node asm (F/C 2003/2005/2007) (view 1)	5-18
66/77/135 MHz Wide Node asm (F/C 2003/2005/2007) (view 2)	5-20
66/77/135 MHz Wide Node asm (F/C 2003/2005/2007) (view 3)	5-22

Assembly 1: 62/66 MHz Thin Node asm (F/C 2001/2002) (view 1)



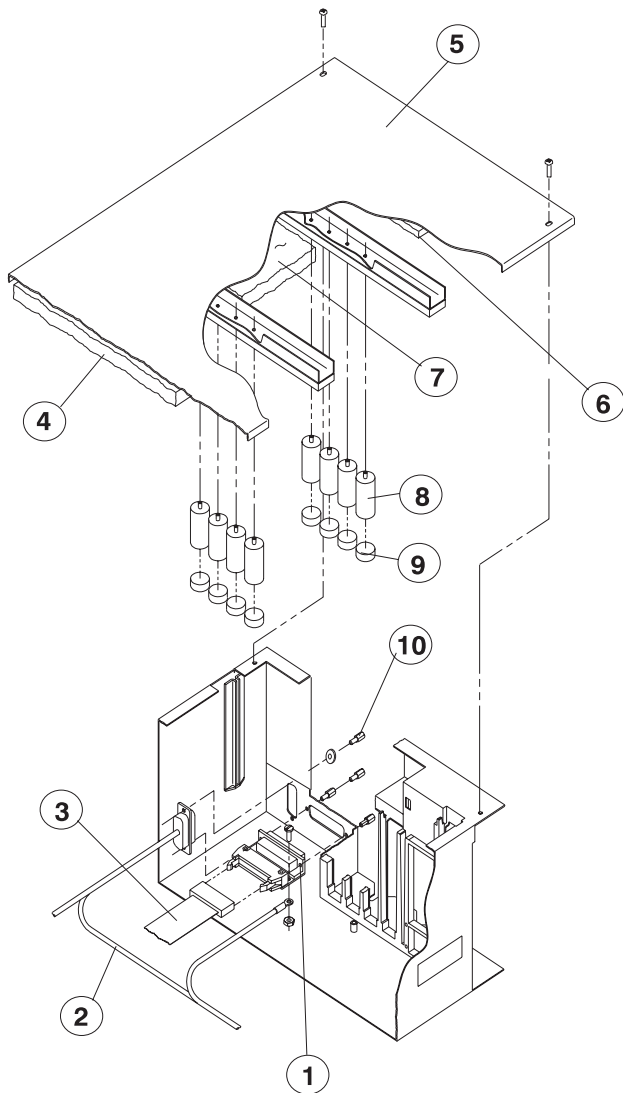
Asm- Index	Part Number	Units	Description
1-			Processor Thin Node 62 MHz Assembly (F/C 2001) (reference only)
-			Processor Thin Node 66 MHz Assembly (F/C 2002) (reference only)
-1	46H9175	1	• Cable, Node Control Harness
-2	31G9274	1	• Cable, Diagnostic Display
-3	54G3001	1	• Cable, Planar Power Distribution
-4	31G9276	1	• Cable, DASD Power (Y-style)
-5		AR	• DASD, Hardfile (See "DASD part numbers" on page 5-24.)
-6		AR	• Memory Cards (See "RS/6000 SP memory part numbers" on page 5-24.)
-7	00G2721	1	• Card, SCSI Riser (62 MHz node only)
-8	43G0779	2	• Cable, SCSI Riser (62 MHz node only)
-9	04H9533	1	• Cable Internal DASD (66 MHz node only)
-10	51G9441	1	• Card, Processor - 62 MHz
-10	40H6717	1	• Card, Processor - 66 MHz
-	88G4012	AR	• SIMM L2, 1.0 MB (F/C 4046)
-12	26H7220	1	• Fan, 5 inch Rear
-13	81F7977	12	• Shock Mount for Fan (Black Isolator)
-14	26H7234	1	• Bracket Thin Node Fan
-15	00G2917	1	• DASD Hardfile Frame
-16	6279235	3	• Bracket I/O
-17	31G9272	1	• Cable, Planar Serial
-18	52G4259	1	• Terminator, SCSI (62 MHz node only)
-	84F2772	2	• Grommet, Edge Trim (not shown)
-	26H7314	1	• Jumper, Node Ctrl/Cable 07H6417 (not shown)
-	46H9176	1	• Jumper, Node Ctrl/Cable 26H7247 (not shown)
-	26H7234	1	• Bracket, Fan (not shown)
-	46H9266	1	• Filler Plate-Single Node (not shown)
-	46H9231	AR	• Insulator (not shown)
-	46G6953	1	• Shelf Assembly - Thin Node (Not shown)

Assembly 2: 62/66 MHz Thin Node asm (F/C 2001/2002) (view 2)



