

RS/6000 SP



System Service Guide

RS/6000 SP



System Service Guide

Note!

Before using this information and the product it supports, read the safety information in *RS/6000 SP: Installation and Relocation* 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 System 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
- Pointing you to device specific procedures

RS/6000 SP hardware service library

For this release, *Maintenance Information Volumes 1-4* (GA22-7375-01, 7376-01, 7377-01, and 7378-01) have been restructured into the following publications:

- *IBM RS/6000 SP: Installation and Relocation*, GA22-7441.
- *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. (This book.)
- *IBM RS/6000 SP: SP Switch Service Guide*, GA22-7443. Service procedures, MAPs and parts catalog information specific to the SP Switch (SPS).
- *IBM RS/6000 SP: Uniprocessor Node Service Guide*, GA22-7445. Service procedures, MAPs and parts catalog information specific to all uniprocessor-type nodes.
- *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: 332 MHz and POWER3 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.

For a complete list of other SP system publications and related information, see the bibliography section of *IBM RS/6000 SP: Installation and Relocation*, GA22-7441-00.

Who should use this book

This book is intended for the product-trained Customer Engineer (CE). The installation 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 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 this book. The Start MAPs will help you 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)
- PCI and MCI Adapters

Note: If the diagnostic procedures indicate that device specific procedures are required, the information in *RS/6000 SP: System Service Guide* will direct you to any additional manuals you may need.

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 CD-ROM 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 *IBM RS/6000 SP: Installation and Relocation*, GA22-7441-00.

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.

Starting a service call (MAP 0100)

Lockout safety procedures	1-1
MAP 0100 procedures	1-3
Supervisory subsystems	1-10

Purpose of this MAP

The MAPs in this section provide 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 or replacement procedures for the corrective action.

This MAP is the starting point for all service calls. It directs you to other MAPs and service information. Refer to Chapter 2, "Locations" on page 2-1.

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 "Lockout/tagout procedure for PDU" 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.

Starting a service Call (MAP 0100)

4. Depending on your customer's safety requirements, you **must** perform either the “Lockout/tagout procedure” on page 1-2 or the “Lockout/bagout procedure” on page 1-2 to completely isolate the frame from the electrical supply.

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” on page 1-1.
 - If power is still present, inform customer of this fact and return to Step 4 of the “Initial SEPBU lockout procedure” on page 1-1.
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.

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 “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 procedures

Lockout/tagout procedure for PDU: 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.

Lockout/bagout procedure for PDU: 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.

MAP 0100 procedures

Step 0100–001: Read the following notes before continuing:

- **Attention:** Processor nodes should never be powered-on without the top cover seated in its normal position to protect internal components.
- **Attention:** Some 48-volt power cables have inline circuit breakers. Ensure the inline circuit breaker switch is in the Off (O) position before connecting or disconnecting 48-volt power cables from the node.
- **Attention:** On all CHRP nodes, it is necessary to wait 30 seconds after turning off the 48-volt inline circuit breaker before turning the circuit breaker back on.
- **Attention:** Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers.
- **Attention:** The MAPs explain restrictions for performing concurrent maintenance on the system. Notify customer where indicated before disconnecting or powering-down parts of the system so that critical information/applications of the customer will not be lost during maintenance/repair.
- **Attention:** Servicing processor nodes with the switch assembly feature (parallel environment) requires that parallel processing must be stopped before removing the nodes from the active configuration. Powering off processor nodes without removing them from the active partition will cause all parallel jobs in that partition to terminate and switch initialization to rerun.

Starting a service Call (MAP 0100)

- **Problem determination** found in *IBM Parallel System Support Programs for AIX: Diagnosis Guide* should be performed before using the following MAPs to reduce the likelihood that the problem is due to a software or user error.
- When you need to power-off a processor node, which has not previously been shut down or flashing **888**, check with the Customer to see if the node can be fenced and shut down; otherwise, maintenance must be deferred.
- **Six Digit SRNs:** If you are here because of a six digit SRN, use the SRN and FFC tables in one of the following books to identify the failing FRU or FRU list:
 - *Diagnostic Information for Micro Channel Bus Systems* (SA38-0532)
 - *Diagnostic Information for Multiple Bus Systems* (SA38-0509)

Notes:

1. If you are running diagnostics and both an SRN and an 8-digit error code appear for the same fault, start the service procedure using the 8-digit error code.
 2. After you obtain the required FRU or FRU list, return to this book or the device specific service guide for additional removal and replacement instructions.
 3. In some cases, the SRNs in *Diagnostic Information for Multiple Bus Systems* may point to other MAPs instead of providing a FRU or FRU list. The referenced MAP will help you determine the which FRUs require service. Once you have obtained the required FRU information, return to the service guides for removal and replacement instructions.
 4. If the SRN is in the range A00-000 to A1F-FFF, see MAP 230 in *Diagnostic Information for Multiple Bus Systems* for additional problem determination information. Unless otherwise directed, replace the listed FRUs in the order presented on the Problem Report Screen.
 5. If the SRN contains a list of FFC's:
 - a. Record the FRU's from the FFC list
 - b. Return to the procedure that directed you to this "Six Digit SRNs:" note and continue service
 6. If the SRN does not contain a list of FFC's:
 - a. Follow the actions listed in the SRN table
 - b. Use the actions to identify the failing FRUs or resolve the problem
 - c. Return to the procedure that directed you to this "Six Digit SRNs:" note and continue service
- **Concurrent service operations** can be done on the following boundaries without interfering with operation of other parts of the system:
 - Bulk power supply or power module (only one can be removed at a time)
 - Frame supervisor card
 - Processor node (only when not in the active configuration)
 - Switch with partitions—for service within a partition, see “Viewing switch partitions” on page 3-28.
 - When a MAP instructs you to replace a FRU, use Chapter 4, “FRU removals and replacements” on page 4-1 (or the "FRU removals and replacements" in the applicable node or switch service guide).
 - Follow the specific instructions for removing and replacing each part.
 - Be sure to observe all danger, caution, and attention notices.
 - If a problem persists after replacing all error code or SRN called FRUs, go to the minimum configuration MAP for the specific device you are working on.

- Features may be installed in this product that are not covered in the following MAPs. Should the following diagnostics fail to resolve the field problem, refer to the documentation that came with the installed features for further diagnostic information.
- If the control workstation hardware is not operating correctly, refer to the appropriate control workstation system unit service guide. Otherwise, go to “Step 0100–002.”
- If you are having a problem running diagnostics and the diagnostics hang, go to *Diagnostic Information for Multiple Bus Systems* and refer to MAP 0020. After completing the problem determination procedure, return to this book or the device specific service guide for removal and replacement instructions.
- If another RS/6000 publication instructs you to run the diagnostics from CD-ROM, go to “IPLing processor nodes from network device (two methods)” on page 3-11 and use Method one: network boot method.

Step 0100–002: Begin system diagnostics:

1. Check for the existence of the high availability control workstation (HACWS) by looking at the frame supervisor card. Verify the twin tail RS/232 cable hook-up needed for HACWS.

Note: The twin tail frame supervisor card is also needed for frames supporting the SP Switch or for frames containing 604 or 604e high node(s).

2. Start either Perspectives or the System Monitor:

Perspectives

On the command line of the control workstation, type **sphardware** and press **Enter**, to start Perspectives. Refer to the System Monitor information in *IBM RS/6000 SP: Administration Guide*, GC23-3897.

3. Open a TTY window, if possible, to the failing node. Real-time error data can be observed that can help with problem determination and repair.
4. Check the boot Ethernet and switch communication status by issuing the following command from the control workstation:

SDRGetObjects host_responds (Ethernet)

SDRGetObjects switch_responds (Switch)

A value of "0" for **host_responds** or **switch_responds**, for any node, indicates a communication problem (this may be the result of some other hardware problem).

5. Check for system monitor, node, and switch errors by issuing one or more of the following commands from an AIX window:

Table 1-1. System monitor status commands		
Check status of:	Issue commands on:	Commands:
SP hardware	Control workstation	errpt -a -N sphwlog pg
Affected node	Node's TTY console or " tn HOSTNAME "	errpt -a pg
Switch links	Primary node's TTY console or " tn HOSTNAME " (use splstdata -s to identify HOSTNAME)	errpt -a -N Worm pg pg /var/adm/SPlogs/css/out.top
Dependent node	Control workstation	SDRGetObjects DependentNode

Starting a service Call (MAP 0100)

Notes:

- a. The most recent entry is found at the *top* of **errpt**
 - b. When viewing the error log using the **pg** command, the following options may be entered at the colon (:): prompt:
 - \$** Jumps to end of output (to view oldest entries of **errpt**)
 - +** Jumps one page forward
 - Jumps one page backward
 - #** Jumps to line number # of the file (first line is 1)
 - c. Refer to “Checking errors using “errpt”” on page 3-13 for more information on using the **errpt** command.
 - d. Check the date/time stamp of the log entries for updated information. Be aware that conditions may have been cleared, as indicated by “Condition cleared” in the message.
 - e. Note that “node17” or “slot17” refers to a switch assembly in the position below processor nodes 1 and 2.
6. The following table contains a **prioritized** list of conditions. Find the **first** condition that describes your problem, then perform the suggested action.

<i>Table 1-2 (Page 1 of 5). System conditions and suggested actions</i>		
Priority	Condition	Action
1	Control workstation hardware not operating correctly.	Go to RS/6000 MAPs to service the control workstation.
2	System monitor (errpt) reports supervisor problem: <ul style="list-style-type: none"> • “Frame Controller does not respond...” • “Frame supervisor does not respond” • “Supervisor bus failed for node...” • “Node supervisor does not respond” • “Supervisor bus failure” • Perspectives/spmon not responding to frame or node 	Go to “Supervisory subsystems” on page 1-10.
3	Problem with entire frame: <ul style="list-style-type: none"> • System monitor (errpt/not topology) reports hardware problem associated with frame(s). • Problem with frame power. 	Go to “Main power (MAP 0450)” on page 1-66.
4	Problem with frame supervisor green LED number 2 flashing.	If the frame has a: <ul style="list-style-type: none"> • SEPBU, go to “SEPBU subsystem MAPs” on page 1-107. • PDU, go to “PDU dc power loss from bulk dc power supplies (MAP 0510)” on page 1-93.

Table 1-2 (Page 2 of 5). System conditions and suggested actions		
Priority	Condition	Action
5	<p>Perspectives LED or LCD display constantly shows:</p> <ul style="list-style-type: none"> • 3-digits • 4-digits • 8-digits • OK/STBY 	<p>If the display shows a constant:</p> <ul style="list-style-type: none"> • 3-digit readout or 4-digit readout starting with 0 to 7: <ul style="list-style-type: none"> – Go to “Processor node function (MAP 0140)” on page 1-56. Note: 4-digit codes beginning with 888 are also considered 3-digit codes/ • 4-digit readout starting with 8 to F or 8-digit readout: <ul style="list-style-type: none"> – Go to the "Error code to FRU index" for the appropriate node. Note: 4-digit codes beginning with 888 are considered 3-digit codes/ • OK/STBY: <ul style="list-style-type: none"> – Go to the messages and codes for the appropriate node.
6	<p>Problem with processor node:</p> <ul style="list-style-type: none"> • TTY console and/or system monitor (errpt/not topology) reports a hardware problem for processor node(s) (slots 1-16). • Uniprocessor (Thin/Wide Node) <ul style="list-style-type: none"> – Yellow LED on or flashing. – Green LED off or flashing. • SMP (Thin/Wide/High Node) <ul style="list-style-type: none"> – Supervisor LED #1 flashing (green) – Supervisor LED #5 flashing (yellow) • SP Expansion I/O Unit <ul style="list-style-type: none"> – Yellow LED on or flashing. – Green LED off or flashing. • Problem with node power. 	<p>Go to “Processor node diagnostics and descriptions (MAP 0130)” on page 1-33.</p>

Starting a service Call (MAP 0100)

Table 1-2 (Page 3 of 5). System conditions and suggested actions

Priority	Condition	Action
7	<p>Problem with switch assembly or switch communication:</p> <ul style="list-style-type: none"> • System monitor (errpt) reports a hardware problem for switch assembly (slot 17). • Yellow LED on or flashing. • Green LED off or flashing. • switchResponds is "0" for nodes. • switchResponds = YELLOW • Primary node errpt -a -N Worm lists problems. • Problem identified in out.top file. • Problem with dependent node connection to switch. 	<p>Go to the "Switch description and problem determination" MAP in <i>RS/6000 SP: SP Switch Service Guide</i>.</p>
8	<p>Network problem reported by "Topology" window, GUI, or customer.</p> <ul style="list-style-type: none"> • Ethernet (en) — hostResponds not green • Switch (css) — switchResponds not green • Token Ring (tr) • FDDI (fi) 	<p>Go to "Network problems (MAP 0570)" on page 1-131.</p>
9	<p>Block Multiplexer Channel Adapter problem detected by customer.</p>	<p>Go to "Block Multiplexer Channel Adapter (MAP 0640)" on page 1-140.</p>

Table 1-2 (Page 4 of 5). System conditions and suggested actions

Priority	Condition	Action
10	<p>Customer reported problems.</p> <p>Examples:</p> <ul style="list-style-type: none"> • I/O adapter problem (other than BMCA). <ul style="list-style-type: none"> – If this is a SPS adapter problem in a 135 MHz wide node at PSSP level 2.3 or below, first check to ensure that the SPS adapter is plugged into an I/O bus 0 slot (preferably slot 0/4). – If this is a 332 MHz SMP node, ensure the SPS adapter cable is plugged into port P0. • Memory or processor problem. <ul style="list-style-type: none"> – For 604e high nodes, ensure that memory DIMM types are not mixed on individual memory cards or on the node • SCSI/HDISK or other device problems. <ul style="list-style-type: none"> – For 604 and 604e high nodes, refer to the media drawer diagram in "Removing the 604 or 604e High Node DASD" in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i> showing the SCSI path and power cable. • Missing resources 	<ol style="list-style-type: none"> 1. If possible, run Advanced Diagnostics Problem Determination in Normal mode. <ul style="list-style-type: none"> • Otherwise, have the customer remove the processor node from the active configuration and SHUTDOWN the node. Then run Advanced Diagnostics Problem Determination in Service mode. 2. Check for failures or missing and additional devices (diag -a). If any SRNs are logged: <ul style="list-style-type: none"> • For 5-digit SRNs, go to "SSA Maintenance Analysis Procedures" on page 1-148. • For 6-digit SRNs, see the "Six Digit SRN" note on 1-4. • For 8-digit error codes, go to service guide for the appropriate node and see the "Error code to FRU index." <p>Note: After identifying the FRU, return to this procedure for additional instructions.</p> 3. Replace the recommended FRUs one at a time. Refer to: <ul style="list-style-type: none"> • The applicable node service guide for processor node locations, removal and replacement procedures, and part numbers, as required. 4. If no problem is found and no service was taken, the problem may be in the software or attached hardware. <ul style="list-style-type: none"> • Go to the "Problem determination" note on 1-4. 5. Go to "End of call procedures (MAP 0650)" on page 1-144.
11	<p>Processor node or switch assembly is not recognized by system monitor:</p> <ul style="list-style-type: none"> • Display shows an empty box for this processor node or switch assembly. 	<p>Go to "Analyzing supervisor bus problems (MAP 0120)" on page 1-21 to service this processor node or switch assembly.</p>

Supervisory Subsystem Descriptions

Table 1-2 (Page 5 of 5). System conditions and suggested actions		
Priority	Condition	Action
12	<p>Processor node problem detected by customer or CE:</p> <ul style="list-style-type: none"> • 3-digit LEDs displayed but missing segments or remain blank • Processor node will not reset • No response from TTY console • Mode switch problem • Yellow or green LEDs on processor node will not light. 	<p>Go to the "Node control" MAP in the applicable SP node service guide.</p> <p>For 604 or 604e high processor nodes, consult the <i>7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide</i> and <i>7015 Supplemental Information</i></p> <p>For SP-Attached Servers (RS/6000 7017 Models S70, S7A, and S80), check the server to SP connection cables for correct plugging. Refer to "Installing SP-Attached server cables" in <i>RS/6000 SP: Installation and Relocation</i>. Consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i> to perform the required service action.</p> <p>Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform "Decoupling and coupling code for SP-Attached Servers" in <i>RS/6000 SP: System Service Guide</i>.</p>
13	Dependent node or SP switch router adapter problem (other than switch connection) detected by customer.	Service required on 9077 switch router (dependent node). Use <i>SP Switch Router Adapter Guide</i> , shipped with the 9077, to continue problem determination.
14	Other problems affecting operation of the system.	Call next level of support.

Supervisory subsystems

Supervisory subsystem descriptions	1-10
Diagnosing supervisory subsystem problems	1-16
Frame supervisor not responding (MAP 0110)	1-17
Analyzing supervisor bus problems (MAP 0120)	1-21
Generic node MAPs	1-33

The MAPs in this unit cover problems in:

- The frame supervisor
- The node supervisor
- The switch supervisor
- The frame power unit (SEPBU or PDU)

Supervisory subsystem descriptions

For descriptions see:

- "Supervisory subsystem components" on page 1-11
- "Frame supervisors with 8-LED displays" on page 1-11
- "Frame supervisors with 4-LED displays" on page 1-13
- "Supervisor subsystem diagrams" on page 1-13

Supervisory subsystem components: The supervisor subsystem consists of the following components:

- Frame supervisor card
- Node supervisor card (one per processor node)
- Switch supervisor card (one per switch assembly)
- Internal cable (one per thin processor node or switch assembly)
- Supervisor bus card (one per thin processor node or switch assembly)
- Supervisor harness (two per frame)
- Supervisor jumper cables (two per frame—PDU only)
- Connector card (PDU only)
- Backplane card (PDU only)
- Serial cable (RS-232)
- SAMI cable (used on systems connected to SP-attached servers **only**)

Frame supervisor LED definitions

Frame supervisors with 8-LED displays: Refer to the following:

- Table 1-3 on page 1-12 for LED descriptions
- Figure 1-1 on page 1-12 illustrates LED locations

Supervisory Subsystem Descriptions

Table 1-3. LED descriptions for frames with 8-LED displays		
LED #	Color	Signifies
8	Yellow	Control workstation current communication status (S1-RS232 data terminal ready line): <ul style="list-style-type: none"> • Momentarily On: Communication active • Flashing: Problem—cannot communicate with control workstation
7	Yellow	Control workstation current communication status (S2-RS232 data terminal ready line): <ul style="list-style-type: none"> • Momentarily On: Communication active • Flashing: Problem—cannot communicate with control workstation in a HACWS configuration. In a configuration without HACWS, a flashing LED 7 is normal. • Off: Communication inactive <p>Note: Be aware that there may be communications to the inactive control workstation</p>
6	Yellow	Supervisor bus communication status: <ul style="list-style-type: none"> • Flashing: Problem—no communication with processor node(s) or switch assemblies • Off: Communication okay
5	Yellow	Not Used
4	Green	Connection S1 to primary control workstation <ul style="list-style-type: none"> • On: Active • Off: Inactive
3	Green	Connection S2 to secondary control workstation <ul style="list-style-type: none"> • On: Active • Off: Inactive
2	Green	Bulk 48 V dc power status: <ul style="list-style-type: none"> • On: All 48 V dc power supplies operating okay • Flashing: 48 V dc power supply problem • Off: No 48 V dc power available
1	Green	Supervisor power status: <ul style="list-style-type: none"> • On: Supervisor power present • Off: No supervisor power

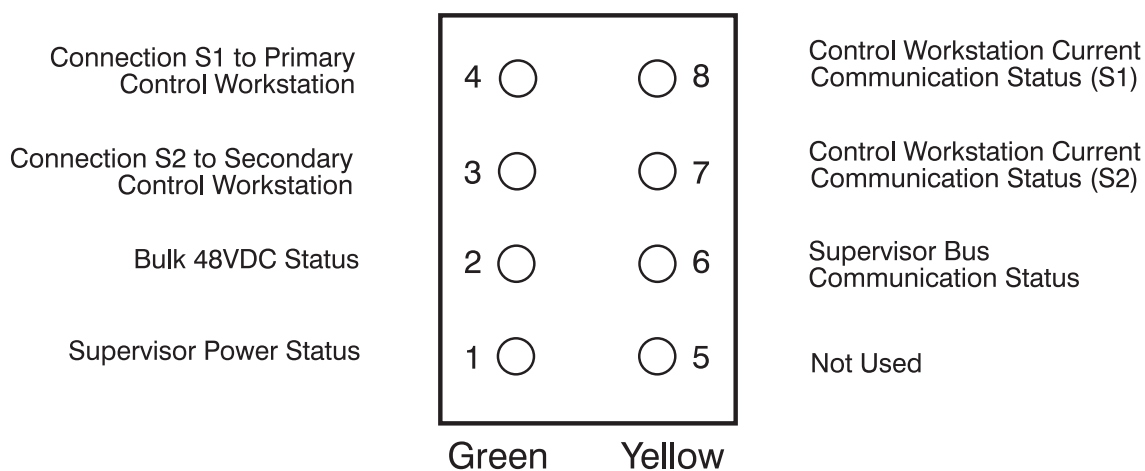


Figure 1-1. 8-LED frame supervisor card LEDs.

Note: For LEDs #3 and #4, only one communication S1 or S2 is active, while the other one is inactive.

Frame supervisors with 4-LED displays: Refer to the following:

- Table 1-4 on page 1-13 for LED descriptions

<i>Table 1-4. LED descriptions for frames with 4-LED displays</i>		
LED #	Color	Signifies
4	Yellow	Supervisor bus communication status: <ul style="list-style-type: none"> • Flashing: Indicates no communication with processor nodes or switch assemblies • Off: Communication okay
3	Yellow	Control workstation current communication status: <ul style="list-style-type: none"> • On: Communication active (momentary) • Flashing: Indicates no communication with control workstation • Off: Communication inactive
2	Green	Bulk 48 V dc power status: <ul style="list-style-type: none"> • On: All 48 V dc power supplies operating okay • Flashing: 48 V dc power supply problem • Off: No 48 V dc power available
1	Green	Supervisor power status: <ul style="list-style-type: none"> • On: Supervisor power present • Off: No supervisor power

Supervisor subsystem diagrams: Refer to the following:

- Figure 1-2 on page 1-14 illustrates SEPBU supervisor subsystem
- Figure 1-3 on page 1-15 illustrates the PDU supervisor subsystem

Supervisory Subsystem Descriptions

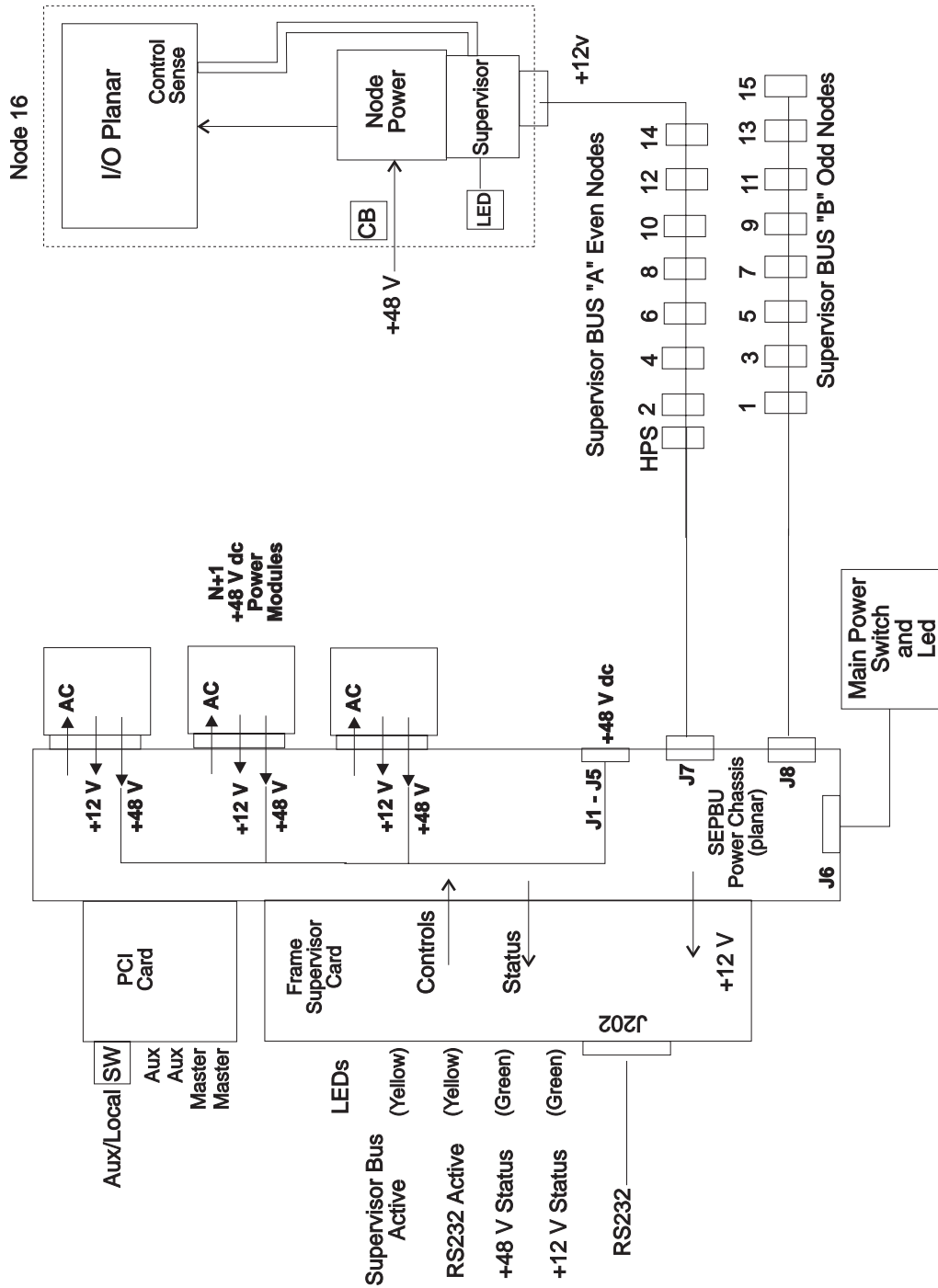


Figure 1-2. RS/6000 SP supervisor subsystem diagram (SEPBU)

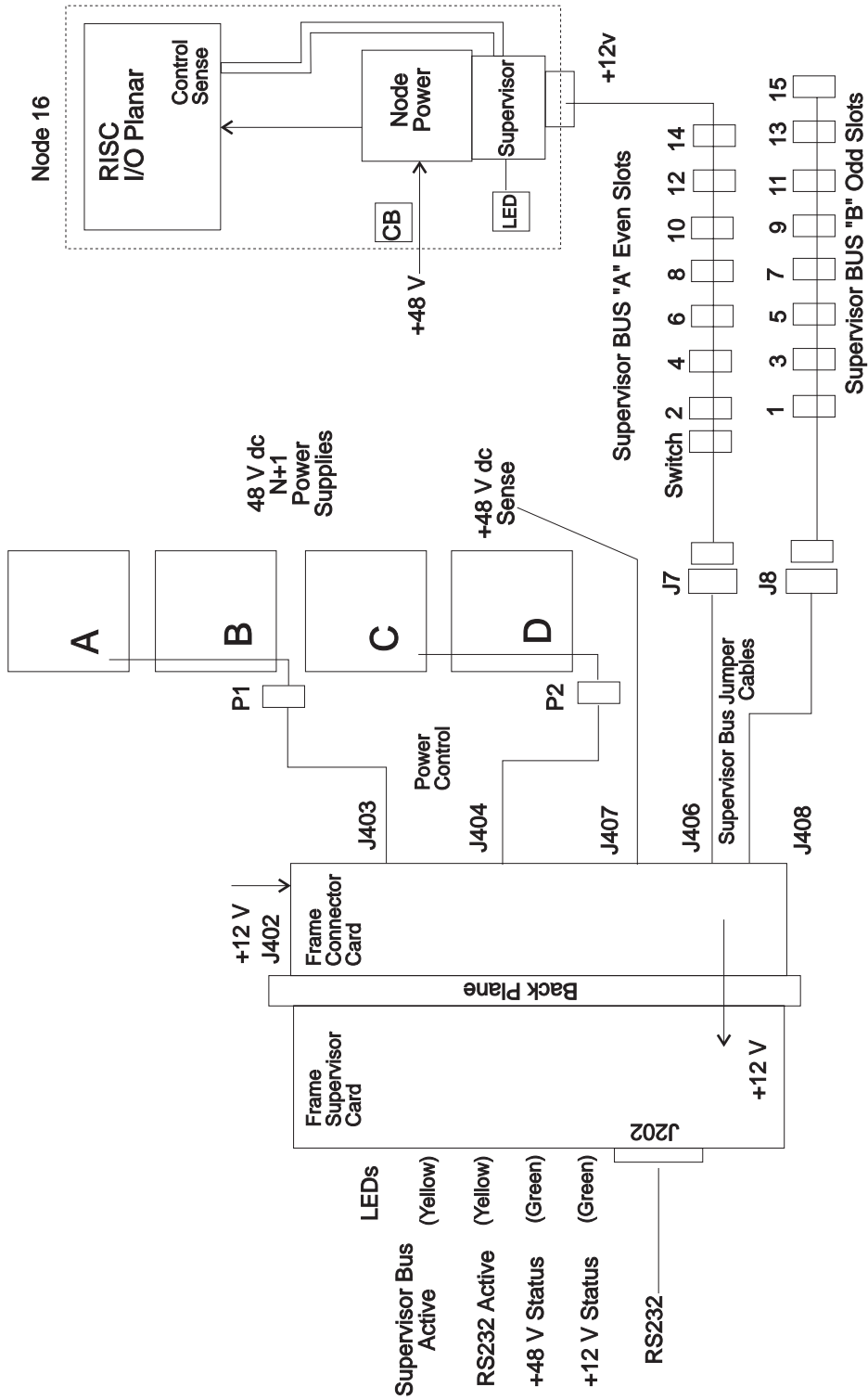


Figure 1-3. RS/6000 SP supervisor subsystem diagram (PDU)

Diagnosing supervisory subsystem problems

Diagnosing supervisory subsystem problems

Purpose of these MAPs (0110 and 0120)

These MAPs are used to diagnose problems with the:

- Frame supervisor subsystems
- Node supervisors
- Switch supervisors

Before you begin

Before using these MAPs, you **must** narrow your problem analysis to specific areas of the system by performing high level diagnoses. This can be done by either:

- Checking the Perspectives hardware monitor log on the control workstation for error messages
- Making personal observations of system performance

If the current problem is related to one of the supervisory subsystem, you will find the results of your high level diagnoses listed in Table 1-5 on page 1-17.

To use Table 1-5 on page 1-17, find the condition that describes your problem, then perform the suggested action.

Frame supervisor not responding (MAP 0110)

Table 1-5. Supervisory subsystem problem diagnoses		
Priority	Condition	Action
1	<p>Error log conditions:</p> <ul style="list-style-type: none"> • “Frame Controller does not respond” <p>Observed conditions:</p> <ul style="list-style-type: none"> • Frame supervisor does not respond • Frame Controller shows red (Perspectives) • Perspectives not responding (spmon on older systems) 	Go to “Frame supervisor not responding (MAP 0110)” on page 1-17
2	<p>Error log conditions:</p> <ul style="list-style-type: none"> • “Supervisor bus failed for node...” • “Supervisor not responding for slot” <p>Note: “nodefail#” indicates a problem with slot address # (for example, nodefail5 indicates a problem with slot address 5).</p> <ul style="list-style-type: none"> • “Supervisor bus failure” <p>Observed conditions:</p> <ul style="list-style-type: none"> • Node supervisor not responding to commands. 	Go to “Analyzing supervisor bus problems (MAP 0120)” on page 1-21
SP-Attached Server Conditions	<p>Error log conditions:</p> <ul style="list-style-type: none"> • “nodefail1” <p>Observed conditions:</p> <ul style="list-style-type: none"> • Frame controller toggles between red and green (Perspectives) <p>Before servicing SP-Attached Servers</p> <p>Before disconnecting cables or performing service actions on an SP-Attached Server, perform “Decoupling and coupling code for SP-Attached Servers” on page 3-35.</p>	<p>Check the server to SP connection cables for correct plugging</p> <ul style="list-style-type: none"> • Refer to “Installing SP-Attached server cables” in <i>RS/6000 SP: Installation and Relocation</i> <p>If the condition was not caused by cable problems, consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i></p>
<p>Note: The Frame Supervisor is commonly referred to as the Frame Controller by SP software.</p>		

Frame supervisor not responding (MAP 0110)

If you have arrived at this MAP through a specific error message on the control workstation's hardware monitor log or by observation:

1. Check the frame supervisor card LEDs
 - The frame supervisor card is located on the rear panel of the frame power unit

Note: Software refers to the frame supervisor as the frame controller
2. Are any of the of the LEDs lit?
 - If yes, go to “Step 0110–003” on page 1-18
 - If no, go to “Step 0110–001” on page 1-18

Frame supervisor not responding (MAP 0110)

Step 0110–001: Check LEDs on front of any processor nodes and switch assemblies. If no LEDs are lit:

1. Detach supervisor harness from one processor node or switch assembly
2. Reinsert supervisor harness to initiate node supervisor self-test
3. Were any processor node or switch assembly LED's lit before or during this procedure?
 - If yes, go to “Step 0110–002”
 - If no:
 - 12 V dc power is not being supplied to either the node or switch supervisors
 - Go to “Main power (MAP 0450)” on page 1-66

Step 0110–002: If the **frame** supervisor LEDs **were not** lit but the processor node or switch assembly LEDs did light before or during the node supervisor harness disconnect procedure in “Step 0110–001”:

1. The frame supervisor card has a power problem
2. Replace the frame supervisor card
 - Refer to Chapter 4, “FRU removals and replacements” on page 4-1.
3. Recheck LEDs on frame supervisor card
4. Are any LEDs lit on frame supervisor card?
 - If yes, problem resolved
 - Go to “End of call” on page 1-144
 - If no, the frame supervisor has a 12 V dc power problem
 - Go to “Main power (MAP 0450)” on page 1-66

Note: If this frame has a PDU, you will have to remove the cover from the PDU dc section to check the LEDs. This cover must be replaced at the end of the service call.

Step 0110–003: You have arrived at this step because the frame supervisor was not responding but some of the LEDs on the frame supervisor card were lit.

1. Look at the frame supervisor card LED display located on the front panel of the frame power unit
 - If the display is an 8-LED display, look at LED #7 and LED #8
 - If the display is an 4-LED display, look at LED #3
 - These LEDs indicate Control Workstation communication status
2. Is either LED #7 or #8 or LED #3 flashing?
 - If yes, there may be a communication problem. Go to “Step 0110–005” on page 1-19.
 - If LED #7 or #8 or LED #3 **are not** flashing, go to “Step 0110–004.”

Step 0110–004: If the control workstation communication status LEDs **are not** flashing, look at LED #2 on either the 4-LED or 8-LED displays. On both types of frame supervisor displays, LED #2 indicates 48 V dc power status.

1. Is LED #2 flashing?
 - If yes, the frame supervisor has a power problem. Go to “Main power (MAP 0450)” on page 1-66.
 - If no, the problem is in the supervisory bus. Go to “Analyzing supervisor bus problems (MAP 0120)” on page 1-21.

Step 0110–005: You have arrived at this step because one of the control workstation communication status LEDs (#7 or #8, or #3) was flashing. This indicates a communication problem between the frame supervisor and the control workstation.

1. Make certain the serial cable between the frame supervisor card and the control workstation (both control workstations if using HACWs) is properly connected.
2. Are all cables properly connected?
 - If all cables properly connected , go to “Step 0110–007.”
 - If the cables are not properly connected, you must determine whether or not the system is set up for HACWS.
 - If the system is using an HACWS configuration, go to “Step 0110–006.”
 - If the system **is not** HACWS connected:
 - a. Connect the serial cable between the frame supervisor card and the control workstation.
 - b. Go to “Step 0110–007.”

Step 0110–006: At this point, you have determined that the serial cables from the frame supervisor card to the control workstations are not properly connected. You also noticed that LEDs #7 or #8 were flashing on the frame supervisor card and that the system is HACWS configured. You now have to look at the frame supervisor LEDs again and decide if LED #7 or LED #8 were actually flashing or whether they were just momentarily on.

1. If either LED #7 or #8 is actively flashing, go to “Step 0110–007.”
2. If either LED #7 or #8 was only lit momentarily, look at LED #3 and LED #4.
 - If LED #3 or #4 **is** lit:
 - a. Change the frame supervisor card
 - b. Go to “Step 0110–008”
 - If LED #3 or #4 **is not** lit, go to “Step 0110–007.”

Step 0110–007: Perform “Verification test for supervisor bus” on page 3-17.

Does the supervisor bus pass the verification test?

- If the supervisor bus does pass the verification test, go to “End of call” on page 1-144.
- If the supervisor bus **does not** pass the verification test, go to “Step 0110–008.”

Step 0110–008: If you have gotten to this step, you have either changed the frame supervisor card, or you have determined that the frame supervisor will not pass the supervisor bus test. You must now determine if the problem is in the frame supervisor card or if it is in the connection to the control workstation.

To begin this series of tests:

1. Disconnect serial cable PDU-BH-J09 from the frame supervisor card.
2. Install wrap plug (P/N 6298964) on the frame end of the serial cable.
3. Locate the port on the multi-port interface or control workstation connected to this serial cable.
4. Run the serial port wrap test. If you need more information on running the serial port wrap test, refer to the RS/6000 MAPs located in *Diagnostic Information for Micro Channel Bus Systems* (SA38-0532).

Frame supervisor not responding (MAP 0110)

Note: Return to this procedure to continue service.

5. Did the wrap test pass with this serial **cable**?

- If the cable passed the wrap test, the problem may be in the frame supervisor card. Go to “Step 0110–012” on page 1-21.
- If the cable wrap test failed, go to “Step 0110–009.”

Step 0110–009: You have arrived at this step because the wrap test failed when it was performed with the wrap plug installed on the frame supervisor end of the serial cable connecting the control workstation to the frame supervisor card. This failure means that the problem is in the control workstation, the serial cable, or in the frame supervisor card. In this step, you will determine if the problem is in either the control workstation or the serial cable connecting the control workstation to the frame supervisor.

1. Remove the serial cable from the port on the control workstation.
2. Install the wrap plug (may be P/N 6298966) directly onto the control workstation serial port.
3. Rerun the serial port wrap test.
4. Did the wrap test pass on the serial **port**?
 - If the wrap test passed, the problem is either in the serial cable or in the frame supervisor. Go to “Step 0110–010.”
 - If the wrap test **failed**, the problem is in the control workstation. Since this is not an RS/6000 SP problem, go to “End of call” on page 1-144.

Step 0110–010: If you have arrived at this step, then the problem has been isolated to either the frame supervisor card or to the serial cable connecting the control workstation to the frame supervisor card. To decide which component is at fault:

1. Replace the old serial cable connecting the control workstation to the frame supervisor.
2. Make certain that the new cable is connected to the serial port on the control workstation.
3. Install wrap plug (P/N 6298964) on the frame end of the serial cable.
4. Rerun the serial port wrap test.
5. Does the wrap test pass with the new serial cable?
 - If the serial cable passes the wrap test, go to “Step 0110–011.”
 - If the wrap test fails, you must call the next level of support.

Step 0110–011: At this point the serial port wrap test has passed with the new serial cable and the problem may be solved. However, you must run a verification test to make certain that there is not an additional problem in the frame supervisor card. To run this test:

1. Connect the new serial cable to the frame supervisor card.
2. Perform “Verification test for supervisor bus” on page 3-17.
3. Does the verification test pass?
 - If the verification test passes, the problem has been resolved. Go to “End of call” on page 1-144.
 - If the verification test fails, the frame supervisor card may also have a problem. Go to “Step 0110–012” on page 1-21.

Step 0110–012: If you have gotten to this point, you have determined that the frame supervisor card may have a problem. To determine if the frame supervisor card is defective:

1. Replace the frame supervisor card.
 - Refer to Chapter 4, “FRU removals and replacements” on page 4-1.
2. Perform the “Verification test for supervisor bus” on page 3-17.
3. Does the verification test pass?
 - If the verification test passes, the problem has been resolved. Go to “End of call” on page 1-144.
 - If the verification test fails, you must call the next level of support.

Note: If this frame has a PDU, you will have to remove the cover from the PDU dc section to access the frame supervisor card. This cover must be replaced at the end of the service call.

Analyzing supervisor bus problems (MAP 0120)

You have arrived at this MAP for one of the following reasons:

- The diagnostics in “Step 0110–004” on page 1-18 indicated a problem in the supervisory bus
- You received one or more of the following messages in the error log:
 - “Supervisor bus failed for node...”
 - “Supervisor not responding for slot”
 - Note:** “nodefail#” indicates a problem with slot address # (for example, nodefail5 indicates a problem with slot address 5).
 - “Supervisor bus failure”
- You made one or more of the following observations:
 - A node supervisor was not responding to commands
 - Perspectives not responding (spmon in older systems)

Refer to Table 1-6 on page 1-22 for a prioritized list of conditions related to the problems listed above. Find the condition that describes your problem and then perform the suggested action.

Analyzing supervisor bus problems (MAP 0120)

<i>Table 1-6. Diagnosing supervisory bus problems</i>		
Priority	Condition	Action
1	<p>Error log conditions:</p> <ul style="list-style-type: none"> • “Supervisor bus failure” • All node and switch supervisors in a frame have one of these messages: <ul style="list-style-type: none"> – “Supervisor bus failed for node...” – “Supervisor not responding for slot” – “Supervisor bus failure” <p>Observed conditions:</p> <ul style="list-style-type: none"> • LED #4 (top yellow LED) or LED #6 (if a twin-tail frame supervisor card is being used) is flashing • Perspectives obviously not responding (spmon on older systems) 	Go to “Step 0120–001” on page 1-22
2	<p>Error log conditions:</p> <ul style="list-style-type: none"> • A single node or switch has one of these messages: <ul style="list-style-type: none"> – “Supervisor bus failed for node...” – “Supervisor not responding for slot” – “Supervisor bus failure” <p>Observed conditions:</p> <ul style="list-style-type: none"> • Single node or switch has a failure symptom received from running verification tests or supervisor self-test • Perspectives display shows an empty box (slot position is not shown/recognized) for this processor node or switch assembly • Node supervisor self test fails 	Go to “Step 0120–013” on page 1-26
3	<p>Error log conditions:</p> <ul style="list-style-type: none"> • Multiple nodes or switches have one of these messages: <ul style="list-style-type: none"> – “Supervisor bus failed for node...” – “Supervisor not responding for slot” – “Supervisor bus failure” <p>Observed conditions:</p> <ul style="list-style-type: none"> • No Priority 3 observations 	Go to “Step 0120–021” on page 1-30

Step 0120–001: You have arrived at this step because there is a supervisor bus problem that is affecting **all** nodes **and** the switch in one frame.

1. Check for obvious problems such as loose connections or damaged components:
 - Check the frame supervisor serial connection located at the rear of the frame power unit (PDU-BH-J09)
 - Check the frame supervisor card
2. Does everything appear OK?

- If yes, go to “Step 0120–003” on page 1-23
- If no, go to “Step 0120–002”

Step 0120–002: You have arrived at this step because either the frame supervisor card or the frame supervisor card serial cable appeared loose or damaged.

1. Fix the connection problem or replace the damaged component
2. Perform all tests of “Verification test for supervisor bus” on page 3-17.
3. Does the verification test pass?
 - If yes, the problem has been resolved. Go to “End of call” on page 1-144.
 - If no, restart the diagnostic procedure by rechecking the error log and referring to the conditions listed in Table 1-6 on page 1-22.

Step 0120–003: You have arrived at this step because a visual examination of the frame supervisor card and the attached serial cable do not show any obvious signs of problems.

1. Check the frame supervisor card LEDs
 - Check LED #6 on cards with 8-LED displays
 - Check LED #4 on cards with 4-LED displays
 - These LEDs show the supervisor bus communication status
2. Is either LED #4 or LED #6 flashing?
 - If yes, go to “Step 0120–005”
 - If no, go to “Step 0120–004”

Step 0120–004: At this point, if either LED #4 or LED #6 **is not** flashing, the frame supervisor card is probably defective or it may have the incorrect supervisor code installed.

1. Replace the frame supervisor card
2. Is the problem resolved?
 - If yes, got to “End of call” on page 1-144.
 - If the problem has not been resolved, you must call the next level of support.

Step 0120–005: At this point, the frame supervisor card and serial cable have passed a visual inspection and the supervisor bus communication status LEDs (LED #4 or LED #6) are flashing.