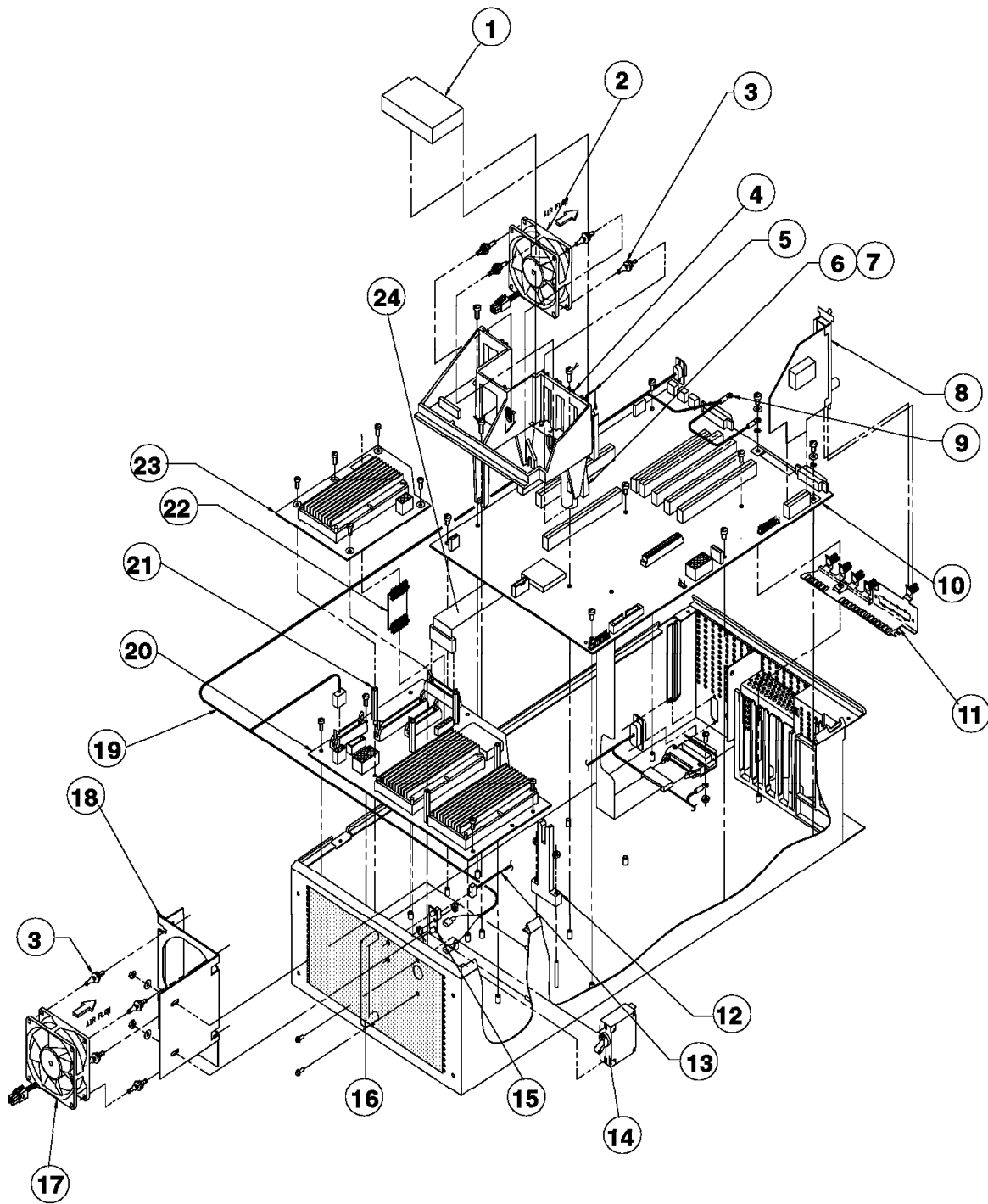
Asm- Index	Part Number	Units	Description
2-			Processor Thin Node 62 MHz Assembly (F/C 2001) (reference only)
-			Processor Thin Node 66 MHz Assembly (F/C 2002) (reference only)
-1	54G2906	1	• Fan, 5 inch Front
-2	81F7977	12	• Shock Mount for Fan (Black Isolator)
-3	26H7085	1	• Card, Node Supervisor
-4	54G3073	5	• Standoff
-5	11J3934	1	• Cable, Node 48 V Dist
-6	31G9271	1	• Cable, Supervisor
-7	31G9305	1	• Support, Card Guide
-8	00G2981	2	• Fan, dc (3-inch front)
-9	00G2259	1	• Foam, Front Fan
-10	40F9969	1	• Spacer, Micro Channel Card
-11	40F9968	1	• Guide, Micro Channel Card
-12	00G2258	1	• Duct, Front Fan
-13	73H1668	1	• Card, Ethernet (Thin/Thick) Riser
-14	93H7182	1	• Card, I/O Planar - 62 MHz
-	93H7059	1	• Card, I/O Planar - 66 MHz
-15	31G9304	1	• Contact, Ground (62 MHz node only)
-	64G5581	1	• Contact, Ground (66 MHz node only)
-16	31G9306	1	• Bridge Support DASD
-17	46H9175	1	• Cable, Node Control Harness
-18	87G8676	1	• Circuit Breaker, 10 amperes
-19	46H9229	1	• Node Weldment
-20	67G4985	1	• Card, LED
-21	46G5964	1	• Handle

Assembly 3: 62/66 MHz Thin Node asm (F/C 2001/2002) (view 3)



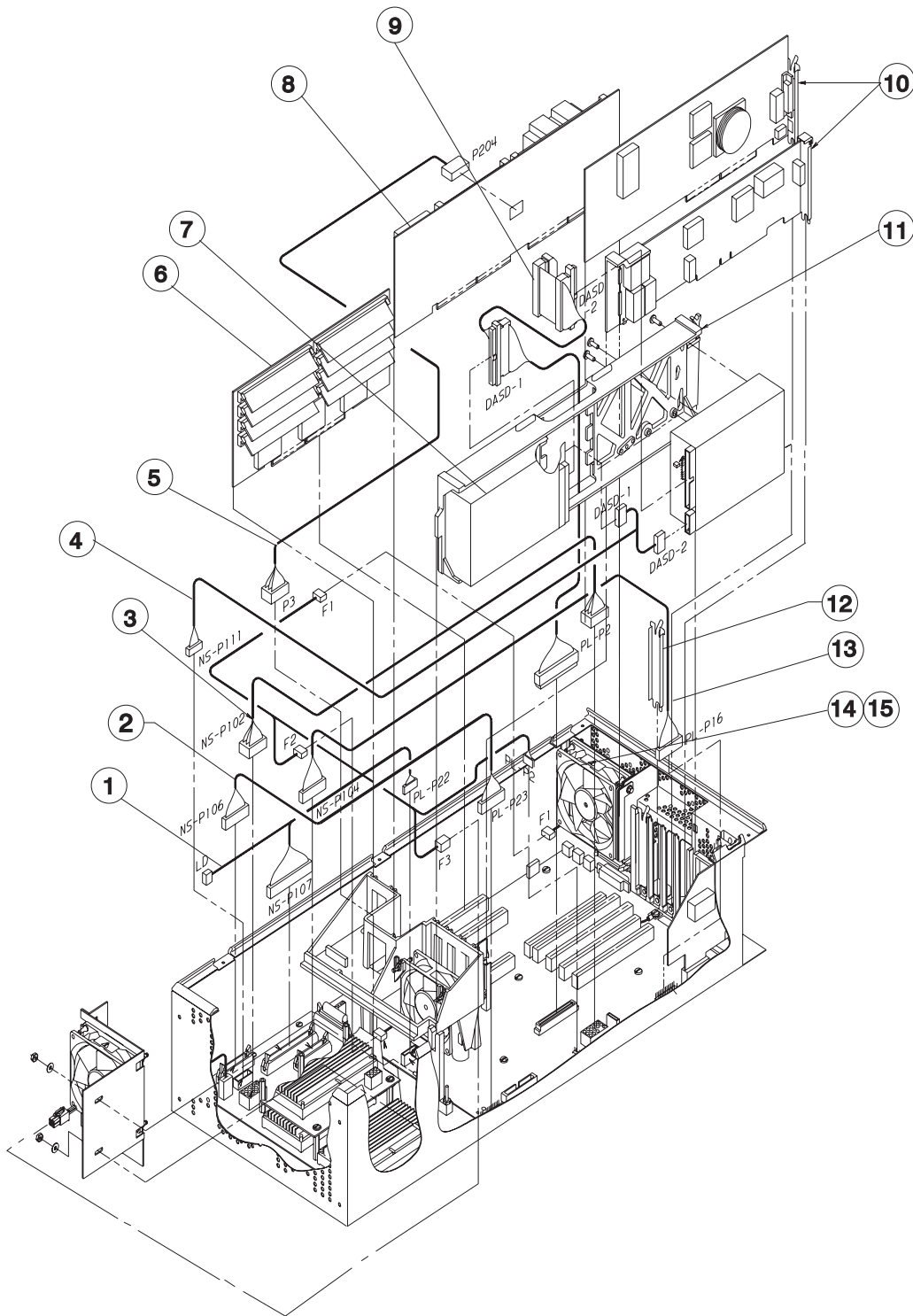
Asm- Index	Part Number	Units	Description
3-			Processor Thin Node 62 MHz Assembly (F/C 2001) (reference only)
-			Processor Thin Node 66 MHz Assembly (F/C 2002) (reference only)
-1	67G4989	1	• Card, Supervisor Bus
-3	31G9271	1	• Cable, Supervisor
-2	11J3934	1	• Cable, Node 48 V Dist
-4	26H7230	1	• Front DASD Insul
-5	26H7194	1	• Node Cover Top
-6	26H7232	1	• Back DASD Insul
-7	26H7231	1	• Mid DASD Insul
-8	46G5963	8	• Card Retainer Cyl
-9	46G7025	8	• Elastomer Strip
-10	51H8738	4	• Screw
-	1622316	4	• Lockwasher

Assembly 4: 66 MHz Thin Node 2 asm (F/C 2004) (view 1)



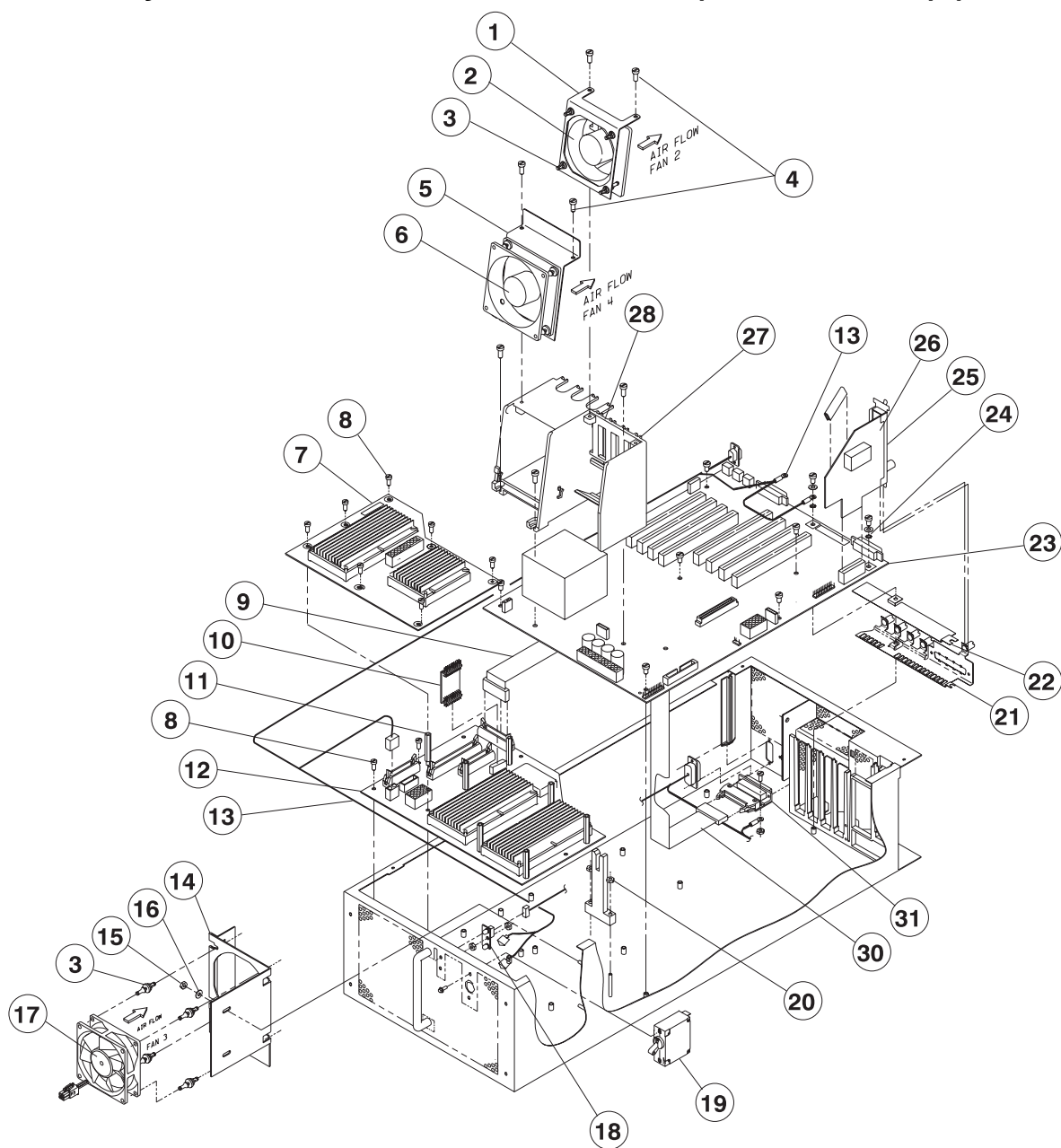
Asm- Index	Part Number	Units	Description
4-			66 MHz Processor Thin Node 2 (F/C 2004) (reference only)
-1	00G2259	1	• Front Fan Foam
-2	00G2981	1	• Fan, Front 3 inch
-3	81F7977	8	• Isolator, Black
-4	31G9305	1	• Guide Card Support
-5	40F9969	1	• Spacer MCA Card
-6	40F9968	1	• Guide MCA Card
-7	00G2258	1	• Duct, Front Fan
-8	73H1668	1	• Ethernet Riser (Thick/Thin)
-9	11J3934	1	• Cable, 48 V Distribution
-10	40H6690	1	• Planar, I/O
-11	64G5581	1	• I/O Contact Grnd
-12	31G9306	1	• Support, DASD Bridge
-13	46H9175	1	• Cable, Node Control
-14	87G8676	1	• Circuit Breaker
-15	67G4985	1	• Card, LED Display
-16	46G5964	1	• Handle
-17	54G2906	1	• Fan, dc 5 inch Front
-18	54G2860	1	• Bracket, Hard Disc Fan
-19	11J3934	1	• Cable, 48 V Distribution
-20	46H9834	1	• Card, Node Supervisor
-21	04H9528	5	• Standoff
-22	77G0938	1	• Jumper Card
-23	46H9799	1	• Card, Power +4 V (Tara)
-24	31G9271	1	• Cable, Supervisor
-	17H5081	1	• Baffle (not shown)
-	26H7314	1	• Jumper, Node Ctrl/Cable 31G9278 (not shown)
-	46H9176	1	• Jumper, Node Ctrl/Cable 26H7247 (not shown)
-	46H9266	AR	• Filler Plate-Single Node (not shown)
-	46H9231	AR	• Insulator (not shown)
-	51H8738	AR	• Screw (not shown)
-	1622316	AR	• Lockwasher (not shown)