1. This indicates that the frame supervisor may be hung
2. Type the following command from the control workstation:
`hmcnds -Gv run_post frame#:0`
3. Recheck the supervisor bus communication status LED (LED #4 or LED #6). Is this LED flashing?
 - If yes, go to “Step 0120–006” on page 1-24
 - If no, go to “Step 0120–029” on page 1-33

Analyzing supervisor bus problems (MAP 0120)

Step 0120–006: At this point, you need to replace the frame supervisor card.

1. Recheck LED #4 or LED #6
2. Is either of these LEDs flashing?
 - If yes, go to “Step 0120–007” on page 1-24
 - If no, go to “Step 0120–029” on page 1-33

Step 0120–007: Although you replaced the supervisor card, LED #4 or LED #6 is still flashing, therefore communication problems over the frame supervisor bus have not fixed. The next procedure requires you to power off all of the processor nodes and the switch assembly in the frame.

Before you begin, please read all of the following notes:

- **Attention:** Powering off processor nodes or switch assemblies in a parallel environment may cause all jobs to flush from the queue and switch initialization to rerun.
 - **Attention:** If this frame contains processor nodes, they should 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.
 - **Attention:** If this frame contains switch assemblies, powering off the switch assemblies will impact the entire switch network.
1. Check with customer to see if you can power off all the processor nodes and switch assemblies in the frame at this time.
 2. Will the customer let you power off all processor nodes and switch assemblies in the frame?
 - If the customer **will** let you power off the frame, “Step 0120–009” on page 1-25
 - If the customer **will not** let you power off the frame, “Step 0120–008”

Step 0120–008: Because you are not able to power off the frame, you cannot perform **complete** isolation at this time. Therefore, the only assumption you can make at this time is that the replacement frame supervisor card was also bad.

1. Replace the frame supervisor card. Refer to Chapter 4, “FRU removals and replacements” on page 4-1, if needed.
2. Check frame supervisor LED #4 or LED #6
3. Is either of these LEDs flashing?
 - If the LED is still flashing:
 - a. Complete diagnosis requires complete isolation of the frame
 - b. Schedule time when the customer can power off the frame
 - c. Resume service call at “Step 0120–009” on page 1-25 or at “Starting a service call (MAP 0100)” on page 1-1
 - If the LED is not flashing, go to “Step 0120–029” on page 1-33 to verify fix

Step 0120–009: At this point, the customer has agreed to allow you to **completely** isolate the frame by powering off all processor nodes and switch assemblies in the frame.

1. Put main power switch in the Off ('0') position.
2. Is there a cable connected at both power bulkhead J7 and power bulkhead J8?
 - If there are cables connected to **both** power bulkhead J7 and J8, refer to Table 1-7 on page 1-25 and continue diagnostic procedure.
 - If cables **are not** connected to **both** power bulkhead J7 and J8, go to “Step 0120–010”

Pri- ority	Component	Action
1	Cable at power bulkhead P7 (if present)	<ol style="list-style-type: none"> 1. Disconnect cable from frame power unit bulkhead. 2. If frame supervisor LED #4 (4-LED displays) or LED #6 (8-LED displays) stops FLASHING, go to “Step 0120–010”; otherwise reconnect cable and continue at Priority 2.
2	Cable at power bulkhead P8 (if present)	<ol style="list-style-type: none"> 1. Disconnect cable from frame power unit bulkhead. 2. If frame supervisor LED #4 (4-LED displays) or LED #6 (8-LED displays) stops FLASHING, go to “Step 0120–010”; otherwise, reconnect cable and continue at Priority 3.
3	Cable Assembly (PDU Only) <ul style="list-style-type: none"> • PDU-FC-P406 • PDU-FC-P408 	<ol style="list-style-type: none"> 1. Check PDU-BH-J7 and PDU-BH-J8 (bulkhead) connections to PDU-FC-J406 and J408 (connector card). 2. If frame supervisor LED #4 (4-LED displays) or LED #6 (8-LED displays) stops FLASHING, go to “Step 0120–029” on page 1-33; otherwise, continue at Priority 4.
4	Connector card (PDU Only)	<ol style="list-style-type: none"> 1. Replace card. 2. If frame supervisor LED #4 (4-LED displays) or LED #6 (8-LED displays) stops FLASHING, go to “Step 0120–029” on page 1-33; otherwise, continue at Priority 5.
5	Backplane card (PDU Only)	<ol style="list-style-type: none"> 1. Replace card. 2. If frame supervisor LED #4 (4-LED displays) or LED #6 (8-LED displays) stops FLASHING, go to “Step 0120–029” on page 1-33; otherwise, continue at Priority 6.
6	SEPBU Chassis (SEPBU Only)	<ol style="list-style-type: none"> 1. Replace chassis. 2. If frame supervisor LED #4 (4-LED displays) or LED #6 (8-LED displays) stops FLASHING, go to “Step 0120–029” on page 1-33; otherwise, continue at Priority 7.
7	All components replaced.	Call next level of support.

Step 0120–010: The frame is now powered off and one of two diagnostic procedures indicated that the problem is isolated to one supervisor harness. Those procedures were:

- In “Step 0120–009,” you observed that there is only one cable connected to **either** power bulkhead J7 or J8
- While using the diagnostics in Table 1-7, a procedural step referred you to this location

You must now determine whether the problem is in the switch, one of the processor nodes, or in the supervisor harness. To do this you must:

1. If you disconnected the harness at the bulkhead, please reconnect it before proceeding

Analyzing supervisor bus problems (MAP 0120)

2. Follow the harness and individually disconnect it from the switch assembly and each processor node
3. Disconnect one device at a time and check LED #4 (4-LED displays) or LED #6 (8-LED displays) after each device is removed from the harness
4. Continue until frame supervisor LED #4 or LED #6 stops flashing **or** the cable is disconnected from all processor nodes and switch assemblies.
5. Does the frame supervisor bus communication status LED (LED #4 or LED #6) stop flashing?
 - If supervisor bus communication LED stops flashing, go to “Step 0120–011”
 - If the LED **does not** stop flashing, go to “Step 0120–012”

Step 0120–011: While disconnecting the supervisor harness from the frame's switch and processor nodes, the frame supervisor communication status LED (#4 or #6) stopped flashing.

1. Note which processor node or switch assembly was disconnected last, this device may be at fault
2. Reconnect the supervisor harness to the appropriate processor nodes and switch assemblies, **except** for the suspect device
3. Go to “Step 0120–016” on page 1-28 to continue service

Step 0120–012: Before you arrived at this step, you disconnected the frame supervisor harness from the switch **and** from **all** of the frame's processor nodes. Even though the supervisor harness was completely disconnected, LED #4 or LED #6 **did not** stop flashing. This indicates that there may be a problem in the supervisor harness.

- Replace the supervisor harness that appears defective (PDU-BH-P7 or PDU-BH-P8)
- Perform “Verification test for supervisor bus” on page 3-17.
- Does the verification test pass?
 - If the verification test passes with the new harness, go to “Step 0120–020” on page 1-30.
 - If the verification test fails, return to Table 1-7 on page 1-25 and look at the instructions for Priority 3.

Step 0120–013: The diagnostics in Table 1-6 on page 1-22, indicated that there is a communication problem with an individual node or switch supervisor. One of the following conditions referred you to this location:

Error log conditions:

- A **single** node **or** switch has one of these messages:
 - “Supervisor bus failed for node...”
 - “Supervisor not responding for slot”
 - “Supervisor bus failure”

Observed conditions:

- Single node or switch has a failure symptom received from running verification tests or supervisor self-test
- Perspectives display shows an empty box (slot position is not shown/recognized) for this processor node or switch assembly
- Node supervisor self test fails

Before you begin, please read all of the following notes:

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

Once you have the customer's verification that it is OK to initiate the shutdown procedure, make certain that the processor node or switch is not in use by customer then,

1. Put the circuit breakers on the processor node or switch assembly into the Off ('0') position.
2. Perform "Node/switch supervisor self-test" on page 3-19 . You can repeat this test as necessary.
3. Check slot address indicated by self-test against physical location. In a frame with processor nodes, the switch assembly is at slot address 17.
4. Does the supervisor card pass self-test, including the correct slot address?
 - If the supervisor card **passes** the self-test, go to "Step 0120–014"
 - If the supervisor card **fails** the self-test:
 - a. If this is a 604, 604e, or 332 MHz SMP, or POWER3 SMP node supervisor card, make certain that the failure is not base code related (see "Base code verification" on page 3-22).
 - b. If the failure is not base code related, go to "Step 0120–015."

Step 0120–014: If the supervisor card passed the self-test including the correct slot address, you must perform all tests of "Verification test for supervisor bus" on page 3-17.

Does the verification test **pass**?

- If the verification tests pass, then you have resolved the problem. Go to "End of call" on page 1-144.
- If the verification tests **fail**, go to "Step 0120–015."

Step 0120–015: You have gotten to this location for one of two reasons:

1. The supervisor card failed the self-test
2. The supervisor card passed the self-test but failed the verification test

You must now determine if the problem is in the processor node or switch assembly or in the supervisor harness.

Before you begin, please read all of the following notes:

- **Attention:** This step may interrupt use of another processor node, or switch assembly.
- **Attention:** Powering off processor nodes or switch assemblies in a parallel environment may cause all jobs to flush from the queue and switch initialization to rerun.

To determine where the problem is:

1. Perform "Supervisor bus swap procedure" on page 3-17.
2. Determine whether problem is in harness or in node or switch:
 - If a node or switch that passed testing before the supervisor harness was swapped fails testing after the swap, then the problems is in the harness.

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- If the node or switch still fails testing after the supervisor harness was swapped, then the problem is in the node or switch.

3. If:

- The problem is in the supervisor harness:
 - a. Replace the supervisor harness connected to this processor node or switch assembly.
 - b. Go to "Step 0120–019" on page 1-30.
- The problem is in the processor node or switch assembly, refer to "Step 0120–016" for device specific instructions.

Step 0120–016: Based on the results of the "Supervisor bus swap procedure" in "Step 0120–015" on page 1-27, you determined that the processor node or switch assembly was at fault. Refer to Table 1-8 for device specific instructions.

<i>Table 1-8. Processor node and switch instructions</i>	
Unit	Action
Thin node Wide node SPS assembly SPS-8 assembly	Replace supervisor card inside the processor node or switch assembly
604 high node 604e high node	Replace node supervisor card
332 MHz SMP or POWER3 SMP Thin and Wide node	Replace node supervisor card. Note: Prior to replacing the node supervisor card, verify 48 V power cables are plugged in the rear panels.

Note: Refer to the service procedures in the applicable node or switch service guide.

Once the recommended procedure has been performed:

1. Perform "Node/switch supervisor self-test" on page 3-19 to verify fix.
2. Does this test pass?
 - If node or switch passes the supervisor self test, go to "Step 0120–019" on page 1-30.
 - If the supervisor self test fails, go to "Step 0120–017."

Step 0120–017: At this point, the "Supervisor bus swap procedure" indicated that the problem was in the node or switch and you performed the action recommended in Table 1-8 but the "Node/switch supervisor self-test" failed. This indicates that there are additional problems in the node or switch. Refer to Table 1-9 on page 1-29 for device specific replacement recommendations.

<i>Table 1-9. Replacement recommendations if supervisor self-test fails after bus swap procedure</i>		
Unit	Replace	Reference
Thin node Wide node	Supervisor bus cable inside the processor node or switch assembly	"FRU removals and replacements" in the applicable node or switch service guide.
SPS assembly SPS-8 assembly	Inner chassis cable	"Removing the switch inner chassis cable (SPS, SPS-8)" in <i>RS/6000 SP: SP Switch Service Guide</i> .
604 or 604e high node	High node supervisor adapter cable	"FRU removals and replacements" in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i>
332 MHz SMP or POWER3 SMP Thin and Wide node	Reseat the power supply modules	"FRU removals and replacements" in <i>RS/6000 SP: SMP Thin and Wide Node Service Guide</i>

Note: Refer to "FRU removals and replacements", in the applicable node or switch service guide, to replace the supervisor bus cable inside processor node or switch assembly.

When you complete the recommended replacement, "Step 0120–018."

Step 0120–018: The replacement installed in "Step 0120–017" on page 1-28 must now be verified.

1. Perform "Node/switch supervisor self-test" on page 3-19 to verify fix.

2. Does the supervisor self-test pass?

- If the supervisor self-test passes:

- a. If this is a 604, 604e, or 332 MHz SMP, or POWER3 SMP node, reinstall the old node supervisor card.
- b. Then, for all nodes, go to "Step 0120–019" on page 1-30.

- If the supervisor self-test still fails:

– **For 604 or 604e high nodes:**

- a. If this is the **first time** here, replace the blue ribbon I2C cable inside the high node supervisor card assembly.
 - Then go back to the beginning of "Step 0120–018" and rerun the "Node/switch supervisor self-test."
- b. If this is the **second time** here, replace the supervisor interface card within the high node supervisor card assembly.
 - Then go back to the beginning of "Step 0120–018" and rerun the "Node/switch supervisor self-test."
- c. If both parts have been replaced, call next level of support

– **For 332 MHz SMP or POWER3 SMP nodes:**

- a. If this is the **first time** here, replace the power mix board.
 - Then go back to the beginning of "Step 0120–018" and rerun the "Node/switch supervisor self-test."
- b. If this is the **second time** here, replace the tailgate card and cable.

Analyzing supervisor bus problems (MAP 0120)

- Then go back to the beginning of “Step 0120–018” and rerun the “Node/switch supervisor self-test.”
- c. If both parts have been replaced, call next level of support.
- **For all other nodes**, call the next level of support.

Step 0120–019: The node or switch in question has passed the supervisor self-test. Since one or more parts have been replaced in the node or switch, you must perform “Verification test for supervisor bus” on page 3-17.

1. Does the verification test pass?
 - If the verification test passed, go to “Step 0120–020.”
 - If the verification test failed, restart the procedures at “Step 0120–017” on page 1-28.

Step 0120–020: At this point, the Node/Switch Supervisor Self Test and the Verification Test for Supervisor Bus have passed and the supervisor problem has been solved.

1. Make sure the main power switch at the front of the frame is in the On (‘1’) position.
2. Put the circuit breakers on the processor nodes and switch assemblies in the On (‘1’) position.
3. If a new 604 or 604e high node supervisor card was installed, and the node supervisor code update was not already performed, then refer to “Updating the node supervisor code” on page 3-23.
4. If you just serviced a switch assembly, then go to the *RS/6000 SP: SP Switch Service Guide*.
5. If you just serviced a node, then go to “End of call” on page 1-144.

Step 0120–021: The diagnostics in Table 1-7 on page 1-25, indicated that there is a communication problem with multiple nodes or switch supervisors but the supervisor bus supports some communication. One of the following error log conditions referred you to this location:

- **Multiple nodes or switches** have one of these messages:
 - “Supervisor bus failed for node...”
 - “Supervisor not responding for slot”
 - “Supervisor bus failure”

You must now determine whether or not all of the nodes or switches reporting problems belong to one of two possible sets of slot addresses.

Set A [2, 4, 6, 8, 10, 12, 14, 16, 17] Left side from back (includes switch or switches)

Set B [1, 3, 5, 7, 9, 11, 13, 15] Right side from back

Do all of the nodes or switches reporting problems belong to one of set of slot addresses?

1. If all of the nodes or switches are from one of set of addresses, go to “Step 0120–022” on page 1-31.
2. If nodes or switches from **both** sets are reporting problems, then you must go to “Step 0120–013” on page 1-26 and service each node or switch supervisor individually.

Step 0120–022: You have determined that all of the nodes or switches experiencing problems belong to **either** Set A or Set B. The next procedure requires you to power off all of the processor nodes and the switch assembly in the frame.

Before you begin, please read all of the following notes:

- **Attention:** Powering off processor nodes or switch assemblies in a parallel environment may cause all jobs to flush from the queue and switch initialization to rerun.
- **Attention:** If this frame contains processor nodes, they should 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.
- **Attention:** If this frame contains switch assemblies, powering off the switch assemblies will impact the entire switch network.

If you have the customer's permission to proceed:

1. From the control workstation, power off all processor nodes and switches in this frame using command **hmcmds -G off xx:yy** (where xx = the designated frame number and yy = the designated nodes).
2. Put the main power switch at front of the frame in the Off ('0') position.
3. Switch the supervisor harnesses connections for Sets A and B **at** connector PDU-BH-J7 and PDU-BH-J8 on the frame power unit. If only one harness is present, move it to the other connector.
4. Perform "Verification test for supervisor bus" on page 3-17.
5. Check the system monitor log on the control workstation for addresses "not responding."
6. Did the failing nodes or switch move to other Set?
 - If the original group of nodes or switches is still failing, go to "Step 0120–023."
 - If the failing devices moved to the other set of slot addresses, go to "Step 0120–024."

Step 0120–023: Since the original group of nodes or switches is still failing, you have isolated the problem to the supervisor harness.

1. Return supervisor harnesses to original connector locations:
 - Set A -> PDU-BH-J7
 - Set B -> PDU-BH-J8
2. Replace the defective supervisor harness (A or B), depending on which Set had original problem (reference "Step 0120–021" on page 1-30 for slot addresses).
3. Go to "Step 0120–029" on page 1-33 to verify fix.

Step 0120–024: The failing devices moved to the other set of slot addresses when the supervisor harness connections were swapped. Therefore you have isolated the problem to the frame power unit.

1. Return supervisor harnesses to original connector locations:
 - Set A -> PDU-BH-J7
 - Set B -> PDU-BH-J8
2. If the frame has a SEPBU power subsystem, go to "Step 0120–025" on page 1-32.
3. If the frame has a PDU power subsystem, go to "Step 0120–026" on page 1-32.

Analyzing supervisor bus problems (MAP 0120)

Step 0120–025: You have isolated the problem to the SEPBU power chassis.

DANGER

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

1. Replace SEPBU power chassis.
 - a. Refer to Chapter 4, "FRU removals and replacements" on page 4-1.
2. Reconnect ac power to frame.
3. Go to "Step 0120–029" on page 1-33 to verify fix.

Step 0120–026: You have isolated the problem to the PDU power chassis.

Attention: High energy present. Do not touch 48 V dc busbars. Shorting will result in system outage.

1. Open Power Distribution Unit dc panel to access the connector card. This can be done with frame power on.
2. Swap cables at connector card PDU-FC-J406 and PDU-FC-J408.
3. Perform "Verification test for supervisor bus" on page 3-17.
4. Check system monitor log from the control workstation.
5. Did the failing addresses move to other Set?
 - If the original group of addresses is still failing, go to "Step 0120–027."
 - If the failing devices moved to the other set of slot addresses, go to "Step 0120–028."

Step 0120–027: Since the original group of addresses is still failing after the connectors were switched, the cable has failed.

1. Return the cables to original connector locations:
 - PDU-BH-J7 to Connector card PDU-FC-J406
 - PDU-BH-J8 to Connector card PDU-FC-J408
2. Replace cable PDU-FC-P406 (Set A) or PDU-FC-P408 (Set B), depending on which Set originally failed.
3. Go to "Step 0120–029" on page 1-33.

Step 0120–028: Since the original group of addresses is still failing after the connectors were switched, the failure is in the connector card.

1. Replace connector card (refer to "FRU removals and replacements" in the applicable node or switch service guide)
2. Go to "Step 0120–029" on page 1-33

Step 0120–029: At this point, the problem should be fixed. However, you must perform one last verification test.

1. Perform “Verification test for supervisor bus” on page 3-17.
2. Did this verification test pass?
 - If the verification test **failed**, go to “Frame supervisor not responding (MAP 0110)” on page 1-17 or “Analyzing supervisor bus problems (MAP 0120)” on page 1-21 as appropriate.
 - If the verification test **passed**, you have resolved the problem.
 - a. Put main power switch at front of frame in the On (‘1’) position
 - b. Go to “End of call” on page 1-144

Generic node MAPs

Processor node diagnostics and descriptions (MAP 0130)	1-33
Processor node function (MAP 0140)	1-56
Processor node IPL problems (MAP 0150)	1-63
Power subsystems	1-66
Main power (MAP 0450)	1-66
Power Distribution Unit (PDU) subsystem MAPs	1-70

Processor node diagnostics and descriptions (MAP 0130)

Step 0130–001: Node related system errors are reported in Perspectives and in various system monitor logs or you may detect a visual indication of a problem in processor node. The table in this step lists node related error messages you may receive and the suggested action you should take to diagnose the problem.

All processor node types are described and illustrated in “Node descriptions” on page 1-35.

Before proceeding, read the following warnings and perform the listed actions to ensure continuity of customer’s jobs in the queue:

Attention: The processor nodes must be removed from active configuration before continuing. If all processor nodes are off, continue; otherwise, ask the 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 nodes in a parallel environment will cause all jobs to flush from the queue and switch initialization to rerun.

Attention: Servicing a processor node with the Scalable POWERparallel Switch (SPS) feature installed, will impact the entire switch network, unless the processor node has already been powered off (or fenced) and the switch data cable has been disconnected.

- Refer to “Service position procedures” in the applicable node service guide for placing processor nodes into the service position or for removing them from the service position.
- Refer to “Viewing switch partitions” on page 3-28 for locating and fencing or unfencing nodes within a switch partition.
- From the control workstation, check the hardware monitor log for indication of problem.