Assembly 5: 66 MHz Thin Node 2 asm (F/C 2004) (view 2)



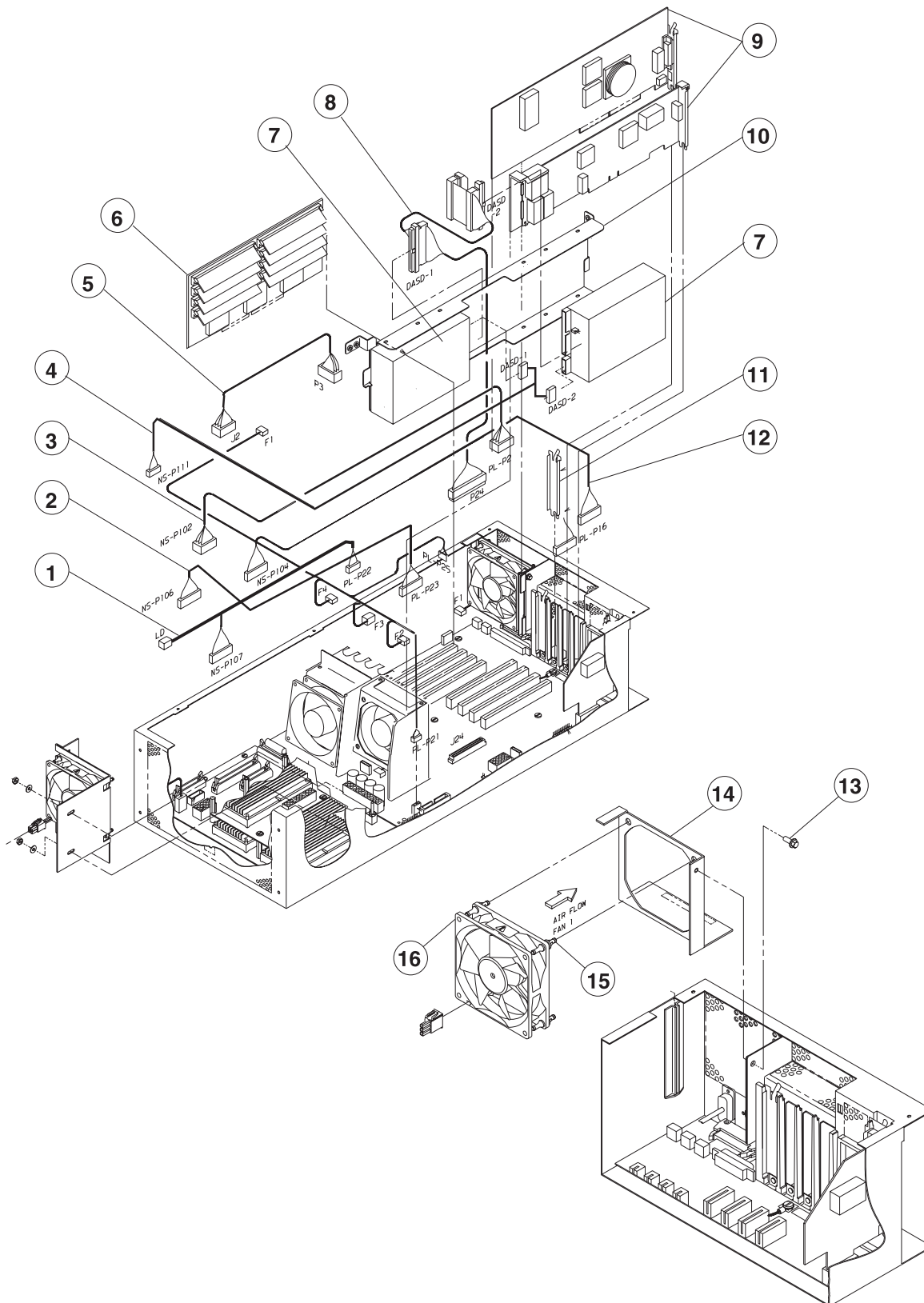
Asm- Index	Part Number	Units	Description
5-			66 MHz Processor Thin Node 2 (F/C 2004) (reference only)
-1	31G9278	1	• Cable, Node Control
-2	31G9274	1	• Cable, Diag Display
-3	54G3001	1	• Cable, Power Distribution
-4	31G9276	1	• Cable, DASD Power
-5	04H9460	1	• Cable, CPU Power
-6		AR	• Memory Card (See "RS/6000 SP memory part numbers" on page 5-24.)
-7		AR	• DASD, Hardfile (See "DASD part numbers" on page 5-24.)
-8	93H4924	1	• Card CPU RS2G (66 Mhz)
-	88G4012	AR	• • SIMM L2 1.0 MB (F/C 4046)
-9	04H9533	1	• Cable, Internal DASD
-10		AR	• MCA Cards (See "Features, Micro Channel adapters" in <i>RS/6000 SP: System Service Guide</i> .)
-11	00G2917	1	• DASD Hardfile Frame
-12	6279235	3	• Bracket, I/O
-13	31G9272	1	• Cable, Planar Serial
-14	26H7220	1	• Fan, Rear 5 inch
-15	07H6446	1	• Bracket, Fan
-	04H9517	1	• Connector Cover Asm 48 V (not shown)

Assembly 6: 120/160 MHz Thin Node asm (F/C 2008/2022) (view 1)



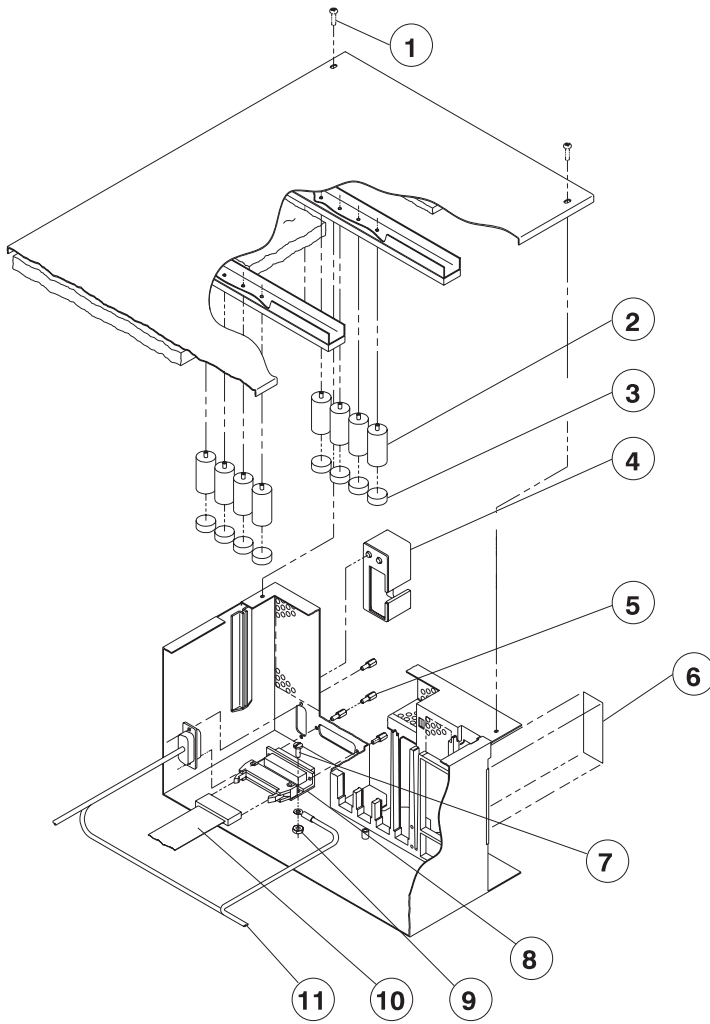
Asm- Index	Part Number	Units	Description
6-			120 MHz Thin Node Asm (F/C 2008) (reference only)
-			160 MHz Thin Node Asm (F/C 2022) (reference only)
-1	46H9768	1	• Bracket, Fan Mount 80 mm
-2	00G2981	1	• Fan, 80 mm Medium Speed
-3	81F7977	16	• Isolator, Black
-4	1622675	4	• Screw, 3.5 X 8 Hex Washer Head
-5	46H9767	1	• Bracket, Fan Mount 92 mm
-6	46H9770	1	• Fan, MED Speed
-7	46H9302	1	• Card, Power Daughter
-8	0038352	10	• Screw, 6-32 X .375
-9	31G9271	1	• Cable, Supervisory Int.
-10	77G0938	1	• Jumper Card
-11	04H9528	1	• Standoff
-12	46H9834	1	• Card, Node Supervisor
-13	11J3934	1	• Cable, Node 48 V
-14	54G2860	1	• Bracket, Fan
-15	0034637	2	• Nut, 6-32
-16	2305158	2	• Washer, Flat #6
-17	54G2906	1	• Fan, dc 5 inch Front
-18	67G4985	1	• Card, LED Display
-	1622433	2	• • Nut, Hex M3.5
-19	46H9304	1	• Circuit Breaker
-	93G1069	2	• • Screw, Hex M3 X 4
-20	31G9306	1	• Support, DASD Bridge
-	0034637	2	• • Nut, Hex 6-32
-21	11J5140	1	• I/O Contact Ground Asm.
-22	93H8593	1	• Insulator, I/O Ground Spring
-23	07L8549	1	• CPU Planar 120 MHz
-	93H5557	1	• CPU Planar 160 MHz
-	0034512	7	• • Screw, BND HD 8-32
-24	0418787	2	• Washer, Flat #8
-24	0055901	2	• Washer, Star #8
-25	84F2722	1	• Edge Trim, Protective
-26	73H1668	1	• Card, Ethernet Riser (Thin/Thick)
-27	46H9969	AR	• Spacer, Micro Channel Card
-28	11J5115	1	• Support, Card Guide
-	0034512	3	• • Screw, GND HD 8-32 X .375
-30	31G9271	1	• Cable, Supervisor Internal
-31	67G4989	1	• Card, Supervisor Bus

Assembly 7: 120/160 MHz Thin Node asm (F/C 2008/2022) (view 2)



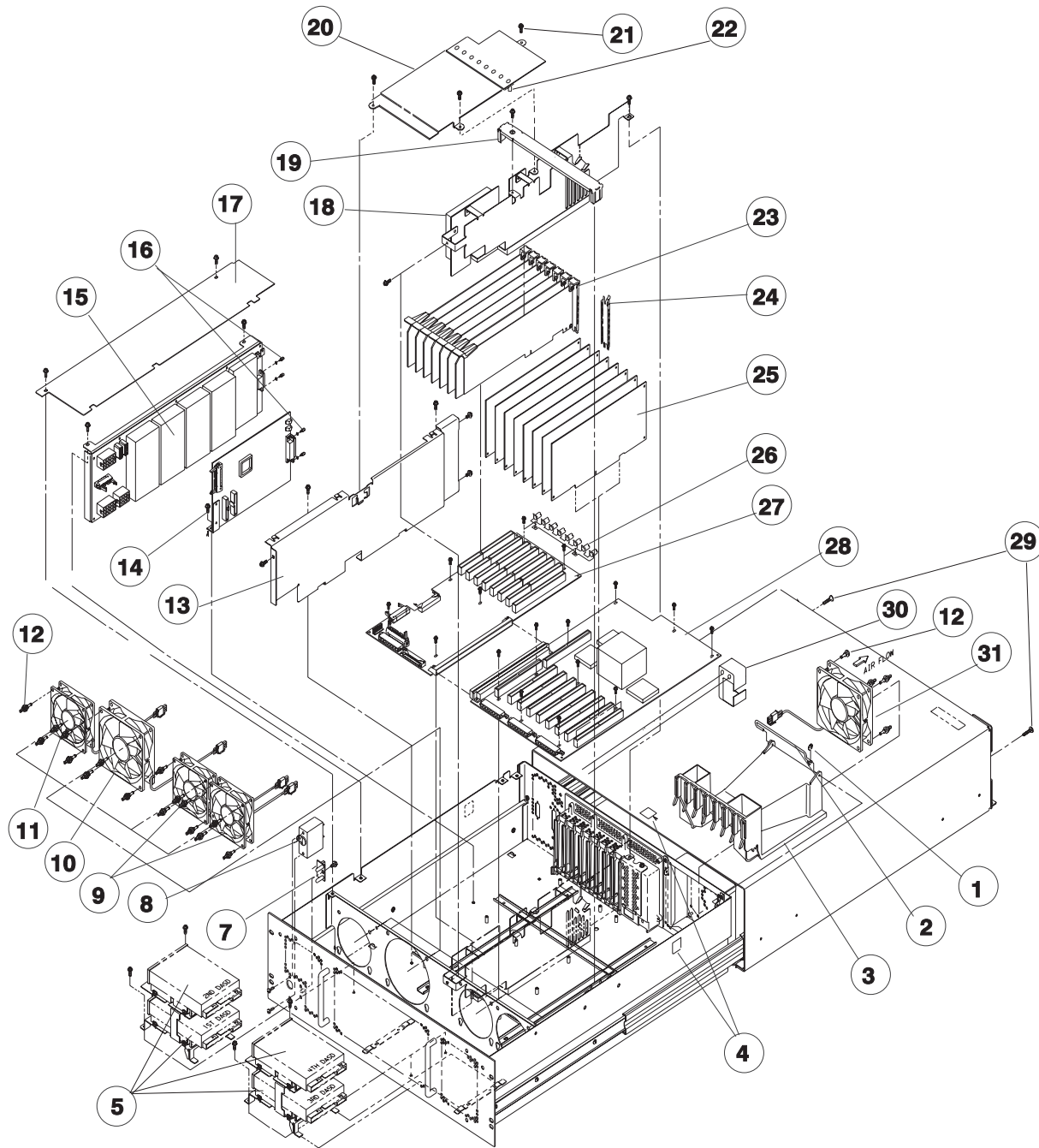
Asm- Index	Part Number	Units	Description
7-			120 MHz Thin Node Asm (F/C 2008) (reference only)
-			160 MHz Thin Node Asm (F/C 2022) (reference only)
-1	46H9772	1	• Cable, Node Control Harness
-2	31G9274	1	• Cable, Diag. Display
-3	54G3001	1	• Cable, Planar Power Dist
-4	31G9276	1	• Cable, DASD Power
-5	46H9773	1	• Cable, 120 MHz CPU Power
-6		AR	• Card, Memory (See "RS/6000 SP memory part numbers" on page 5-24.)
-7		AR	• DASD, Hardfile (See "DASD part numbers" on page 5-24.)
-8	04H9533	1	• Cable, DASD Signal (DASD-to-DASD)
-9		AR	• MCA Cards (See "Features, Micro Channel adapters" in <i>RS/6000 SP: System Service Guide</i> .)
-10	08J5834	1	• Bracket, DASD Mounting
-11	6279235	1	• Bracket I/O
-12	31G9272	1	• Cable, Planar Serial
-13	1624764	1	• Screw, Hex Flange HD M4 X 6
-14	26H7234	1	• Bracket, Thin Node Fan
-15	81F7977	16	• Isolator, Black
-16	26H7220	1	• Fan, dc (5-inch Rear)