Processor node diagnostics and descriptions (MAP 0130)

- Table 1-10 on page 1-34 contains a prioritized list of conditions. Find the first condition that describes your problem, then perform the associated action:

Table 1-10 (Page 1 of 2). Node error message references		
Priority	Message or condition	Action
1	<p>Environmental problems</p> <ul style="list-style-type: none"> • Errpt: "Failure..." • Log: "Shutdown: Voltage..." • Log: "Shutdown: Fan..." • Log: "Shutdown: Temperature..." • Log: "Shutdown: Memory protect fault" • Errpt: "Warning..." • Log: "Warning:..." • (Environment) <ul style="list-style-type: none"> – Uniprocessor (Thin/Wide Node) <ul style="list-style-type: none"> - Yellow LED on or flashing – SMP (Thin/Wide/High Node) <ul style="list-style-type: none"> - LED #5 (yellow) on or flashing • SP Expansion I/O Unit <ul style="list-style-type: none"> – Yellow LED on or flashing • "rc.powerfail" from TTY • Node's errpt -a pg shows "Loss of Electric Power" 	<p>Go to the "Node environment" MAP in the applicable node service guide to perform the required service action.</p> <p>SP-Attached Servers (RS/6000 7017 Models S70, S7A, and S80): Consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i>.</p> <p>Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform "Decoupling and coupling code for SP-Attached Servers" in <i>RS/6000 SP: System Service Guide</i>.</p>
2	<p>Power problem</p> <ul style="list-style-type: none"> • Uniprocessor (Thin/Wide Node) <ul style="list-style-type: none"> – Green LED off or flashing • SMP (Thin/Wide/High Node) <ul style="list-style-type: none"> – LED #1 (green) off or flashing • SP Expansion I/O Unit <ul style="list-style-type: none"> – Green LED off or flashing • (Power) Green LED off or flashing • Node has no power • All voltages at zero 	<p>Perform "Node/switch supervisor self-test" on page 3-19 to verify operation of LEDs.</p> <ul style="list-style-type: none"> • If supervisor test fails, go to "Step 0120–001" on page 1-22. • If test passes, go to the "Node power" MAP in the applicable node service guide to perform the required service action. <p>SP-Attached Servers (RS/6000 7017 Models S70, S7A, and S80): Consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i>.</p> <p>Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform "Decoupling and coupling code for SP-Attached Servers" in <i>RS/6000 SP: System Service Guide</i>.</p>

Table 1-10 (Page 2 of 2). Node error message references

Priority	Message or condition	Action
3	Power problem — SP-Attached Servers (RS/6000 7017 Models S70, S7A, and S80)	<ul style="list-style-type: none"> Check the server to SP connection cables for correct plugging. Refer to "Installing SP-Attached server cables " in <i>RS/6000 SP: Installation and Relocation</i>. Consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i> to perform any required service action. <p>Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform "Decoupling and coupling code for SP-Attached Servers" on page 3-35.</p> <ul style="list-style-type: none"> Go to "Processor node function (MAP 0140)" on page 1-56.
4	Processor problem <ul style="list-style-type: none"> Front panel LED or LCD readout non-blank (OK=blank) 	Go to "Processor node function (MAP 0140)" on page 1-56.
5	Control problem <ul style="list-style-type: none"> Node will not reset Mode switch problem—problem setting NORMAL, SECURE, or SERVICE mode. No response from TTY console only 3-digit Front Panel Displays missing segments or remain blank 	Perform the required service, go to: <ul style="list-style-type: none"> The "Node control" MAP in the applicable SP node service guide. For SP-Attached Servers (RS/6000 7017 Models S70, S7A, and S80): Check the server to SP connection cables for correct plugging. Refer to "Installing SP-Attached server cables " in <i>RS/6000 SP: Installation and Relocation</i>. Consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i> to perform any required service action. <p>Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform "Decoupling and coupling code for SP-Attached Servers" in <i>RS/6000 SP: Installation and Relocation</i>.</p>

Node descriptions: The **Uniprocessor thin and wide nodes** have two LEDs on the front of each node. Uniprocessor wide processor nodes also have a duplicate pair of LEDs at the rear of the node. Their definitions are as follows:

Environment (Yellow)	
Off	No environmental problems detected by node supervisor card.
On	Warning of environmental condition out of nominal range. Preventative Maintenance should be scheduled for this node.
Flashing	Serious environmental condition detected; power shut off.

Processor node diagnostics and descriptions (MAP 0130)

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.

The **604 or 604e high node** supervisor card LED definitions are shown in the following table and in Figure 1-4.

Table 1-11. 604 or 604e High Node LED definitions

LED #	Color	Signifies
8		Not used
7		Not used
6		Not Used
5	Yellow	Environment status
4	Green	Key mode (Normal)
3	Green	Key mode (Secure)
2	Green	Key mode (Service)
1	Green	Node power status (same as wide node green LED)

Note: When LED #1 is Off and LED #5 is On, this indicates that base code is active.

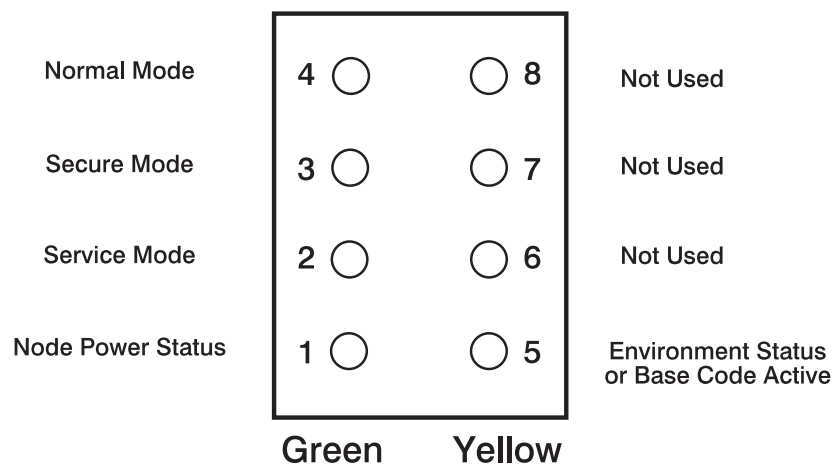


Figure 1-4. High Node supervisor card LEDs

Note: LEDs 6, 7, and 8 are unused.

The **332 MHz SMP node** supervisor card LED definitions are shown in the following table.

Table 1-12. 332 MHz SMP Node LED definitions

LED #	Color	Signifies
8		Not used
7		Not used
6		Not used
5	Yellow	Environment status (On = Problem)
4	Green	I/O expansion power (On = Good)
3	Green	CPU assembly (On = Good)
2	Green	I/O expansion assembly installed (On = Yes)
1	Green	Node power status (On = OK)

Table 1-13. 332 MHz SMP Node LED status

Front Power LEDs	Thin Node Power Status	I/O Expansion Power Status
Yellow Off, Green Off	No 48 V dc power	No 48 V dc power
Yellow On, Green Blinking	48 V dc, but Power Off	48 V dc, but Power Off
Yellow On, Green On	48 V dc, and Power On	48 V dc, and Power On



Figure 1-5. 332 MHz SMP Node supervisor card LEDs

Note: LEDs 6, 7, and 8 are unused.

The **POWER3 SMP Thin and Wide node** supervisor card LED definitions are shown in the following table.

Processor node diagnostics and descriptions (MAP 0130)

Table 1-14. POWER3 SMP Thin and Wide Node LED definitions

LED #	Color	Signifies
8		Not used
7		Not used
6		Not used
5	Yellow	Environment status (On = Problem)
4	Green	I/O expansion power (On = Good)
3	Green	CPU assembly (On = Good)
2	Green	I/O expansion assembly installed (On = Yes)
1	Green	Node power status (On = OK)



Figure 1-6. POWER3 SMP Thin and Wide Node supervisor card LEDs

Note: LEDs 6, 7, and 8 are unused.

The **POWER3 SMP High Node** supervisor card LED definitions are shown in the following table.

Table 1-15. POWER3 SMP High Node LED definitions

LED #	Color	Signifies
8		Not Used
7		Not Used
6		Not Used
5	Yellow	Environment Status (On = environment problem or basecode active)
4	Green	48-volt "B" present (On = good)
3	Green	48-volt "A" present (On = good)
2	Green	Supervisor Power (On = good)
1	Green	Node Power Status (On = good)

Note: The function of node supervisor LEDs 1 and 5 are mirrored by the green and yellow LEDs on the front of the node.

<i>Table 1-16. POWER3 SMP High Node LED status</i>	
Front Power LEDs	Node Power Status
Yellow Off, Green On	Power is On and the environment is okay
Yellow Off, Green Off	No 48 V dc power
Yellow Off, Green Blinking	48 V dc available but power is Off
Yellow On, Green On	48 V dc and power are On, however there is an environment power problem or the basecode is active

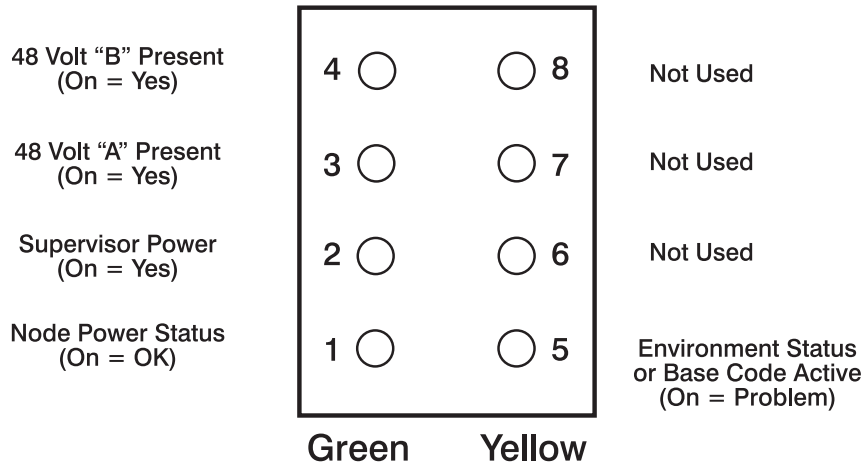


Figure 1-7. POWER3 SMP High Node supervisor card LEDs

Note: LEDs 6, 7, and 8 are unused.

The RS/6000 SP processor nodes are functionally equivalent to various RS/6000 systems. Table 1-17 on page 1-40 shows the SP processor node and its equivalent RS/6000 model. This information can be used when referring to RS/6000 maintenance publications.

Processor node diagnostics and descriptions (MAP 0130)

<i>Table 1-17. SP processor nodes and their functionally equivalent RS/6000 models</i>	
RS/6000 SP processor node	Equivalent RS/6000 model
Thin Nodes	
62 MHz Thin Node	7012 Model 370
66 MHz Thin Node	7012 Model 390
66 MHz Thin Node 2	7012 Model 394
120 MHz Thin Node	No equivalent RS/6000 model
160 MHz Thin Node	7012 Model 397
Wide Nodes	
66 MHz Wide Node	7013 Model 590
77 MHz Wide Node	7013 Model 591
135 MHz Wide Node	7013 Model 595
High Nodes	
604 High Node	7015 Model R40
604e High Node	7015 Model R50
Symmetric MultiProcessor (SMP) Nodes	
332 MHz SMP Thin Node	7025 Model H50
SP-Attached Server	Enterprise Server Models S70, S7A, and S80
POWER3 SMP Thin Node	7043 Model 260
POWER3 SMP High Node	No equivalent RS/6000 model (use 9076 POWER3 SMP high node documentation)

Uniprocessor Thin Nodes

Components

Each thin processor node consists of the following parts:

- RS/6000-based components:
 - I/O planar (except in 120 and 160 MHz thin nodes)
 - CPU card (except in 120 and 160 MHz thin nodes)
 - CPU planar (only in 120 and 160 MHz thin nodes)
 - Memory card(s)
 - SCSI riser card
 - SCSI terminator
 - Fixed disk drive cable(s)
 - Integrated Ethernet card
 - Micro Channel Ethernet card
 - Fixed disk drive(s)
 - Optional Micro Channel adapter cards.
- Unique RS/6000 SP components:
 - Node supervisor card/power supply
 - LED display card
 - Circuit breaker
 - Node control harness
 - Control cables
 - Power cables
 - Fans
 - Supervisor bus assembly.

Refer to Figure 1-8 on page 1-48, Figure 1-9 on page 1-49, and Figure 1-10 on page 1-50 for high-level views of a 66 MHz thin processor node, 66 MHz thin processor node 2, 120 MHz thin processor node, and 160 MHz thin processor node. Refer to "Location diagrams of the RS/6000 SP components" in *RS/6000 SP: Uniprocessor Node Service Guide* for top views of the 66 MHz thin processor node, 66 MHz thin processor node 2, 120 MHz thin processor node, and 160 MHz thin processor node.

Feature Codes

2002	Two 66 MHz thin processor nodes
2004	Two 66 MHz thin node 2 processor nodes
2008	Two 120 MHz thin processor nodes
2022	Two 160 MHz thin processor nodes

Uniprocessor Wide Nodes

Components

Each wide processor node consists of the following parts:

- RS/6000-based components:
 - CPU planar
 - I/O planar
 - Memory card(s)
 - Micro Channel Ethernet card
 - Fixed disk drive(s)
 - Optional Micro Channel adapter cards.
- Unique RS/6000 SP components:
 - Wide Node supervisor card
 - Wide Node power card
 - LED display card
 - Circuit breaker
 - Node control harness
 - Control cables
 - Power cables
 - Fans
 - Fixed disk drive cable(s)

Refer to Figure 1-11 on page 1-51, for a high-level view of a wide processor node and to "Location diagrams of the RS/6000 SP components" in *RS/6000 SP: Uniprocessor Node Service Guide*, for a top view of a wide processor node.

Types

2003	One 66 MHz wide processor node
2005	One 77 MHz wide processor node
2007	One 135 MHz wide processor nodes

604 or 604e High Nodes

Components

Each high node consists of the following parts:

- RS/6000-based components:
 - System planar
 - I/O planar (x2)
 - Processor card(s)
 - Memory card(s)
 - Micro Channel Ethernet card
 - Fixed disk drive(s)
 - Optional Micro Channel adapter cards.
 - CPU card
 - Lateral planar 1 card
 - Lateral planar 2 card
 - IOD
 - Power supply
 - Cooling unit
 - Fans
- Unique RS/6000 SP components:
 - High Node supervisor card
 - High Node power card
 - LED display card
 - Circuit breaker
 - Node control harness
 - Control cables
 - Power cables
 - Fixed disk drive cable(s)

Refer to Figure 1-12 on page 1-52, for a high-level component view of a 604 or 604e high node and to "Location diagrams of the RS/6000 SP components" in *RS/6000 SP: 604 and 604e SMP High Node Service Guide*, for a top view of a 604 or 604e high node. Refer to *7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide* and *7015 Supplemental Information* for more detailed information on the 604 or 604e high node components.

Types

- | | |
|-------------|----------------------------|
| 2006 | One 112 MHz 604 high node |
| 2009 | One 200 MHz 604e high node |

332 MHz SMP Thin and Wide Nodes

Components

Each 332 MHz SMP node consists of the following parts:

- RS/6000-based components:
 - System planar
 - I/O planar (x2)
 - Service processor card
 - Memory card(s)
 - Fixed disk drive(s)
 - Optional PCI channel cards
 - CPU cards
 - Power supplies
 - Fans
- Unique RS/6000 SP components:
 - 332 MHz SMP Node supervisor card
 - 332 MHz SMP Node power mix card
 - MX bus card
 - Wide node interface card
 - LED display card
 - Circuit breaker (power cables)
 - Node control harness
 - Control cables
 - Fixed disk drive cable(s)

Refer to Figure 1-13 on page 1-53, for a high-level component view of a 332 MHz SMP node and to "Location diagrams of the RS/6000 SP components" in *RS/6000 SP: SMP Thin and Wide Node Service Guide*, for a top view of a 332 MHz SMP node.

Types

- | | |
|-------------|---------------------------|
| 2050 | One 332 MHz SMP thin node |
| 2051 | One 332 MHz SMP wide node |

SP-Attached Servers

Components

Each SP-Attached Server consists of the following parts:

- See *RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide*, SA38-0548, for a list of RS/6000 components.
- Unique RS/6000 SP components:
 - SAMI cable assembly
 - S1 term cable assembly
 - Coax cable
 - 10-meter ground cable
 - RS/6000 SP system attachment adapter

Refer to *RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide*, SA38-0548, for a high-level component views of a SP-Attached Server.

Types

The RS/6000 SP feature codes associated with the SP-Attached Server (F/C 9122 plus F/C 9123) refer to the system connections that attach the RS/6000 enterprise Server to your RS/6000 SP system. F/C 9122 and 9123 do not refer to hardware components. Because the Enterprise Servers are stand-alone devices with cable attachments to the SP system, these servers have some attributes that appear node-like to the SP system and other attributes that appear frame-like.

- | | |
|-------------|---|
| 9122 | Refers to the node-like attachment between the SP-Attached Server and the SP system |
| 9123 | Refers to the frame-like attachment between the SP-Attached Server and the SP system. |

POWER3 SMP Thin and WideNodes

Components

Each POWER3 SMP thin node and POWER3 SMP wide node consists of the following parts:

- RS/6000-based components:
 - System planar
 - I/O planar (x2)
 - Memory card(s)
 - Fixed disk drive(s)
 - Optional PCI channel cards
 - CPU cards
 - Power supplies
 - Fans
- Unique RS/6000 SP components:
 - Node supervisor card
 - Node power mix card
 - MX bus card
 - Wide node interface card
 - LED display card
 - Circuit breaker (power cables)
 - Node control harness
 - Control cables
 - Fixed disk drive cable(s)

Refer to Figure 1-14 on page 1-54, for a high-level component view of POWER3 SMP thin and wide nodes and to "Location diagrams of the RS/6000 SP components" in *RS/6000 SP: SMP Thin and Wide Node Service Guide*, for top views of POWER3 SMP thin nodes and POWER3 SMP wide nodes.

Types

- | | |
|-------------|--------------------------|
| 2052 | One POWER3 SMP thin node |
| 2053 | One POWER3 SMP wide node |

POWER3 SMP High Nodes

Components

Each POWER3 SMP High Node consists of the following parts:

- RS/6000 SP components:
 - Cooling assembly
 - Fans
 - Fan control card
 - Power board assembly
 - Power cards (2.5-volt, 3.3-volt, 5-volt, and 12-volt)
 - Power cables
 - System planar assembly
 - System planar control cables
 - CPU cards
 - Memory cards and DIMMs
 - DASDs
 - DASD docking card
 - SCSI cables
 - Node I/O planar assembly
 - SP Expansion I/O Unit interposer cards
 - SPS MX adapter
 - Optional PCI adapters
 - Node Supervisor card
 - Node Supervisor docking card
 - Supervisor cable
 - Interposer
 - Pico riser card
 - Bulkhead card
- SP Expansion I/O Unit components:
 - SP Expansion I/O Unit planar
 - Power assemblies
 - DASD
 - Optional PCI adapters
 - Service Processor
 - Interposers
 - Fans
 - DASD Controller
 - DASD docking card

Refer to Figure 1-15 on page 1-55 and Figure 1-16 on page 1-56 for high-level component views of the POWER3 SMP High Node and the SP Expansion I/O Unit. For detailed views of these devices, refer to "Location diagrams of the RS/6000 SP components" in *RS/6000 SP: POWER3 SMP High Node Service Guide*.

Types

2054 One POWER3 SMP High Node

Processor node diagnostics and descriptions (MAP 0130)