Assembly 8: 120/160 MHz Thin Node asm (F/C 2008/2022) (view 3)



Asm- Index	Part Number	Units	Description
8-			120 MHz Thin Node Asm (F/C 2008) (reference only)
-			160 MHz Thin Node Asm (F/C 2022) (reference only)
-1	21L2743	1	• Cover Top Asm.
-	54G3364	6	• • Screw, #2 Phil Pan HD
-2	46G5963	8	• Retainer, Card
-3	46G7025	8	• Elastomer Strip
-4	04H9517	1	• Cover, Connector
-5	51H8738	4	• Screwlock
-	1622316	4	• Washer
-6	42G4996	1	• Label, Bar Code
-7	1621032	1	• Screw, Chesse HD M3.5 X 8
-8	67G4989	1	• Card, Supervisor Bus
-9	1622433	1	• Nut, Hex M3.5
-10	31G9271	1	• Cable, Supervisor Internal
-11	11J3934	1	• Cable, Node 48 V

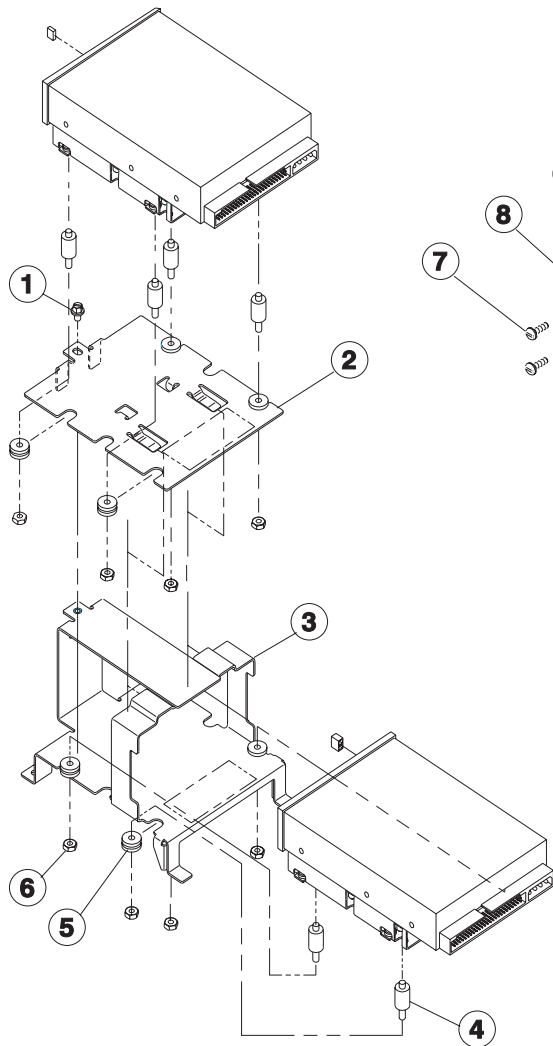
Assembly 9: 66/77/135 MHz Wide Node asm (F/C 2003/2005/2007) (view 1)



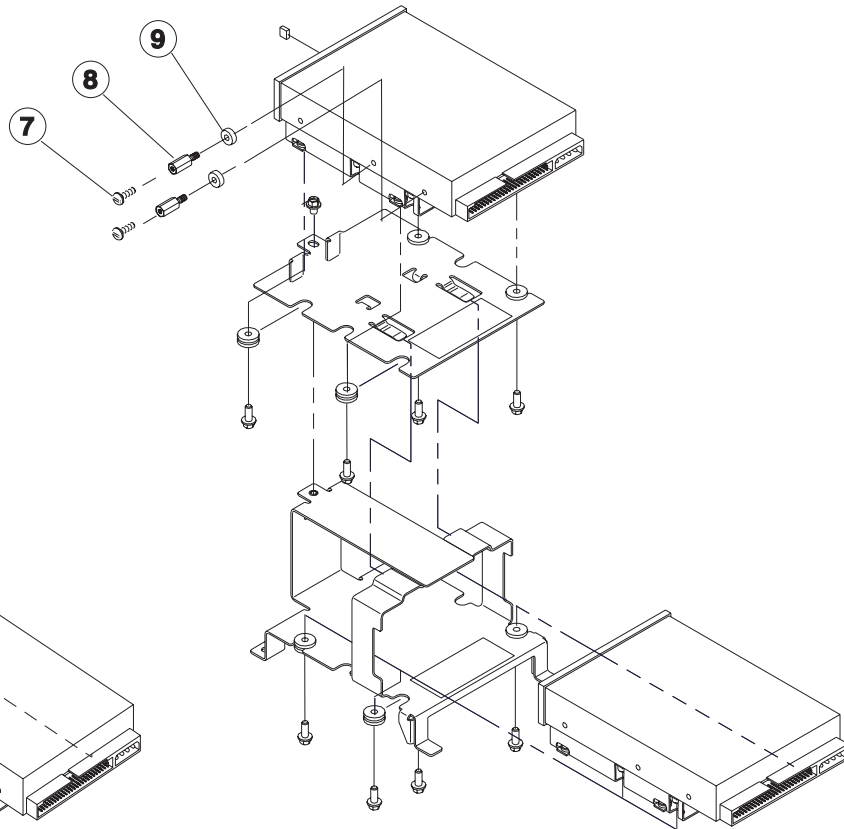
Asm- Index	Part Number	Units	Description
9-			66 MHz Wide Node Assembly (F/C 2003) (reference only)
-			77 MHz Wide Node Assembly (F/C 2005) (reference only)
-			135 MHz Wide Node Assembly (F/C 2007) (reference only)
-1	1073418	1	• Retaining Ring
-2	46G6981	1	• Hinge Pin
-3	8184623	1	• Air Baffle Assembly (66 and 77 MHz)
-3	73H4288	1	• Air Baffle Assembly (135 MHz)
-4	5423464	1	• Label, Weight Safety
-5		AR	• DASD, Hardfile (See "DASD part numbers" on page 5-24.)
-7	67G4985	1	• Card, LED Display
-8	87G8677	1	• Circuit Breaker, 20 Amp (66 MHz)
-8	07H6411	1	• Circuit Breaker, 25 Amp (77 and 135 MHz)
-9	54G3291	1	• Fan, Memory
-10	42F7434	2	• Fan, CPU
-11	42F7434	1	• Fan, Power
-12	81F7977	20	• Shock Mount for Fan (Black Isolator)
-13	26H7189	1	• Divider
-14	38H9698	1	• Card, Supervisor
-15	07H6410	1	• Card, Power (66 and 77 MHz)
-15	46H9703	1	• Card, Power (135 MHz)
-16	51H8738	4	• Screw
-17	46G6994	1	• Cover
-18	52G1492	1	• Divider Assembly
-19	26H7319	1	• Retainer
-20	26H7186	1	• Retainer Assembly
-21	32G1547	3	• Screw, Hex FI Hd, M4 X 5
-22	26H7190	8	• Cylinder Card Retainer
-23		AR	• MCA Cards (See "Features, Micro Channel adapters" in <i>RS/6000 SP: System Service Guide</i> .)
-24	6279235	7	• Bracket, I/O
-25		AR	• Memory Card (See "RS/6000 SP memory part numbers" on page 5-24.)
-26	22F9503	1	• Ground Spring
-	1622316	4	• • Lockwasher
-27	07L6765	1	• Card, I/O Planar (66 and 77 MHz)
-27	93H6519	1	• Card, I/O Planar (135 MHz)
-28	07L7370	1	• Card, CPU Planar (66 MHz)
-28	93H4843	1	• Card, CPU Planar (66 MHz)
-28	93H4880	1	• Card, CPU Planar (77 MHz)
-	88G4012	2	• SIMM, 1.0 MB
-28	94H0445	1	• Card, CPU Planar (135 MHz Wide Node)
-	40H7442	1	• V dc Converter Daughter Card (Not shown)
-29	00G1270	2	• Screw, Hex FI SI Hd, M4 X 17
-30	04H9417	1	• Guide, Cable 48 V
-31	11J3942	1	• CPU High Speed Fan

Assembly 10: 66/77/135 MHz Wide Node asm (F/C 2003/2005/2007) (view 2)