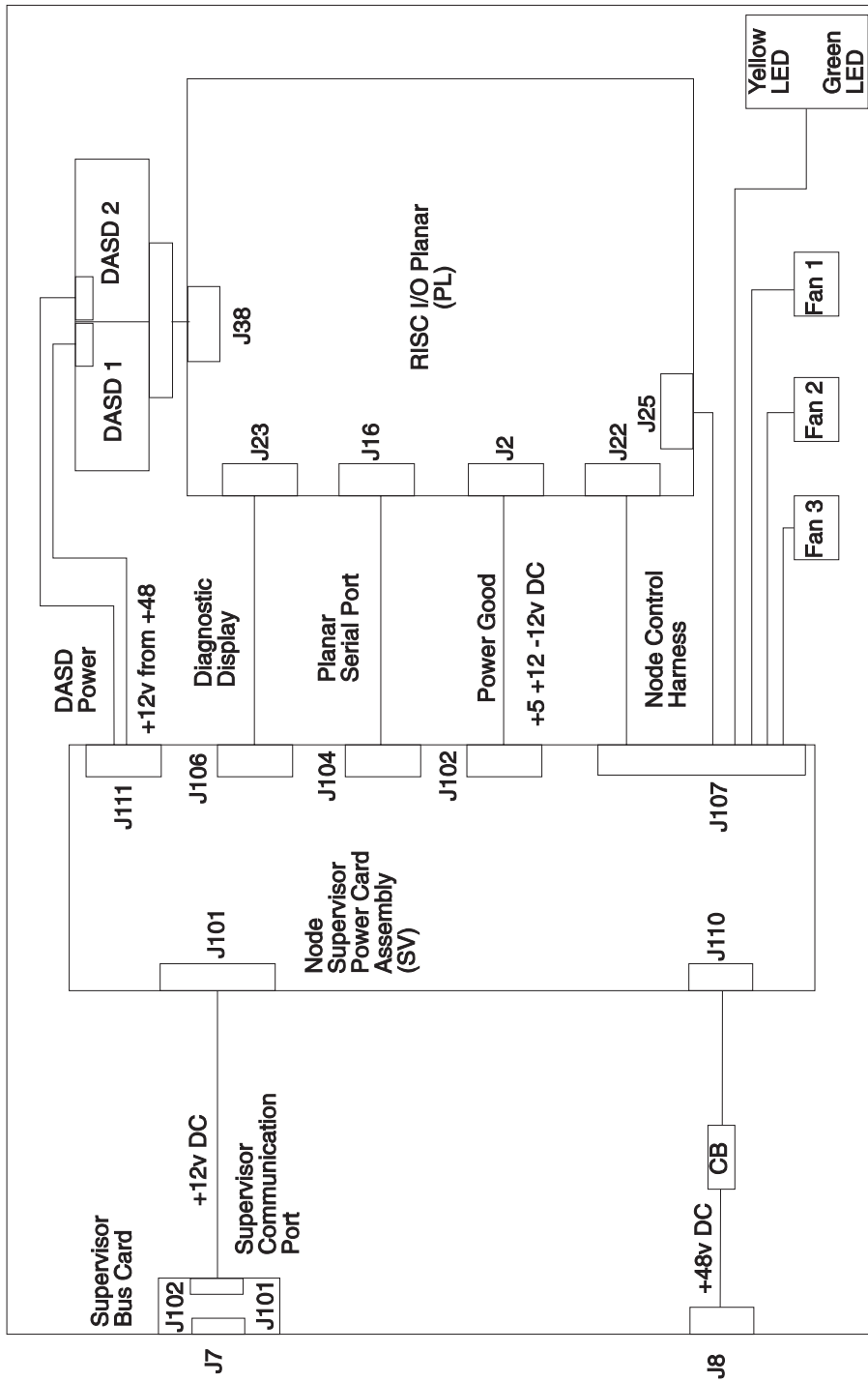


Figure 1-8. Uniprocessor Thin Node high level diagram

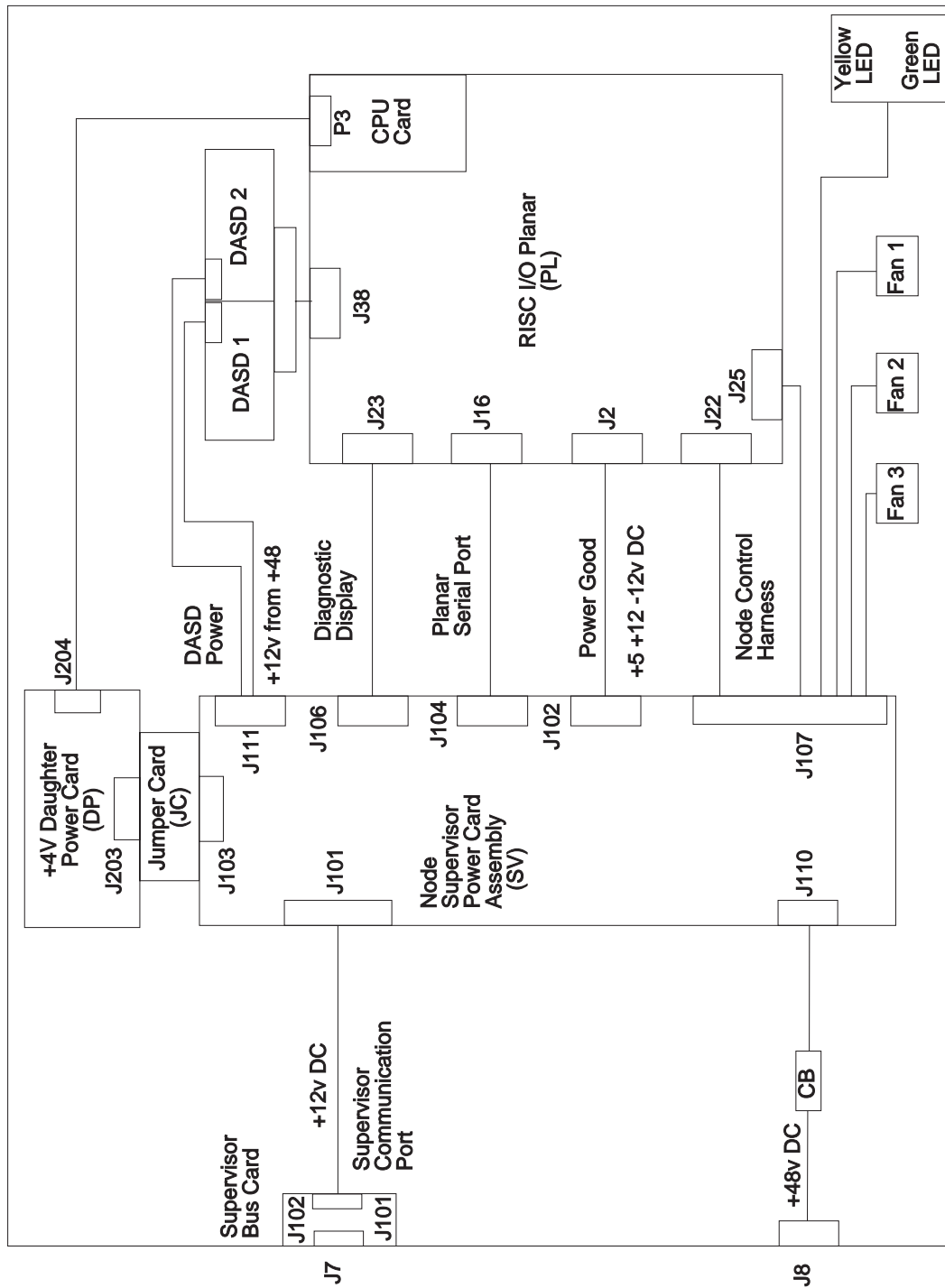


Figure 1-9. Uniprocessor Thin Node 2 high level diagram

Processor node diagnostics and descriptions (MAP 0130)

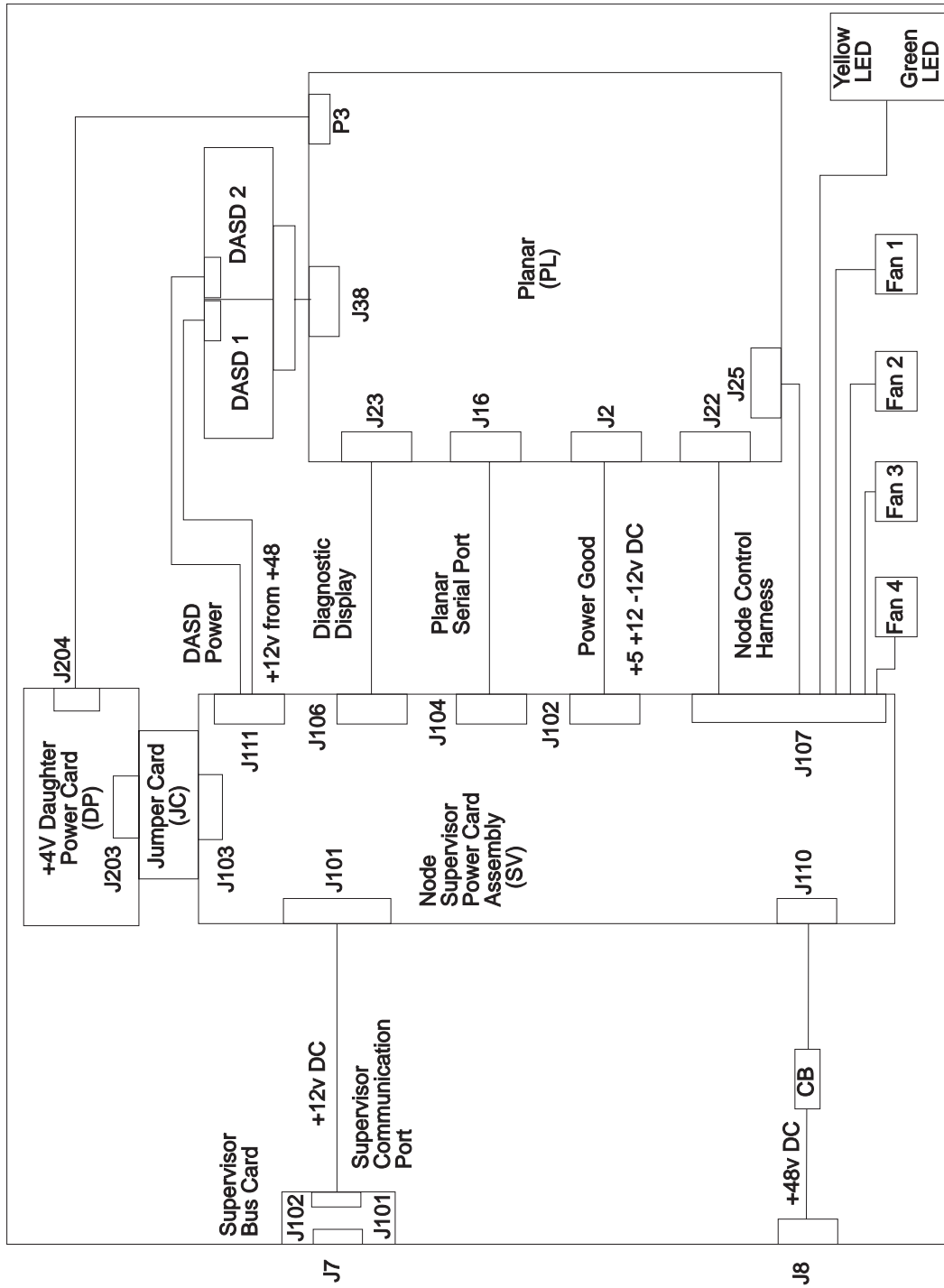


Figure 1-10. 120 and 160 MHz Uniprocessor Thin Node high level diagram

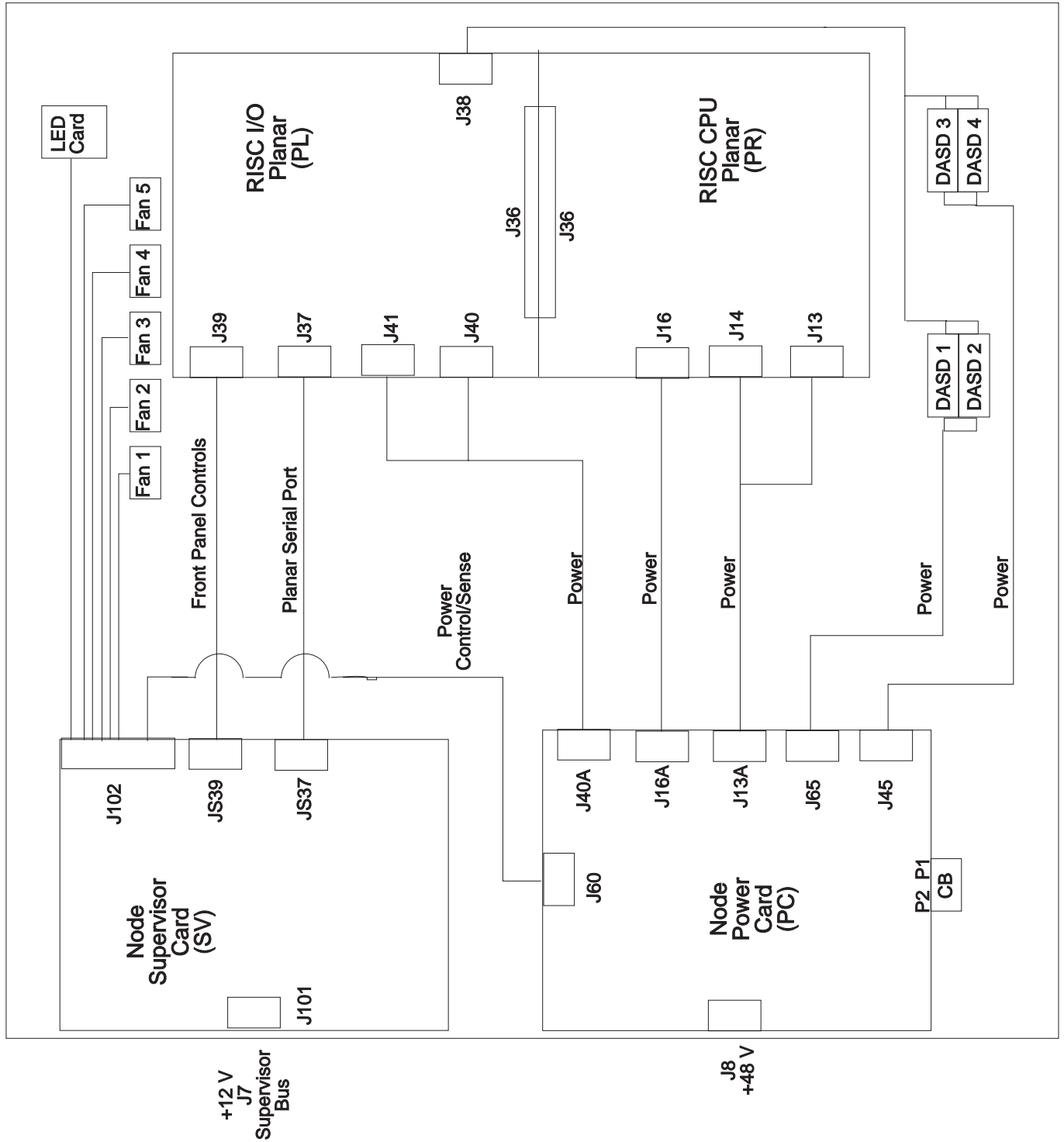


Figure 1-11. Uniprocessor Wide Node high level diagram

Processor node diagnostics and descriptions (MAP 0130)

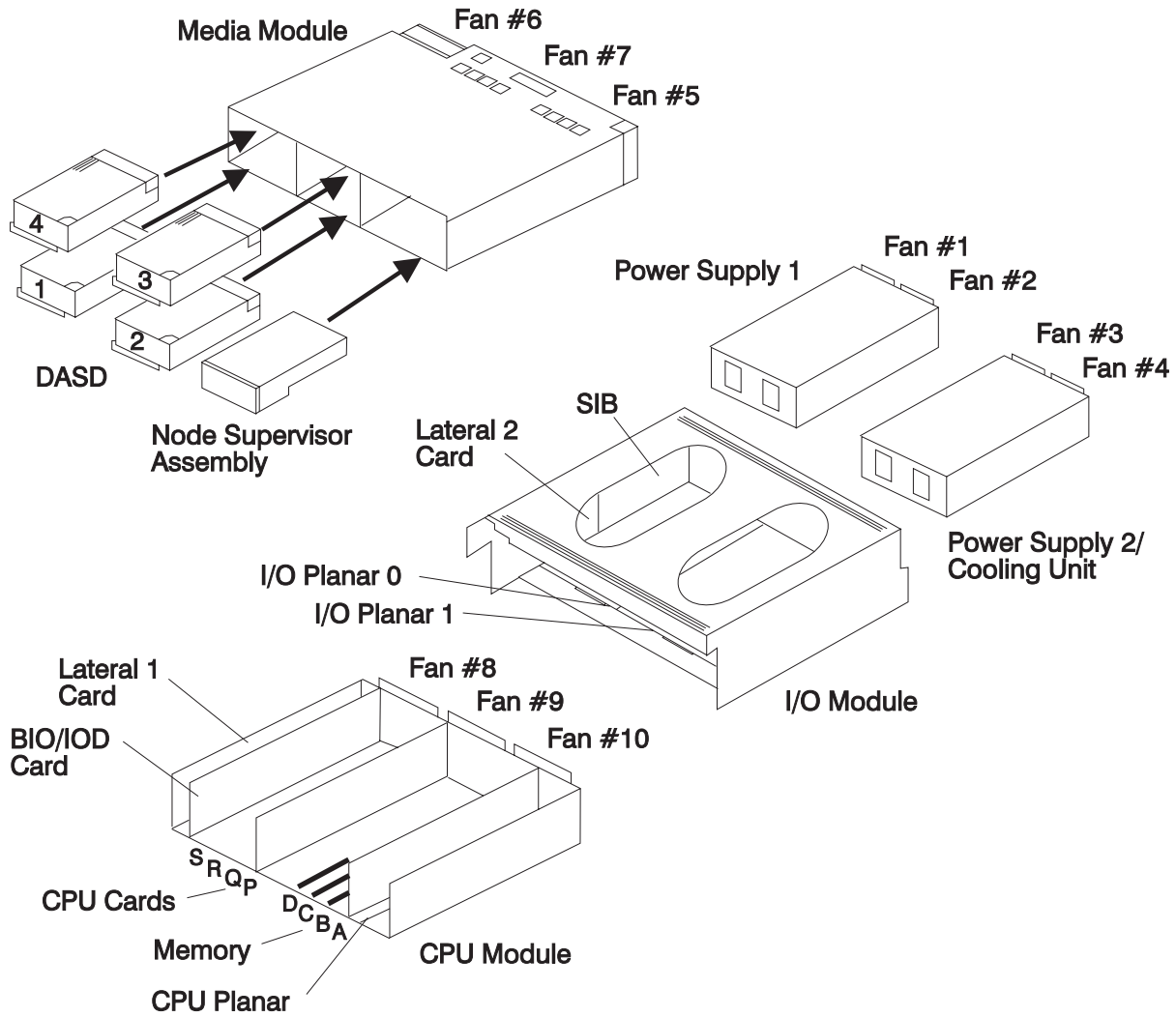


Figure 1-12. 604 or 604e High Node high level component diagram

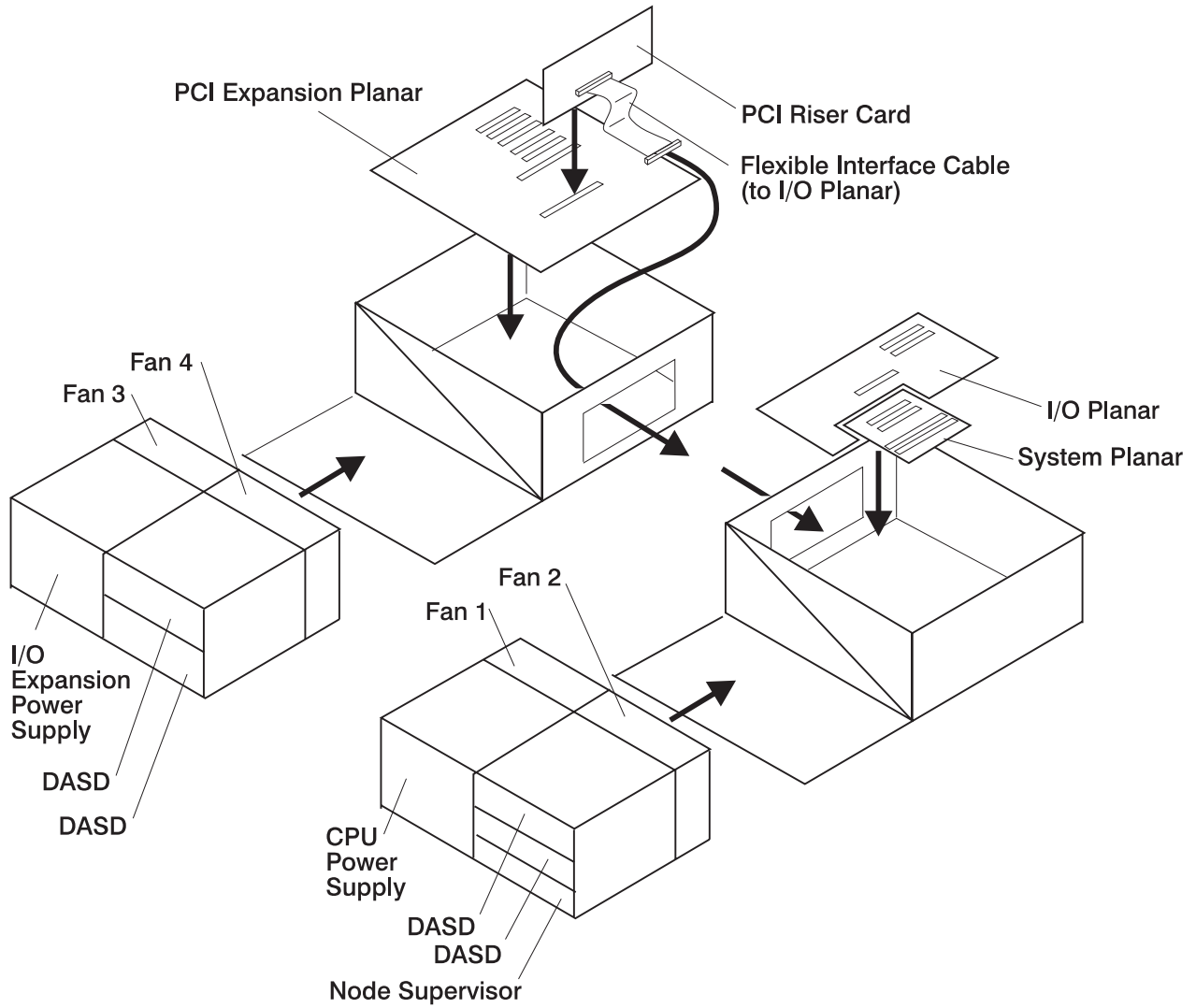


Figure 1-13. 332 MHz SMP Node high level component diagram

Processor node diagnostics and descriptions (MAP 0130)

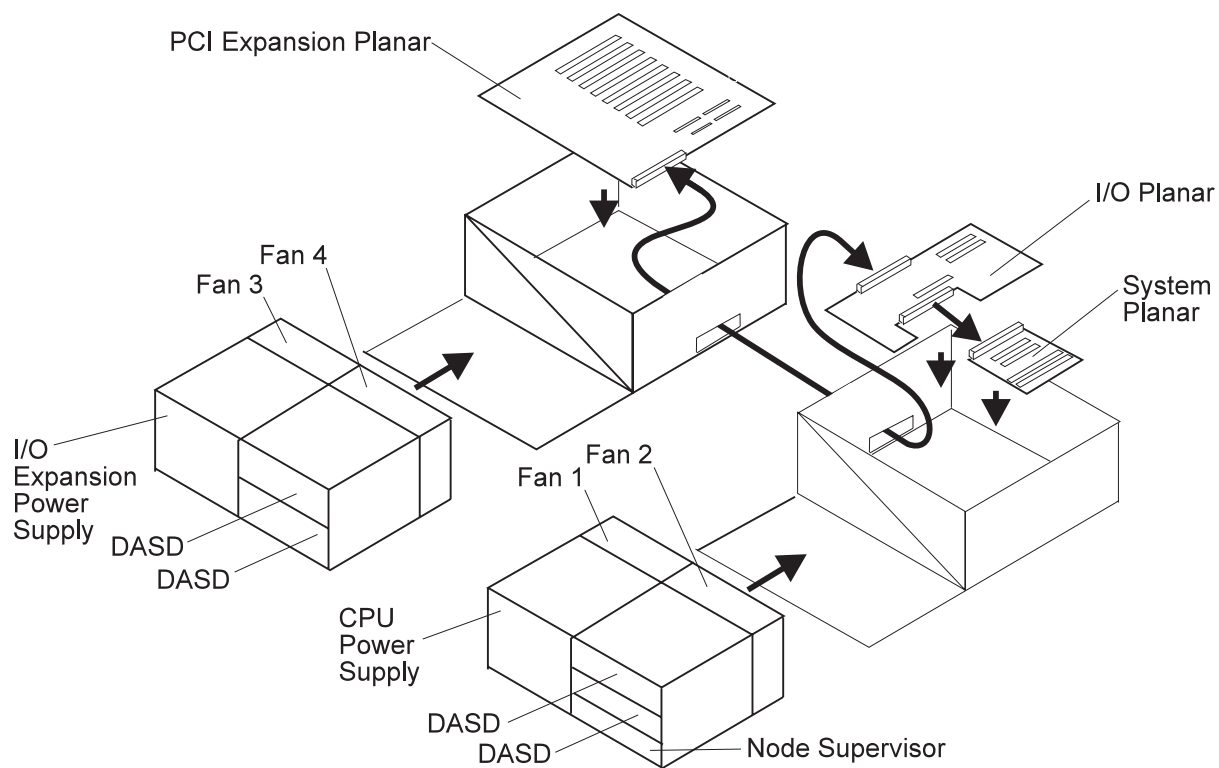


Figure 1-14. POWER3 SMP Thin and WideNode high level component diagram

Processor node diagnostics and descriptions (MAP 0130)

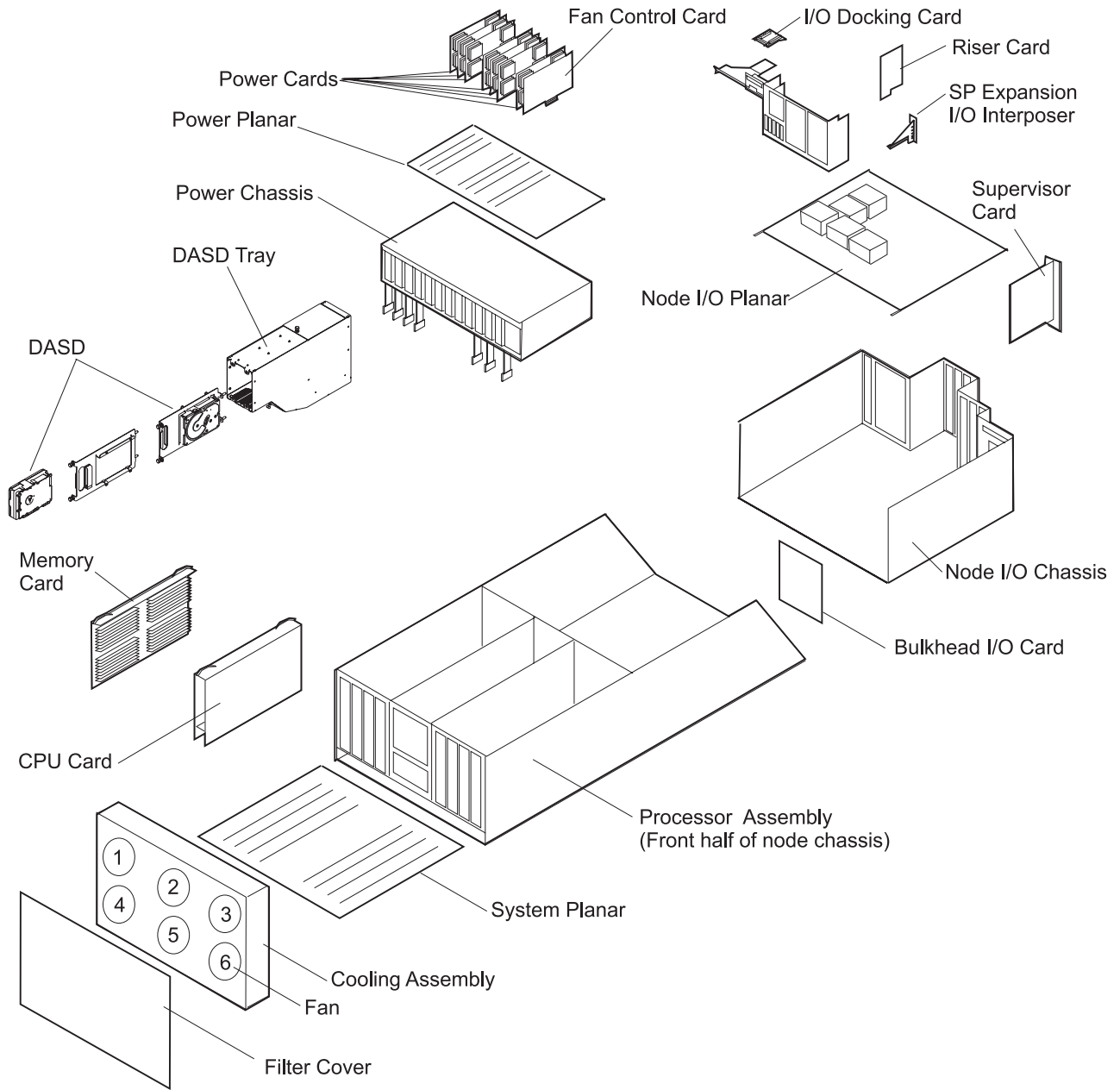


Figure 1-15. POWER3 SMP High Node high level component diagram

Processor node function (MAP 0140)

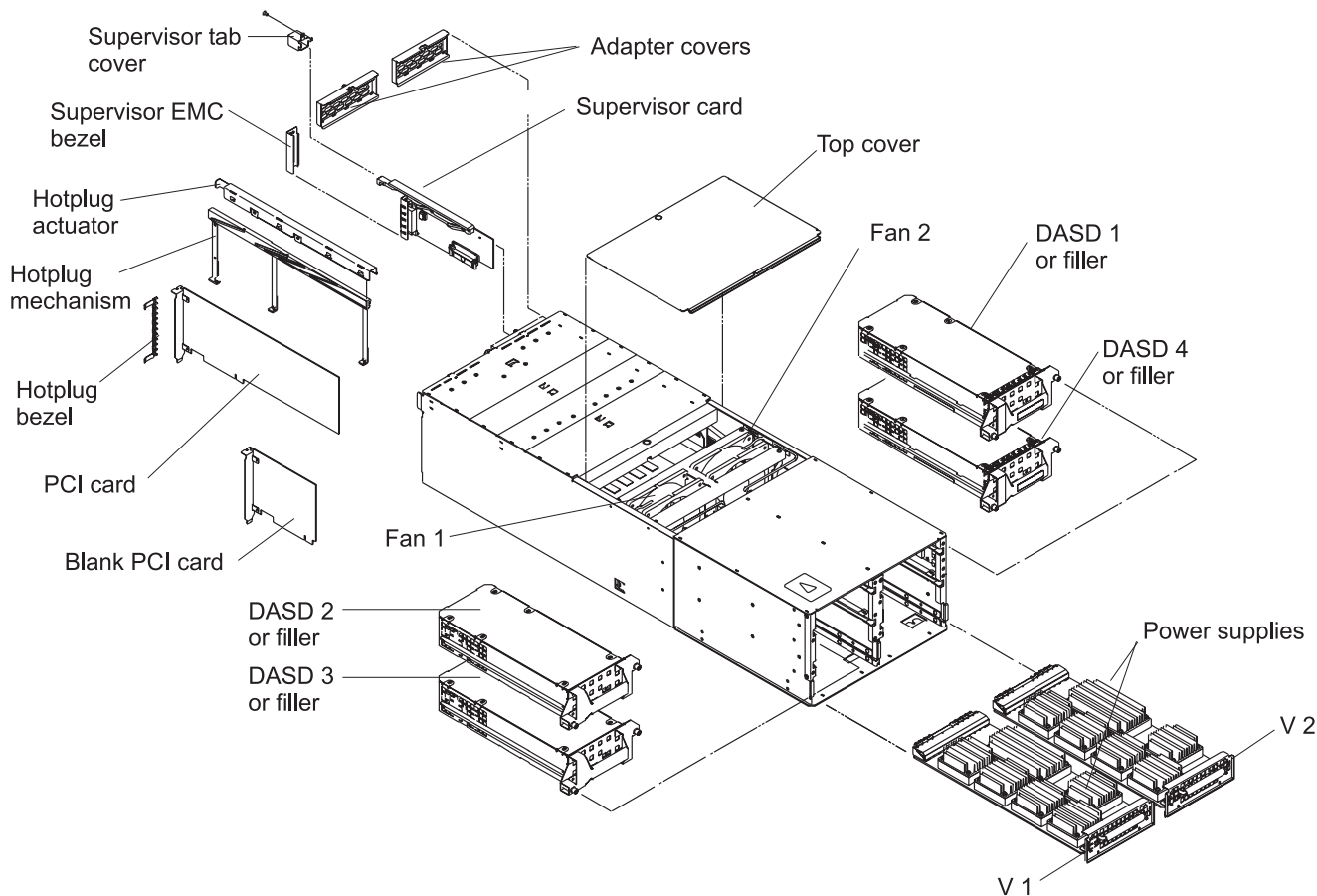


Figure 1-16. SP Expansion I/O Unit high level component diagram

Processor node function (MAP 0140)

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

Attention: Servicing a processor node with the Scalable POWERparallel Switch (SPS) feature installed, will impact the entire switch network, unless the processor node has already been powered off (or fenced) and the switch data cable has been disconnected.

Refer to "Service position procedures" in the applicable node service guide for placing processor nodes into the service position or for removing processor nodes from the service position.

Refer to "Viewing switch partitions" on page 3-28 for locating and fencing or unfencing nodes within a switch partition.

Note: By opening a TTY session to the failing node, real-time error data can be observed that can help with problem determination and repair.

Step 0140–001: A problem has been detected in a processor node.

1. From the system monitor on the control workstation or from Perspectives, obtain processor node front display.
 - Check the Perspectives LCD and LED display.
 - If the display flashes '888':
 - **For uniprocessor thin and wide processor nodes**, click on "RESET" button to read any sequence of numbers that follow; repeat RESET/read LEDs until LEDs display '888' again.
 - **For 604 or 604e high nodes**, record values displayed after the '888'. If you see '---' (three dashes), look at the front panel readout. (Choose the 3-digit display from the "All Node Summary Display.")
 - **For 332 MHz SMP, POWER3 SMP Thin and Wide nodes, or POWER3 SMP High Node**, use mouse button 3 on the front panel readout for additional information.
 - **For SP-Attached Servers**, use mouse button 3 on the front panel readout for additional information.
2. Record the front panel readout value or sequence for reference.
3. Power off and power on processor node from the control workstation.
4. Are any different front panel readout values displayed during node power on or power off?
 - If yes, go to "Step 0140–003."
 - If no, go to "Step 0140–002."

Step 0140–002: You **did not** see different front panel readout values displayed during node power on or power off.

1. Does processor node completely IPL?
 - If yes:
 - a. Check the record of this processor node to see if it experiences excessive fails (more than one per week).
 - If this processor node experiences frequent problems call the next level of support.
 - If this processor node **does not** have a history of frequent problems:
 - 1) Record the intermittent problem.
 - 2) Go to "End of call" on page 1-144.
 - If the processor node **does not** IPL completely, go to "Step 0140–004" on page 1-58.

Step 0140–003: You were able to see different front panel readout values displayed when you powered on the node or powered it off.

1. Record the new front panel readout value or sequence.
2. Check the service process logs From the control workstation power off processor node.
3. From node front panel display, click on TTY button to open a TTY console.
4. From the TTY console:
 - a. Select option 3 on the Main Menu Select
 - b. Select option 4 on the System Information Menu
5. Record the log information and clear the log.
6. Go to "Starting a service call (MAP 0100)" on page 1-1 with the new error information.

Processor node function (MAP 0140)

Step 0140–004: The front panel readout values **did not** change when you powered on or powered off the processor node **and** the node **does not** IPL completely.

1. You must use Table 1-18 on page 1-58 to isolate the problem and continue service.
2. After using Table 1-18 on page 1-58, continue the diagnostic procedure at “Step 0140–005” on page 1-62.

Table 1-18 (Page 1 of 4). Diagnostics using Perspectives node status front panel display

Condition of front panel display	Action
<ul style="list-style-type: none"> • Front panel display readout uuu <ul style="list-style-type: none"> – Commonly used to indicate that processor node has completed IPL. 	IPL okay. Treat as blank front panel display.
<ul style="list-style-type: none"> • Front Panel Display shows u98 <ul style="list-style-type: none"> – Indicates processor node is IPLed in maintenance mode. 	Refer to “Selecting a processor node boot response” on page 3-9 for more information.
<ul style="list-style-type: none"> • Front panel display readout shows u## or ##u <ul style="list-style-type: none"> – Indicates status of SP-unique software. 	IPL or software installation in progress. If they do not change within 30 minutes, use the <i>IBM Parallel System Support Programs for AIX: Diagnosis Guide</i> to diagnose the software/hardware problem.
<ul style="list-style-type: none"> • Front panel display stops at 103 during IPL <ul style="list-style-type: none"> – Problem with reset function. 	Go to the "Node control" MAP in <i>RS/6000 SP: Uniprocessor Node Service Guide</i> .
<ul style="list-style-type: none"> • Front panel display stops at 200 during IPL <ul style="list-style-type: none"> – IPL attempted in SECURE mode. 	<ol style="list-style-type: none"> 1. From the node front panel, put processor node in SERVICE or NORMAL mode (as appropriate), then click on RESET to reset processor node. 2. If this reoccurs, go to the "Node control" MAP in the applicable node service guide to fix the mode switch problem.
<ul style="list-style-type: none"> • Front panel display stops at 214/215 during IPL, • Obtained the following RS/6000 SRNs: <ul style="list-style-type: none"> – 128- 100 through 195 – 143- 714/715/814/815 – 144- 514/515 – 146- 014/015/314/315 – 148- 111/112/114/115/190/197 	<ol style="list-style-type: none"> 1. Go to the "Node environment" MAP in the applicable SP node service guide. 2. Go to “Step 0140–005” on page 1-62 to check for any additional actions required to complete a FRU replacement.

Table 1-18 (Page 2 of 4). Diagnostics using Perspectives node status front panel display

Condition of front panel display	Action
<ul style="list-style-type: none"> • Front panel display cycling through values in the following ranges indicates processor node is unable to boot: <ul style="list-style-type: none"> – 222 - 260 – 517 - 518 – 551 - 557 • Front panel display shows the following constant values during IPL indicates processor node is unable to boot: <ul style="list-style-type: none"> – 269 – E0A0 – E1F7 • Node hangs during boot, TTY panel shows "RS/6000" on display. 	<p>Go to "Processor node IPL problems (MAP 0150)" on page 1-63.</p>
<ul style="list-style-type: none"> • Front panel display stops at 262 during IPL 	<ol style="list-style-type: none"> 1. If processor node mode switch is not set for SERVICE mode, go to the "Node control" MAP in the applicable node service guide to fix mode switch problems. 2. From the node front panel, click on "OPEN TTY" to open the TTY console on this processor node. 3. Press '1' then ENTER in the TTY console window. 4. SERVICE IPL should continue.
<ul style="list-style-type: none"> • Front panel display stops at 292 during IPL 	<p>Problem configuring SCSI/SSA/serial device.</p> <p>If the failing device is the device you want to boot from, or is another device in the boot chain (before your device), the system will not boot. To isolate the problem, minimum configuration of DASD bootable adapters may be required. See "Diagnosing an LED 292 hang condition" in the 604 and 604e SMP High Node Service Guide.</p>
<ul style="list-style-type: none"> • Front panel display stops at 553 or 570 during IPL 	<p>Problem configuring SCSI device.</p> <ol style="list-style-type: none"> 1. If processor is currently booting from disk, go to "Processor node IPL problems (MAP 0150)" on page 1-63. 2. If processor is booting over network and other devices are still attached, disconnect SCSI cable(s) from SCSI MCA or I/O planar, then go to "Step 0150-003" on page 1-64. 3. If processor is booting over network and no devices are attached, at SCSI MCA or I/O planar, then replace SCSI MCA or I/O planar.
<ul style="list-style-type: none"> • Front panel display stops at constant 83u OR 888-103-762-xxx <ul style="list-style-type: none"> – Problem with SP adapter. 	<p>Go to "Switch function" MAP in <i>RS/6000 SP: SP Switch Service Guide</i>.</p> <p>Note: Front panel display 83u corresponds to SRN of type 83C-xxx.</p>
<ul style="list-style-type: none"> • Front panel display stops at 862 during IPL <ul style="list-style-type: none"> – Problem with BMCA feature. 	<p>Go to "Block Multiplexer Channel Adapter (MAP 0640)" on page 1-140.</p>

Processor node function (MAP 0140)

Table 1-18 (Page 3 of 4). Diagnostics using Perspectives node status front panel display

Condition of front panel display	Action
<ul style="list-style-type: none"> • Front panel display stops at constant 888 (followed by no other sequence of numbers) <ul style="list-style-type: none"> – IPL not starting. 	<ol style="list-style-type: none"> 1. Remove processor node from frame. Refer to "Service position procedures" in the applicable node service guide for these procedures. 2. Check for proper seating of cards in the processor node, especially the CPU planar and the supervisor card. <ul style="list-style-type: none"> • For uniprocessor nodes, go to node environment MAP in the service guide for the specific node type. • For SMP nodes, go to the minimum configuration MAP in the service guide for the specific node type. <p>Note: Use the SRN tables in <i>Diagnostic Information for Micro Channel Bus Systems (SA38-0532)</i> or <i>Diagnostic Information for Multiple Bus Systems (SA38-0509)</i>.</p> 3. Return to this procedure to continue service.
<ul style="list-style-type: none"> • Front panel display stops at constant 980 <ul style="list-style-type: none"> – Problem with HiPS adapter-1. 	Go to "Switch function" MAP in <i>RS/6000 SP: SP Switch Service Guide</i> .
<ul style="list-style-type: none"> • Front panel display stops at c20 - c29 during IPL <ul style="list-style-type: none"> – Node boot information corrupted. 	Call software support.
<ul style="list-style-type: none"> • Front panel display stops at c31 during IPL 	<ol style="list-style-type: none"> 1. From the node front panel, click on "OPEN TTY" to open the tty console on this node. 2. Press "1" then ENTER in the tty console window. 3. Service IPL should continue.
<ul style="list-style-type: none"> • Front panel display at 888-103 followed by this sequence of numbers: <ul style="list-style-type: none"> – 409-008 – 409-022 	<ol style="list-style-type: none"> 1. Remove processor node from frame. Refer to "Service position procedures" in the applicable node service guide for these procedures. 2. Check for proper seating of cards and cables on IOD. 3. Check flex cables for damage and freedom of motion on the "floating" connector. 4. Change any suspected problem flex cables. 5. If this is a high node, go to the "Minimum configuration" MAP in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i>.
<ul style="list-style-type: none"> • Front panel display at 888 followed by this sequence of numbers: <ul style="list-style-type: none"> – 409-070/073/074/075 – 409-076/077/078/079 – 409-093/094/095/096 	<ol style="list-style-type: none"> 1. Go to <i>Diagnostic Information for Micro Channel Bus Systems (SA38-0532)</i> or <i>Diagnostic Information for Multiple Bus Systems (SA38-0509)</i> to decode the fan number information. 2. Then go to the "604 or 604e High Node environment" MAP in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i>
<ul style="list-style-type: none"> • All other Front Panel Display 8-digit and 4-digit LED values. 	Go to the "Error code to FRU index" in the applicable node service guide.

Table 1-18 (Page 4 of 4). Diagnostics using Perspectives node status front panel display

Condition of front panel display	Action
<ul style="list-style-type: none"> • All other constant front panel display values <ol style="list-style-type: none"> 1. The system stopped with a 3-digit readout or a 4-digit readout starting with 0 to 7 2. The LCD or LED display reads 888 followed by a sequence of numbers 	<ol style="list-style-type: none"> 1. For a 3-digit or 4-digit code, record SRN 101-xxx <ul style="list-style-type: none"> • xxx is the 3-digit code or the last 3 digits of the 4-digit code 2. If a physical location code or an AIX location code is displayed: <ol style="list-style-type: none"> a. Record the location code b. Find the SRN in the SRN table c. Obtain the FRU or FRU list from the SRN information <p>Note: SRN's can be found in <i>Diagnostic Information for Micro Channel Bus Systems (SA38-0532)</i> and <i>Diagnostic Information for Multiple Bus Systems (SA38-0509)</i></p> 3. If the display reads 888 followed by a sequence of numbers, go to MAP 0070 in either <i>Diagnostic Information for Micro Channel Bus Systems</i> or <i>Diagnostic Information for Multiple Bus Systems</i>. <p>Note: Return to this procedure to continue service.</p> <p>Use the failing function code and description to perform service or to replace the most probable failing component. Refer to the applicable node service guide for processor node locations, removal and replacement procedures, or part numbers, as required.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. If the SRN indicates a memory problem, check that all the memory is of the same operating speed, and you should also consider the CPU and planar as potential FRUs. 2. If this is a 135 MHz wide processor node, and the SRN indicates a problem with the CPU, change the V dc converter daughter card before replacing the CPU card. 3. If this is a 604 or 604e high node, consider lateral planar 1 card and lateral planar 2 card as possible cause of this problem. If directed to the <i>7015 Models R30, R40, and R50 CPU Enclosure Installation and Service Guide Map 1540</i>, use the "Minimum configuration" MAP in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i>. 4. If this is a SP-Attached Server (RS/6000 7017 Models S70, S7A, and S80), consult the <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide</i> to perform any required service action. <p>Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform "Decoupling and coupling code for SP-Attached Servers" on page 3-35.</p> <p>Then run diagnostics from SERVICE mode as described in "Running diagnostics in a processor node" on page 3-5.</p>
<ul style="list-style-type: none"> • Machine check (604 and 604e high processor nodes) 	<p>Go to "Diagnosing a machine check (604 or 604e High Node)" in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i>.</p>

Processor node function (MAP 0140)

Step 0140–005: You have used Table 1-18 on page 1-58 to determine what failure is indicated by the front panel display.

1. Check Table 1-19 on page 1-62 for any additional actions that must be performed to recover use of the processor node following certain FRU replacements.

Note: The procedures in this table can be found by the customer in *IBM RS/6000 SP: Administration Guide*, under the section entitled “Reconfiguring the RS/6000 SP System”.

Replaced Part	Required customer action
<ul style="list-style-type: none"> • System I/O Planar (Thin processor node) • Ethernet adapter in Micro Channel slot 1 (Wide or 604 (or 604e) high processor node) • Ethernet riser in POWER3 and 332 MHz SMP wide nodes or thin nodes • I/O planar on POWER3 high nodes 	Have customer perform “Updating the Ethernet hardware address” on page 3-13.
Fixed Disk #1 (Boot DASD)	<p>Have customer perform the following steps to reinstall an AIX image on this DASD.</p> <ol style="list-style-type: none"> 1. Use the spbootins command to select a boot_response of “install”: <ol style="list-style-type: none"> a. Determine <i>frame#</i> and <i>slot#</i> of this processor node. b. Issue the following command from the control workstation: <pre>spbootins -r install frame# slot# 1</pre> 2. From the “Global Controls” window, perform a Network boot on this processor node. 3. The processor node should boot and install AIX on fixed disk #1.

2. Has the processor node been recovered?

- If yes, go to “End of call” on page 1-144.
- If no, go to “Step 0140–006.”

Step 0140–006: After reviewing all diagnostic information, you have not been able to recover the node.

1. Have all the parts listed in *Diagnostic Information for Micro Channel Bus Systems*, (SA38-0532) or *Diagnostic Information for Multiple Bus Systems*, (SA38-0509) and *Adapters, Devices and Cable Information*, (SA38-0533) been replaced?
 - If you **have replaced** all listed parts **and** the node has not been recovered, call the next level of support.
 - If you **have not** replaced all listed parts:
 - a. Replace the next priority part.
 - b. Return to “Step 0140–005.”