Old Style Bracket

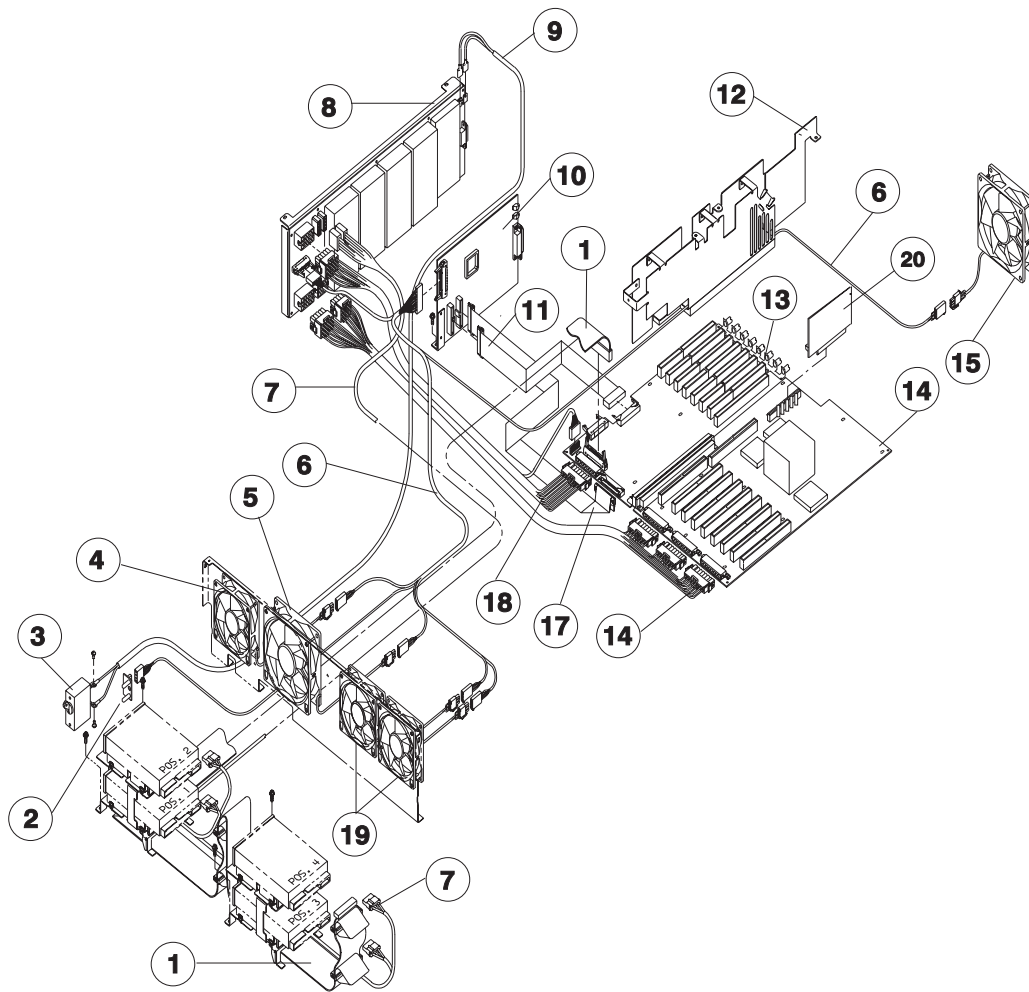


New Style Bracket



Asm- Index	Part Number	Units	Description
10-			66 MHz Wide Node Assembly (F/C 2003) (reference only)
-			77 MHz Wide Node Assembly (F/C 2005) (reference only)
-			135 MHz Wide Node Assembly (F/C 2007) (reference only)
-1	32G1547	1	• Screw, Hex Fl Hd, M4 X 5
-2	46G7020	2	• Tray, DASD
-3	46G7019	2	• Bracket, DASD
-4	26H7316	8	• Mount, Shock Flex Bolt
-5	00G3272	8	• Grommet (DASD)
-6	0034637	8	• Nut, Hex 6-32
-7	1621197	4	• Screw
-8	51H8738	2	• Standoff
-9	1622304	2	• Washer

Assembly 11: 66/77/135 MHz Wide Node asm (F/C 2003/2005/2007) (view 3)



Asm- Index	Part Number	Units	Description
11-			66 MHz Wide Node Assembly (F/C 2003) (reference only)
-			77 MHz Wide Node Assembly (F/C 2005) (reference only)
-			135 MHz Wide Node Assembly (F/C 2007) (reference only)
-1	54G3246	1	• Cable, Internal SCSI (66 and 77 MHz)
-	26H7249	1	• Cable, SCSI, Fast/Wide (135 MHz)
-2	67G4985	1	• Card, LED Display
-3	87G8677	1	• Circuit Breaker, 20 Amp (66 MHz)
-3	07H6411	1	• Circuit Breaker, 25 Amp (77 and 135 MHz)
-4	42F7434	1	• Fan, Power
-5	42F7434	2	• Fan, CPU
-6	17H5038	1	• Cable, Supervisor Card/Fan/LED Power (66 and 77 MHz)
-6	54G3241	1	• Cable, Supervisor Card/Fan/LED Power (135 MHz)
-7	54G3240	1	• Cable, DASD Power
-8	07H6410	1	• Card, Power (66 and 77 MHz)
-8	46H9703	1	• Card, Power (135 MHz)
-9	54G3242	1	• Cable, Switch Assembly
-10	38H9698	1	• Card, Supervisor
-11	04H9441	1	• Cable, CPU J37
-12	52G1492	1	• Divider Assembly
-13	07L6765	1	• Card, I/O Planar (66 and 77 MHz)
-13	93H6519	1	• Card, I/O Planar (135 MHz)
-14	93H4843	1	• Card, CPU Planar (66 MHz)
-14	93H4880	1	• Card, CPU Planar (77 MHz)
-	88G4012	2	• SIMM, 1.0 MB
-14	07L7370	1	• Card, CPU Planar (135 MHz Wide Node)
-15	11J3942	1	• CPU High Speed Fan
-16	46H9312	1	• Cable, CPU Planar Power (66 and 77 MHz)
-16	46H9707	1	• Cable, CPU Planar Power (135 MHz)
-17	54G3244	1	• Cable, CPU J39
-18	54G3238	1	• Cable, I/O Planar Power
-19	54G3291	1	• Fan, Memory
-	46G5619	1	• Wrap Plug, Male (not shown)
-	48G3055	1	• Plug (not shown)
-20	40H7442	1	• V dc Converter Daughter Card

DASD part numbers

<i>Table 5-1. DASD part numbers</i>				
Feature Code	Part Number	Size (GB)	Type	Address Jumper
3046/2918 See note	5986923	18.2	Ultra	45G9800
3034	74G7008	4.5	Fast/Wide	45G9800
3033	74G7007	2.2	Fast/Wide	45G9800
3032	74G7006	1.1	Fast/Wide	45G9800
3031	74G6996	2.2	Fast	93X2452
3031	86G9099	2.2	Fast	93X2452
3010	93G2972	9.1	Fast/Wide	45G9800
3000	93G2970	4.5	Fast/Wide	45G9800
2908/2909 See note	59H6926	9.1	Ultra	45G9800
2900/2904 See note	83H7105	4.5	Ultra	45G9800
2580	90F0894	2	Fast	93X2452
2580	86F0118	2	Fast	45G9800
2555	36G6930	1	Fast	45G9800
2555	86G9049	1	Fast	45G9800
2555	45G9467	1	Fast	45G9800
Note: Feature codes 2909, 2904, and 2918 are DASD mirroring.				

RS/6000 SP memory part numbers

<i>Table 5-2. Memory part numbers/S4.6 cards. MEM part numbers - 8 SIMMs per card</i>				
Card Size	F/C	SIMMless card FRU #	SIMM FRU #	SIMM Size
32 MB	4053 4067	52G4801	70F9973	4 MB
64 MB	4054 4069 5064	52G4801	70F9976	8 MB
128 MB	4055 4090 5129	52G4801	43G1796	16 MB
256 MB	4056 4095	88G3680	07L8500	32 MB
256 MB	4056 4095	52G4801	39H8312	32 MB

<i>Table 5-3. Memory part numbers/S5.0 cards. MEM part numbers - 8 SIMMs per card</i>				
Card Size	F/C	SIMMless Card FRU #	SIMM FRU #	SIMM Size
32 MB	4076	12H1331	39H8924	4 MB
64MB	4077	12H1331	39H8925	8 MB
128 MB	4078	12H1331	43G1796	16 MB
256 MB	4079	12H1331	39H8312	32 MB

<i>Table 5-4. Memory SIMM/SIMMless S.60 cards. For 160 MHz Thin Processor Nodes)</i>				
Card Size	F/C	SIMMless Card FRU #	SIMM FRU #	SIMM Size
32 MB	4086	93H5994	39H8924	4 MB
64MB	4087	93H5994	39H8925	8 MB
128 MB	4088	93H5994	43G1796	16 MB
256 MB	4089	93H5994	39H8312	32 MB

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Industry Canada compliance statement

This Class A digital apparatus meets the requirements of the Canadian 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:

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

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

這是甲類的資訊產品，在居住的環境中使用時，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)

Hinweis

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

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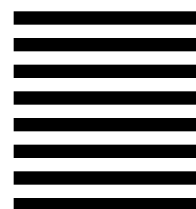
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