Processor node IPL problems (MAP 0150)

The processor node does not IPL and the front panel display continuously cycles within the range 222-260 or a constant 269 (see “Step 0140–004” on page 1-58).

- Record this value for later use.

Note: Before continuing, refer to "Service position procedures" in the applicable node service guide for either placing a processor node into the service position, or removing it from the service position.

Step 0150–001: A processor node will not IPL. Since the file system for each processor node may reside on an internal fixed disk or an externally attached device, determine the IPL device for the node by checking the *response* field after entering the command:

splstdata -b

1. Determine the IPL device for this processor node.
2. The information in Table 1-20 will help you determine the IPL devices; however, customers may have customized configurations.
3. After reviewing the information in Table 1-20, go to “Step 0150–002.”

<i>Table 1-20. Determining the IPL device</i>	
Condition	Default IPL device
Thin/wide/high processor node: <ul style="list-style-type: none"> • Normal operation • Response field indicates “disk” • Problem with SCSI device 	Boot disk (most likely disk #1)
Wide processor node: <ul style="list-style-type: none"> • Response field indicates “install,” “customize,” or “maintenance” 	I/O Ethernet adapter
High processor node: <ul style="list-style-type: none"> • Response field indicates “install,” “customize,” or “maintenance” 	I/O Ethernet adapter
Thin processor node: <ul style="list-style-type: none"> • Response field indicates “install,” “customize,” or “maintenance” 	Integrated Ethernet card

Step 0150–002: Use Table 1-21 to continue service.

<i>Table 1-21. IPL failure diagnostics</i>	
IPL device	Action
Boot disk	Go to “Step 0150–003” on page 1-64.
Integrated Ethernet card	Go to “Ethernet LAN (MAP 0580)” on page 1-132, to isolate a software problem affecting this processor node’s Ethernet LAN connection.
Ethernet I/O adapter	Go to “Ethernet LAN (MAP 0580)” on page 1-132, to isolate a software problem affecting this processor node’s Ethernet LAN connection.

Processor node IPL problems (MAP 0150)

Step 0150–003: You are having a problem IPLing from the boot disk and Table 1-21 sent you to this location.

1. Determine the normal boot disk by entering the **splstdata -b** command and checking the *install_disk* field.
2. Prepare to IPL and run diagnostics from Ethernet LAN by performing the procedure in “Basic stand-alone mode (from network boot)” on page 3-7 for this processor node.
3. Does the processor node IPL?
 - If yes, go to “Step 0150–006.”
 - If no, go to “Step 0150–004.”

Step 0150–004: Processor node does not complete IPL over Ethernet.

1. Recheck procedures in “Step 0150–003” for any mistakes.
2. Is there an obvious problem?
 - If yes:
 - a. Fix any obvious problems.
 - b. Return to “Step 0150–003.”
 - If no, go to “Step 0150–005.”

Step 0150–005: The node **does not** IPL and you **do not** detect any obvious problems.

1. Problem may be in software or hardware.
2. Check the front panel display for this processor node for non-blank values.
3. Do you get a problem indication in the front panel display?
 - If yes, go to “Processor node function (MAP 0140)” on page 1-56 to continue service.
 - If you **do not** get a problem indication in the display:
 - a. This indicates that you have a probable software problem.
 - b. Call the next level of support.

Step 0150–006: Processor node has completed IPL in maintenance mode.

- For the following steps, refer to “Basic stand-alone mode (from network boot)” on page 3-7.
1. Check device list for a SCSI device like:
 - “scsi0” (SCSI port on I/O planar)
 - “ascsi...”, “vscsi1...” (SCSI MCA).
 2. Check device list for the problem “hdisk...” (fixed disk).
 3. For all appropriate “scsi0”, “vscsi...”, and “hdisk...” devices, run diagnostics against the device and check results.
 4. Does device list include “hdisk...” and does diagnostics pass for “hdisk...”?
 - If yes, go to “Step 0150–007” on page 1-65.
 - If the device list does not include and pass the diagnostics for “hdisk...”:
 - a. This indicates that the system detected a problem.
 - b. Note any diagnostic results before continuing.

- c. Put any circuit breaker on the processor node in the Off ('0') position.
- d. Go to "Step 0150-007."

Step 0150-007: The processor node IPLed in the maintenance mode and the device list may or may not have included "hdisk..."

1. Ensure that the processor node is in service position.
2. Use Table 1-22 to continue service.

Priority	Condition	Action
1	<ul style="list-style-type: none"> • Device list does not include any device(s) like "scsi0" or "ascsi0". • Diagnostics fail for device(s) like "scsi0" or "ascsi0". 	<ol style="list-style-type: none"> 1. If diagnostics indicate the cause of failure, perform service based on the diagnostics results, then go to "Step 0150-008." 2. Replace I/O planar. 3. Go to "Step 0150-008."
2	<ul style="list-style-type: none"> • Device list does not include any SCSI MCAs like "ascsi..." or "vscsi..." • Diagnostics fail for SCSI MCAs "ascsi..." or "vscsi..." 	<ol style="list-style-type: none"> 1. If diagnostics indicate the cause of failure, perform service based on the diagnostics results, then go to "Step 0150-008." 2. Replace SCSI MCA card. 3. Go to "Step 0150-008."
3	<ul style="list-style-type: none"> • Device list does not include the problem "hdisk..." • Diagnostics fail for the problem "hdisk..." • "hdisk missing" 	<ol style="list-style-type: none"> 1. Check the SCSI bus cables (and SCSI riser card if present) for a loose connection or damaged cable, especially at this disk. Also check for a loose or missing terminator. (For 604 and 604e high nodes, refer to the media drawer diagram in "Removing the 604 or 604e High Node DASD" in <i>RS/6000 SP: 604 and 604e SMP High Node Service Guide</i> showing the SCSI path and power cable.) 2. Check the power cables for this disk at both ends for a loose connection or damaged cable. 3. Check DASD addressing. Refer to <i>Adapters, Devices, and Cable Information for Micro-Channel Bus Systems</i>, SA38-0533, for the required jumper information. 4. If a cable problem is found, repair or replace cable, then go to "Step 0150-008." 5. If no cable problem is found, replace disk, then go to "Step 0150-008."
4	Diagnostics pass for the problem "hdisk..."	Go to "Step 0150-009" on page 1-66.

Step 0150-008: You have repaired or replaced a component.

1. Put the circuit breaker on the processor node in the On ('1') position.
2. Return to "Step 0150-003" on page 1-64 to continue service.

Main Power (MAP 0450)

Step 0150–009: Diagnostics pass for both SCSI port and boot disk.

1. Refer to “Basic stand-alone mode (from network boot)” on page 3-7 to exit from the verification menu.
2. Change boot response to “disk”, using “Selecting a processor node boot response” on page 3-9.
3. Did you replace the boot disk?
 - If yes, go to “Step 0150–011” on page 1-66.
 - If no, go to “Step 0150–010.”

Step 0150–010: You replaced the boot disk.

1. From the control workstation, power off and on this processor node.
2. Does this processor node IPL?
 - If yes, go to “Step 0150–011.”
 - If no:
 - a. Probable software problem (AIX image on boot disk may not be functional).
 - b. Call next level of support.

Step 0150–011: You have resolved the hardware problem.

1. Inform the customer to use the appropriate procedures in IBM RS/6000 SP: Administration Guide to reinstall (or recover) an AIX image on the fixed disk.
2. Remove processor node from service position.
3. Reconnect all cables at rear of the processor node.
4. Go to “End of call” on page 1-144.

Power subsystems

Main power (MAP 0450)

Purpose of these MAPs

This MAP provides describes the types of power subsystems found on IBM RS/6000 SP frames. There are two different implementations of the frame power:

1. Scalable Electrical Power Base Unit (SEPBU)
 - For more information see 1-66 and 1-69.
2. Power Distribution Unit (PDU)
 - For more information see 1-68 and 1-69.

Scalable Electrical Power Base Unit:

- Used in SP2 systems
- Converts 200-240 V ac and 380-415 V ac to +12 and +48 V dc without manual intervention
- Uses three or four bulk power modules to provide N+1, +12, and +48 V dc power
 - Power modules are available in two, non-interchangeable variations:
 1. 3.5 kW module (see Figure 1-17 on page 1-67)

2. 5.0 kW module (see Figure 1-18 on page 1-67)

- To determine which power modules are installed in a frame, issue the command: **hmmom -GQs n:0 |grep frMod** (where n is the frame number).
- Uses power modules and power chassis backplane for power conversion, distribution, and control functions
- The LC8 has only one power module (in position D — see Figure 1-19 on page 1-68) and optionally one additional power module in position C.
- No external transformer required
- Has no mainline circuit breaker (power modules contain individual circuit breakers)
- Has quick disconnect ac power connector
- The main power switch acts as EPO switch and also sends a signal to the PCI indicating that the power switch is closed
- Provides power control interface (PCI) function
- All power modules are controlled with one power switch by the System Monitor.

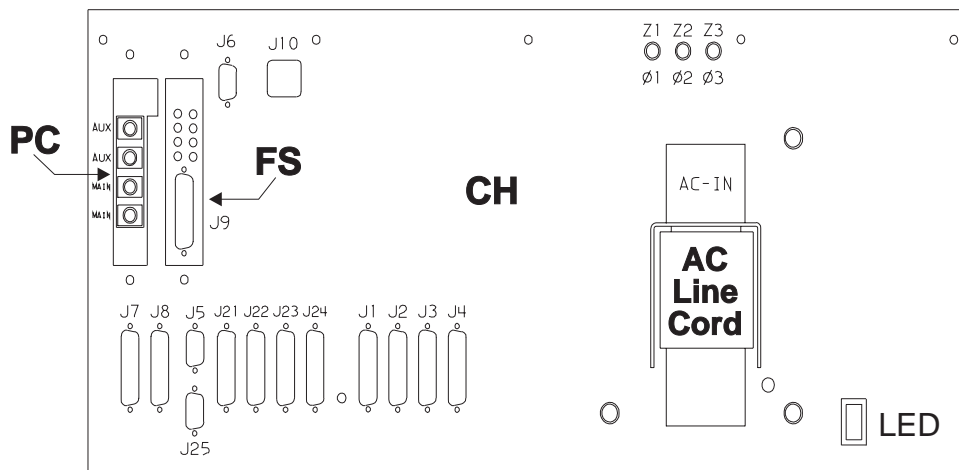


Figure 1-17. Rear view of the 3.5 kW Scalable Electrical Power Base Unit

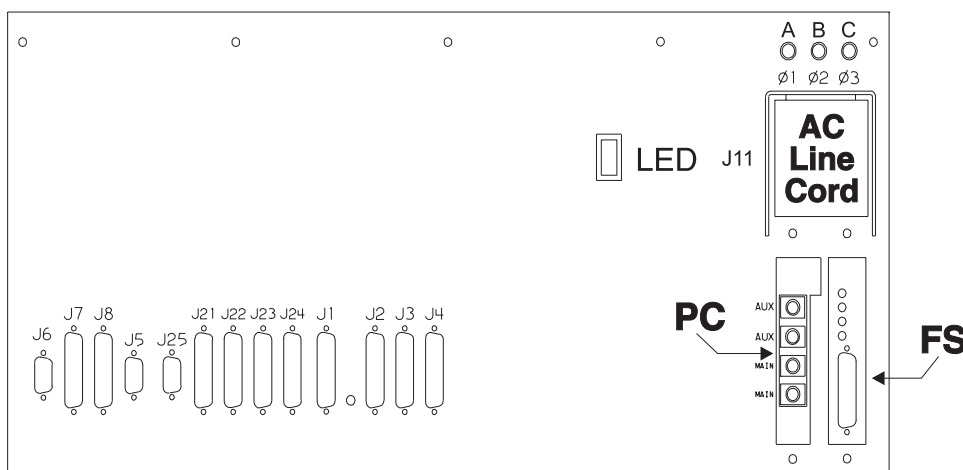


Figure 1-18. Rear view of the 5.0 kW Scalable Electrical Power Base Unit

Main Power (MAP 0450)

SP Frame locations (1.25 m and 1.4 m frames) - front view

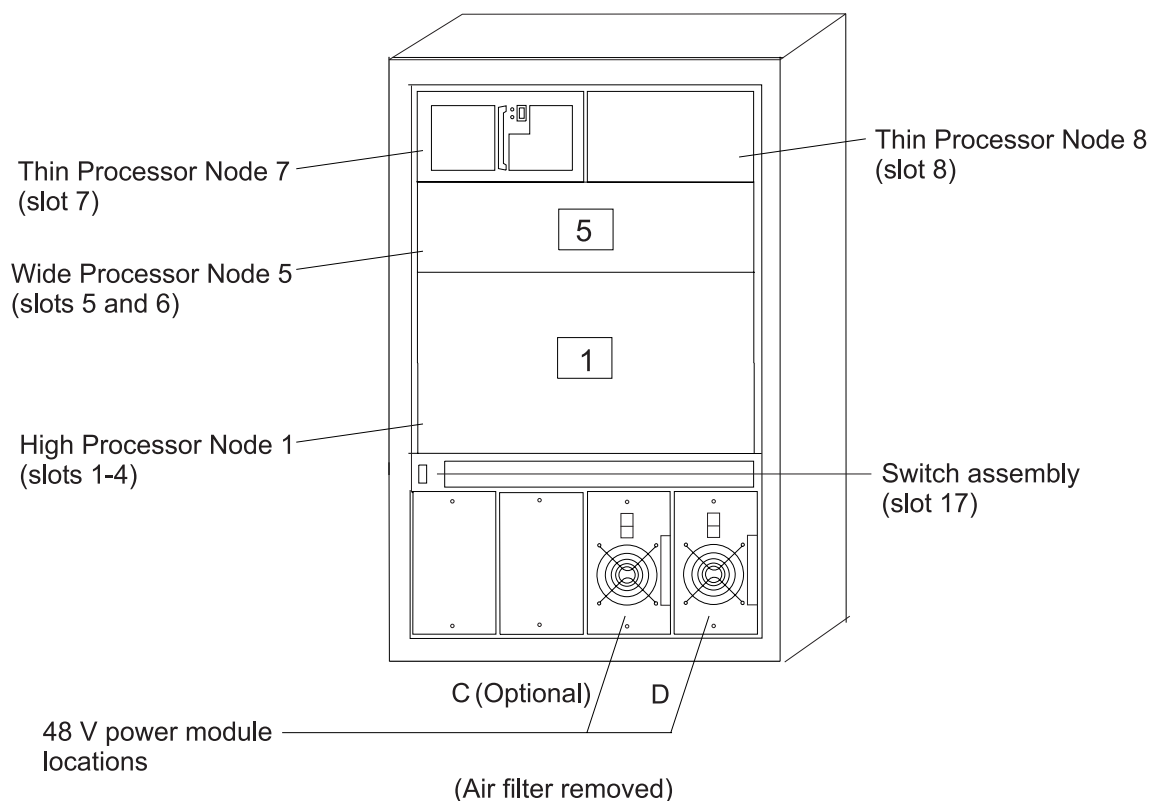


Figure 1-19. Front view of 1.25 m frame locations

Power Distribution Unit:

- Used in SP1 and some SP2 systems
- Converts 200-240 V ac to +12, +24, and +48 V dc
- The +24 V dc supply is used to power an EPO contactor
- The main power switch acts as EPO switch
- Uses 4 bulk power supplies to provide N+1 +48 V dc power
- Uses many discrete components for power conversion, distribution, and control functions
- Requires external transformer for use with 380-415 V ac
- Power for bulk supplies is controlled individually for each supply by the System Monitor.

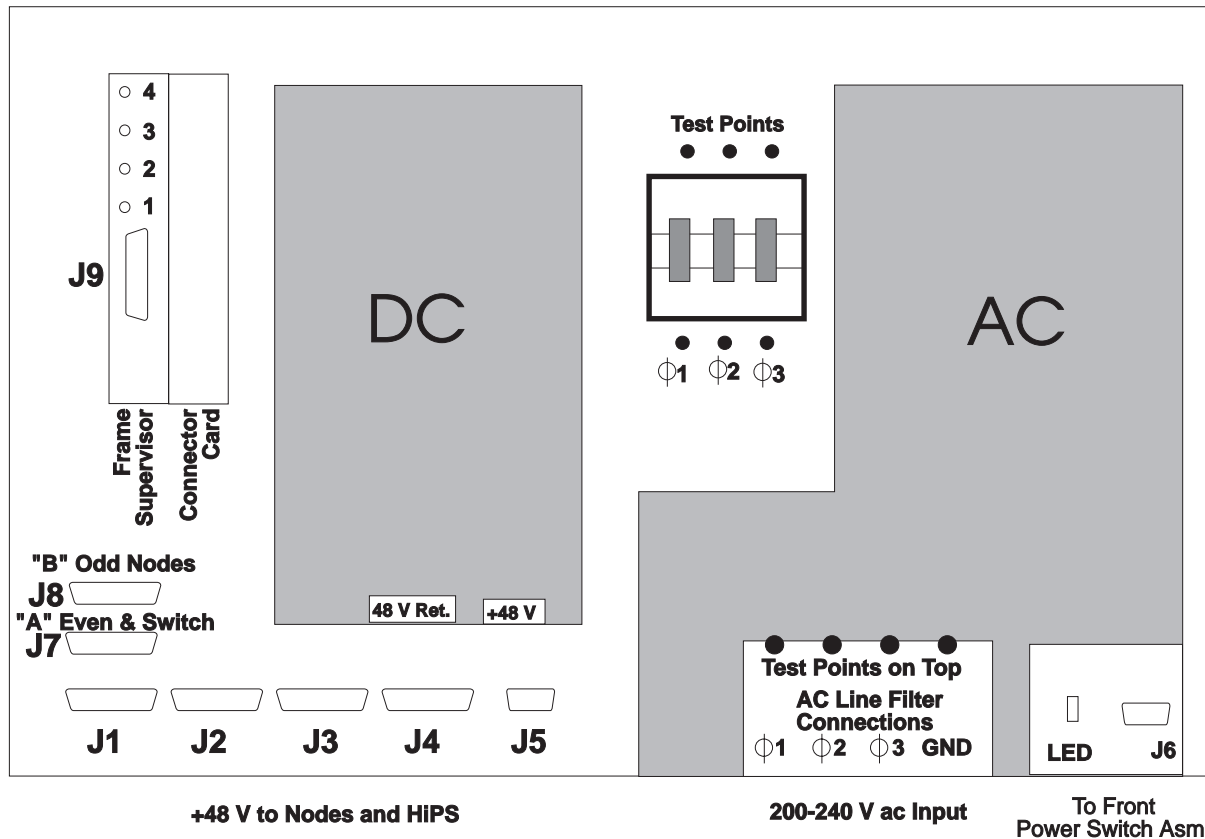


Figure 1-20. Rear view of Power Distribution Unit

Common to SEPBU and PDU:

- Provides supervisor +12 V dc power
- Provides +48 V dc power for processor node(s) and/or switch assemblies (usually N+1 configuration)
- Houses frame supervisor for frame control/monitoring
- Common connectors at bulkhead
- The +48 V dc power can be controlled via frame supervisor.

Main power subsystem diagnostics

Step 0450-001: Problem detected concerning power in frame.

DANGER

Both the SEPBU power chassis and the PDU 48 V 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.

Attention: When servicing frame(s) in a parallel environment, powering off a frame will cause all parallel jobs to terminate. The switch network can not be re-initialized until power is restored to the frame, or the frame is removed from the active configuration in a multi-frame system. Refer to "Removing and restoring switch resources" on page 3-27, for these procedures.

Power Distribution Unit description

Use Table 1-23 on page 1-70 to continue service.

Frame Power Type	Action
SEPBU	Go to “SEPBU subsystem MAPs” on page 1-107.
PDU	Go to “Power Distribution Unit diagnostics (MAP 0460)” on page 1-72.

Power Distribution Unit (PDU) subsystem MAPs

Power Distribution Unit description	1-70
Power Distribution Unit diagnostics (MAP 0460)	1-72
PDU supervisor power problem (MAP 0470)	1-74
PDU 12 V dc supervisor power problem (MAP 0480)	1-82
PDU 24 V dc supervisor power problem (MAP 0490)	1-88
PDU main power switch problem (MAP 0500)	1-91
PDU dc power loss from bulk dc power supplies (MAP 0510)	1-93
PDU short in 48 V dc power distribution (MAP 0520)	1-100
PDU frame environment (MAP 0530)	1-105
SEPBU subsystem MAPs	1-107

Purpose of these MAPs

The MAPs in this section provide information for diagnosing power subsystem problems.

The dc frame power is supplied by ac-dc power supplies in the base of each frame. There are two different implementations of the frame power:

1. Scalable Electrical Power Base Unit (SEPBU)
 - See “SEPBU subsystem MAPs” on page 1-107
2. Power Distribution Unit (PDU)
 - Covered in this chapter

Power Distribution Unit description

Note: PDU is an acronym for Power Distribution Unit.

The 48 V dc power system consists of the following components:

- ac line cord
- ac line filter
- Main circuit breaker
- Contactor
- 48 V Power chassis
- Bulk dc power supplies
- Busbars
- 48 V dc distribution cables
- Miscellaneous cables.

The supervisor 12/24 V dc power system consists of the following components:

- Supervisor 12 V dc power supply (S1)
- Contactor main power switch 24 V dc power supply (S2)
- PDU rear panel LED

- Main power switch LED
- Connector card
- Supervisor harnesses
- Miscellaneous cables.

The supervisor 12/24 V dc power system consists of the following components:

- Supervisor 12 V dc power supply (S1)
- Contactor main power switch 24 V dc power supply (S2)
- PDU rear panel LED
- Main power switch LED
- Connector card
- Supervisor harnesses
- Miscellaneous cables.

Power Distribution Unit diagnostics (MAP 0460)

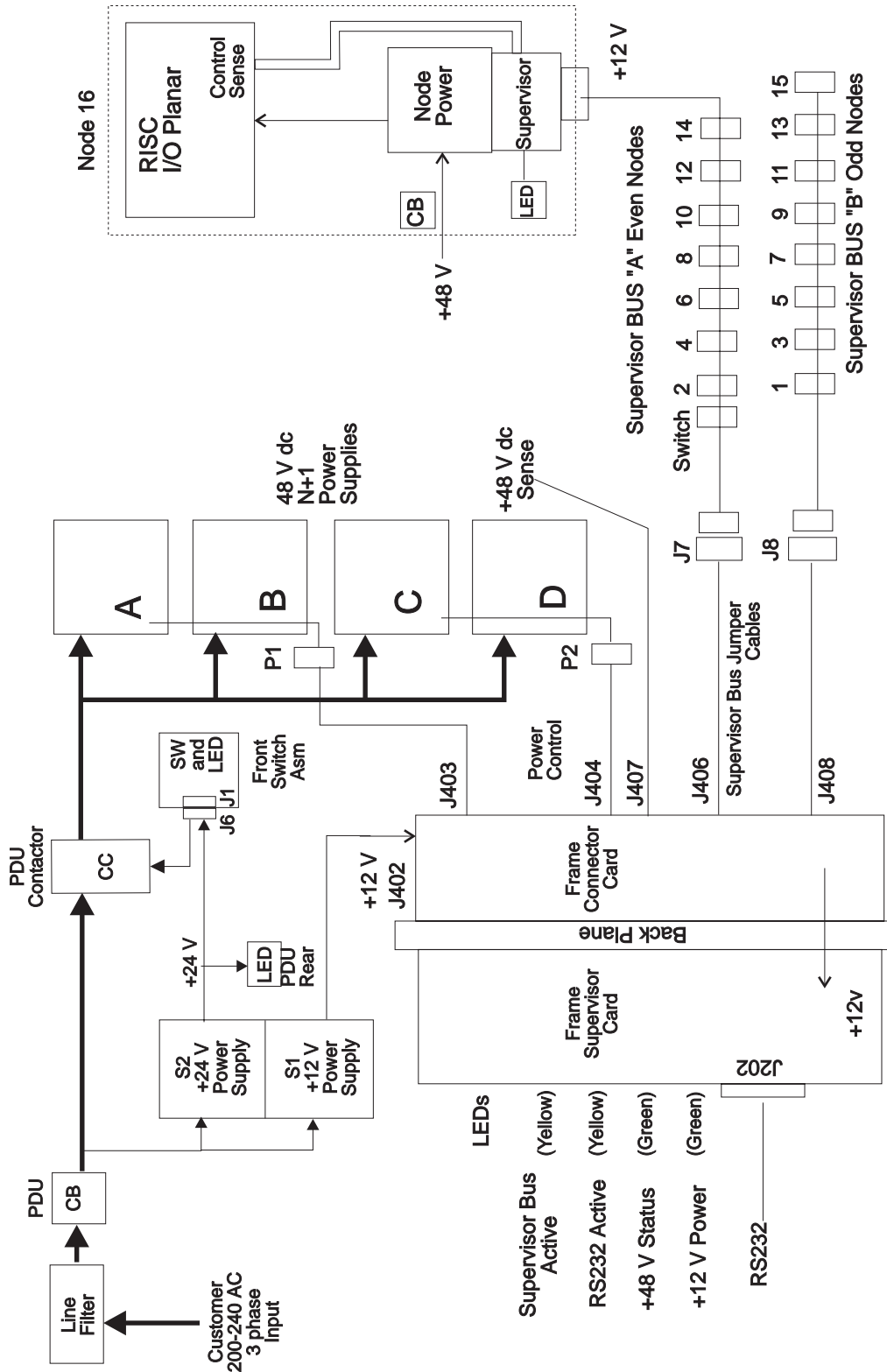


Figure 1-21. RS/6000 SP PDU power diagram

Power Distribution Unit diagnostics (MAP 0460)

Step 0460–001: Problem detected concerning power in frame.

Attention: When servicing frame(s) in a parallel environment, powering off a frame will cause all parallel jobs to terminate. The switch network can not be re-initialized until power is restored to the frame, or the frame is removed from the active configuration in a multi-frame system. Refer to “Removing and restoring switch resources” on page 3-27, for these procedures.

1. Check the condition of the following LEDs:

- Main power switch LED
- PDU panel LED
- Frame supervisor LEDs.

2. The following table contains a prioritized list of conditions.

Find the first condition that describes your problem, then perform the suggested action.

Note: The system monitor log can be viewed by issuing the following command on the control workstation:

```
errpt -a -N sphwlog | pg
```

Priority	Condition	Action
1	Main power switch LED is Off -AND- PDU rear panel LED is Off -AND- Frame Supervisor LEDs are Off.	Go to “PDU supervisor power problem (MAP 0470)” on page 1-74.
2	Main power switch LED is On -OR- PDU rear panel LED is On, -BUT- all frame supervisor LEDs are Off.	Go to “PDU 12 V dc supervisor power problem (MAP 0480)” on page 1-82.
3	Main power switch LED is On -AND- PDU rear panel LED is Off, -BUT- some frame supervisor LEDs are On.	Go to “PDU 24 V dc supervisor power problem (MAP 0490)” on page 1-88.
4	Main power switch LED is Off.	Go to “PDU main power switch problem (MAP 0500)” on page 1-91.
5	System monitor log reports “dc Power Loss” for any bulk dc power supplies.	Go to “PDU dc power loss from bulk dc power supplies (MAP 0510)” on page 1-93.
6	Frame supervisor detecting problem: <ul style="list-style-type: none"> • Frame supervisor green LED #2 (dc OK) is flashing. • Frame temperature is over 40° C. 	Go to “PDU frame environment (MAP 0530)” on page 1-105.
7	Problem with 48 V dc power distribution to processor node(s) or switch assemblies.	Go to “Open in 48 V dc distribution (MAP 0560)” on page 1-128.

PDU supervisor power problem (MAP 0470)

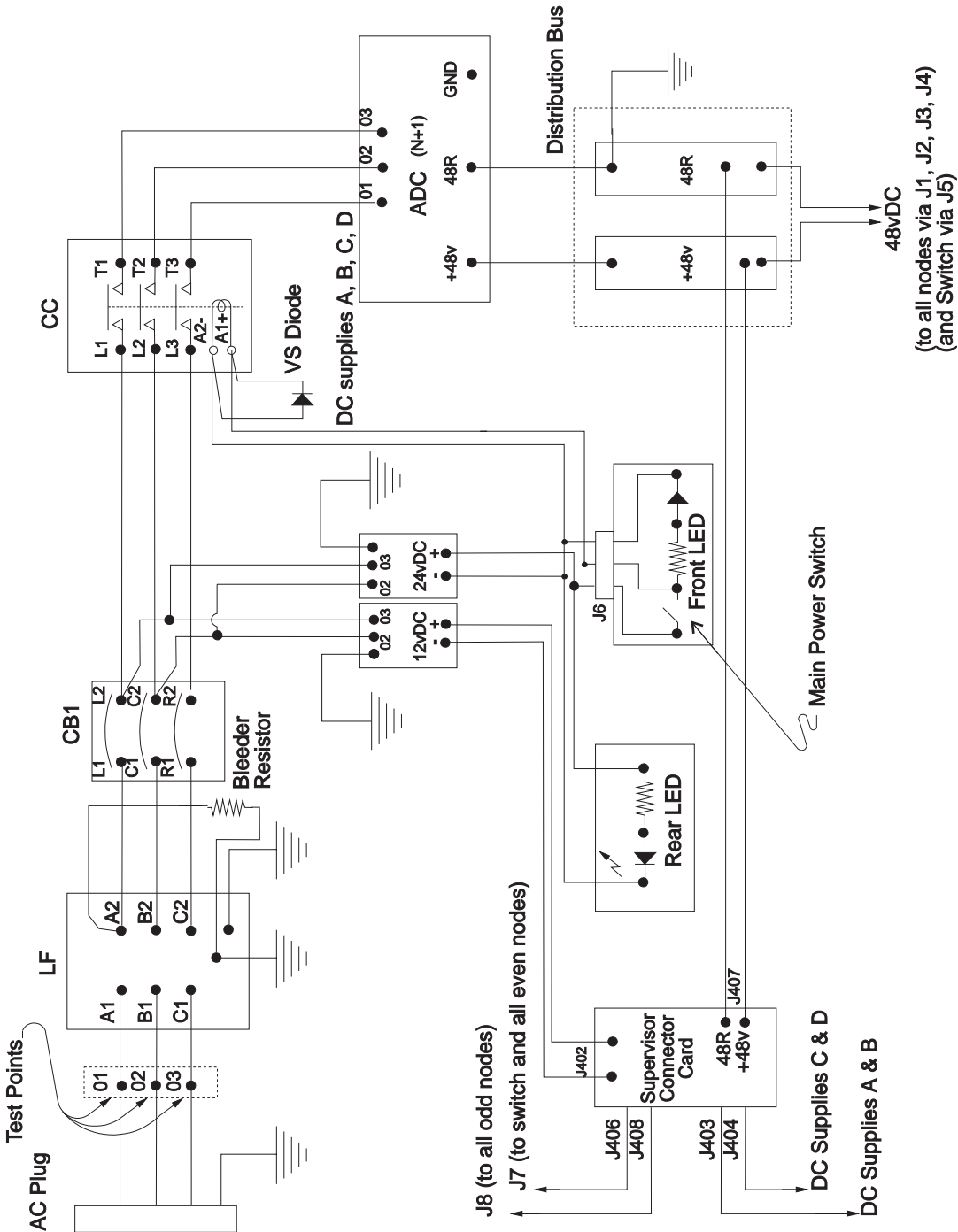


Figure 1-22. Wiring diagram of RS/6000 SP Power Distribution Unit

PDU supervisor power problem (MAP 0470)

Problem detected concerning power in system with the following symptoms:

- Main power switch LED is Off
- **-AND-** PDU rear panel LED is Off
- **-AND-** Frame Supervisor LEDs are Off

Step 0470–001: Put frame's main power switch in the Off ('0') position.

DANGER

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

1. Using a multimeter, check ac phase-to-phase voltage between test points O1 and O2 on ac filter.
 - The voltage should be in the range 180-254 V ac.
2. Is the ac voltage outside of the specified range?
 - If yes, go to "Step 0470–002."
 - If no, the power supplied to the frame is not at fault. Go to "Step 0470–018" on page 1-79.

Step 0470–002: You have determined that there is a problem with the power coming into the frame.

1. Put the RS/6000 SP main circuit breaker in the Off ('0') position.
2. Is there a high-voltage transformer connected to this frame?
 - If yes, go to "Step 0470–009" on page 1-77.
 - If no, go to "Step 0470–003."

Step 0470–003: There is a problem with the power coming into the frame and the frame **does not** have a high-voltage transformer connected to the PDU.

1. Make certain that the customer has put the wall circuit breaker in the On position.
2. Does the customer circuit breaker stay in the On position?
 - If yes, go to "Step 0470–006" on page 1-76.
 - If no, go to "Step 0470–004."

Step 0470–004: The customer's circuit breaker does not stay in the On position. You must now determine if there is an electrical short.

DANGER

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

1. With power removed, check for a short condition between ac phases using test points O1, O2, and O3 on ac filter.
2. Do you detect a short condition?
 - If yes, go to "Step 0470–005" on page 1-76.
 - If no, call the next level of support.

PDU supervisor power problem (MAP 0470)

Step 0470–005: You have detected an electrical short between test points 01, 02, and 03 on ac filter.

1. Isolate ac short between line filter and circuit breaker input using Figure 1-22 on page 1-74 as a reference.
2. Replace parts as required.
3. Go to “Step 0470–025” on page 1-81 to verify fix.

Step 0470–006: There is a problem with the power coming into the frame and the customer's wall circuit breaker stays in the On position.

1. Repeat “Step 0470–001” on page 1-75 and check the phase-to-phase voltage.
2. Is ac present and within 180-254 V ac?
 - If yes, go to “Step 0470–008.”
 - If no, go to “Step 0470–007.”

Step 0470–007: The ac voltage being supplied at the frame **is not** within the specified range of 180-254 V ac. You must now determine whether the problem is in the customer's supply or in the line cord attached to the SP frame.

DANGER

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

1. Have customer check the ac voltage at their receptacle or other frame related power connections.
 - The ac voltage for all connections should fall within the 180-254 V ac range.
2. Is the voltage at all connections within the specified range?
 - If yes, the line cord is likely at fault.
 - a. Remove power from the frame.
 - b. Replace the SP line cord.
 - c. Go to “Step 0470–024” on page 1-81 to verify fix.
 - If no, there is a problem with the customer's ac power.
 - a. Have the customer correct the problem.
 - b. Go to “End of call” on page 1-144.

Step 0470–008: You repeated the voltage test in “Step 0470–001” on page 1-75. You still find that there is a problem with the power coming into the frame and the customer's wall circuit breaker stays in the On position.

1. The ac voltage is within the specified range (180-254 V ac) at frame input.
2. Is this the first time at this step?
 - If yes, go to “Step 0470–018” on page 1-79 to continue fault isolation.
 - If no, go to “Step 0470–025” on page 1-81

Step 0470–009: You have arrived at this step from “Step 0470–002” on page 1-75 where you found that there was a problem with the power coming into the frame and that the frame you are working on has a high-voltage transformer attached to the PDU. You will now check PDU function.

DANGER

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

1. Open the service access cover of the high-voltage transformer.
2. Using a multimeter, check ac phase-to-phase voltage between test points H0 and H1 on the high-voltage transformer.
3. Is ac present and within 340-440 V ac?
 - If yes, go to “Step 0470–014” on page 1-78.
 - If no, go to “Step 0470–010.”

Step 0470–010: You have a frame with a high-voltage transformer attached to the PDU and the ac voltage **is not** within the specified range.

1. Put both circuit breakers of high-voltage transformer in the Off (0) position.
2. Make certain that the customer has put the wall circuit breaker in the On position.
3. Does the customer circuit breaker stay in the On position?
 - If yes, go to “Step 0470–012.”
 - If no, go to “Step 0470–011.”

Step 0470–011: The customer's wall mounted circuit breaker **does not** stay in the On position when both circuit breakers of high-voltage transformer in the Off (0) position. This means the SP line cord is likely at fault.

DANGER

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

1. Replace the ac power cord connecting the high-voltage transformer to the customer's power.
2. Go to “Step 0470–024” on page 1-81 to verify fix.

Step 0470–012: The customer's wall mounted circuit breaker stays in the On position when both circuit breakers of high-voltage transformer in the Off (0) position. You must now test the high-voltage transformer.

DANGER

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

1. Put the input circuit breaker of the high-voltage transformer in the On ('1') position.

PDU supervisor power problem (MAP 0470)

2. Using a multimeter, check ac phase-to-phase voltage between test points H0 and H1 on the high-voltage transformer.
 - The acceptable voltage range is 340-440 V ac.
3. Is ac voltage present and within the acceptable range?
 - If yes, go to "Step 0470-014."
 - If no, go to "Step 0470-013."

Step 0470-013: The high-voltage transformer and line cord are at fault.

DANGER

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

1. Replace the ac power cord connecting the high-voltage transformer to the customer's power.
2. Go to "Step 0470-024" on page 1-81 to verify fix.

Step 0470-014: Everything on the input side of the high-voltage transformer appears to be functioning properly. You must now test the power going into the frame.

DANGER

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

1. Put output circuit breaker of the high-voltage transformer in the On ('1') position.
2. Using a multimeter, check ac phase-to-phase voltage between test points O1 and O2 on ac filter.
 - The acceptable voltage range is 180-254 V ac.
3. Is ac voltage present and within the specified range?
 - If yes, go to "Step 0470-018" on page 1-79.
 - If no, go to "Step 0470-015."

Step 0470-015: You have determined that the output power from the high-voltage transformer is not being supplied to the frame. You must now determine if the problem is in the line cord or in the PDU.

DANGER

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

1. Disconnect RS/6000 SP ac line cord from the high-voltage transformer.
2. Using a multimeter, check continuity of the ac line cord from the plug to test points O1, O2, and O3 on the ac filter.
3. Is there continuity on all three phases?
 - If yes, go to "Step 0470-016" on page 1-79.

- If no:
 - a. The line cord has an open circuit.
 - b. Replace the high voltage transformer to PDU ac line cord.
 - c. Go to “Step 0470–024” on page 1-81 to verify fix.

Step 0470–016: You have found that the line cord has continuity between the plug and the test points on the ac filter. Continue checking the line cord by looking for an electrical short.

1. Using a multimeter, check for a short condition between the three test points (O1, O2, and O3) on the ac filter.
2. Is there a short condition between the test points?
 - If yes, go to “Step 0470–017.”
 - If no, the failure is in the high-voltage transformer, not the line cord.
 - a. Replace the high-voltage transformer.
 - b. Go to “Step 0470–024” on page 1-81 to verify fix.

Step 0470–017: You have detected an electrical short between test points O1, O2, and O3 on the ac filter. This isolates the problem to either a short in the line cord or a PDU failure.

1. Detach ac line cord from ac filter.
2. Check for a short condition on the ac line cord.
3. Is there a short condition on the ac line cord?
 - If yes:
 - a. Replace the ac line cord.
 - b. Go to “Step 0470–024” on page 1-81 to verify fix.
 - If no, the failure is in the PDU. Go to “Step 0470–018.”

Step 0470–018: You have isolated the problem to a failure in the Power Distribution Unit (PDU).

DANGER

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

1. Open Power Distribution ac section.
2. Check for an obvious electrical short or open cable on the 12/24 V supervisor power supplies. Check the following ac cables:
 - PDU-CB-L2 to PDU-S1-L1
 - PDU-CB-C2 to PDU-S1-L2/N
 - PDU-CB-L2 to PDU-S2-L1
 - PDU-CB-C2 to PDU-S2-L2/N
3. Check for a short condition between the following points:
 - PDU-CB-L2 to PDU-CB-C2
 - PDU-CB-L2 to PDU-CB-R2
 - PDU-CB-C2 to PDU-CC-R2

PDU supervisor power problem (MAP 0470)

ADC-TB-01 to ADC-TB-02
ADC-TB-01 to ADC-TB-03
ADC-TB-02 to ADC-TB-03

4. Do the cables appear to be okay?
 - If yes, go to “Step 0470–019.”
 - If no:
 - a. Fix the obvious cable problem.
 - b. Go to “Step 0470–025” on page 1-81 to verify fix.

Step 0470–019: The supervisor power supply cables appear okay, continue checking PDU.

1. With power removed, put main circuit breaker in On ('1') position.
2. Check continuity of the three phases between ac filter and the circuit breaker output using the following test points:
 - **ac filter O1 to top left of main circuit breaker**
 - **ac filter O2 to top center of main circuit breaker**
 - **ac filter O3 to top right of main circuit breaker**
3. Is there continuity on all three phases?
 - If yes, go to “Step 0470–022” on page 1-81.
 - If no, go to “Step 0470–020.”

Step 0470–020: You did not have electrical continuity across the test point. You will now check the main circuit breaker on all three phases.

1. Check continuity across main circuit breaker on all three phases. This is done by checking continuity between corresponding **test points directly above to test points directly below the main circuit breaker**.
2. Is there continuity across circuit breaker on all three phases?
 - If yes, go to “Step 0470–021.”
 - If no:
 - a. Replace the main circuit breaker.
 - b. Go to “Step 0470–024” on page 1-81.

Step 0470–021: The main circuit breaker appears to be okay, check the ac filter.

1. Check continuity of the three phases from the ac filter to the circuit breaker input using the following test points:
 - **ac filter O1 to top left of main circuit breaker**
 - **ac filter O2 to top center of main circuit breaker**
 - **ac filter O3 to top right of main circuit breaker**
2. Is there continuity on all three phases?
 - If yes, go to “Step 0470–018” on page 1-79.
 - If no:
 - a. Replace the ac filter.
 - b. Go to “Step 0470–024” on page 1-81 to verify fix.

Step 0470–022: You arrived at this step because you had electrical continuity on all three phases in “Step 0470–019.”

Note: If you are working on an SP1 frame, consult *9076 SP1 Maintenance Information* for SP1-specific procedures.

For SP2 frames:

1. Check cable connections at circuit breaker and supervisor power supplies for any loose connections.
2. Does there appear to be any loose connections?
 - If yes:
 - a. Fix the connections.
 - b. Go to “Step 0470–024.”
 - If no, go to “Step 0470–023.”

Step 0470–023: You did not find any loose cable connections at the circuit breaker or supervisor power supplies.

1. Replace cable PDU-CB-L2.
2. Is this your first time at this step?
 - If yes, go to “Step 0470–024” to verify fix.
 - If no:
 - a. Replace supervisor power supply.
 - b. Go to “Step 0470–024” to verify fix.

Step 0470–024: You have arrived at this step because it appears you have resolved the problem.

1. Make sure that all circuit breakers feeding power to this frame are in the On (‘1’) position. This includes:
 - The customer's circuit breaker
 - The circuit breaker for the frame
 - The circuit breakers on the high-voltage transformer (if present)
2. Once all circuit breakers have been put in the On (‘1’) position, verify that they have all stayed in the On (‘1’) position.
3. Do all circuit breakers stay in the (‘On’) position?
 - If yes, go to “Step 0470–025.”
 - If no, the problem is not resolved. Restart this MAP at “Step 0470–001” on page 1-75.

Step 0470–025: Since all the circuit breakers are staying on, this means that this frame does not have any apparent shorts to 12/24 V supervisor power supplies.

1. Check the Power Distribution Unit rear panel LED and the frame supervisor LEDs.
2. Is the Power Distribution Unit rear panel LED or any frame supervisor LED lit?
 - If yes, go to “Step 0470–026” on page 1-82.
 - If no, the problem is not resolved. Restart this MAP at “Step 0470–001” on page 1-75.

PDU 12 V dc supervisor power problem (MAP 0480)

Step 0470–026: Supervisor power problem resolved.

1. Reinstall service access cover on the high-voltage transformer (if present).
2. Put main power switch on the On (1) position.
3. Check the PDU rear panel LED and the frame supervisor LEDs for any LEDs that are lit.
4. Are the PDU rear panel LED or any frame supervisor LEDs lit?
 - If yes:
 - a. Problem is resolved.
 - b. Reinstall PDU access covers.
 - c. Go to “End of call” on page 1-144.
 - If no:
 - a. Isolate short between contactor T1, T2, T3 and 48 V power chassis 01, 02, and 03.
 - b. Replace parts as required.
 - c. Go to “Step 0470–025” on page 1-81 to verify fix.

PDU 12 V dc supervisor power problem (MAP 0480)

You have detected a problem with the 12 V dc supervisor power supply. The symptoms are:

- Main power switch LED is On
- **-OR-** PDU rear panel LED is On
- **-BUT-** all frame supervisor LEDs are Off.

Refer to Figure 1-23, for a diagram of the RS/6000 SP +12 V dc supervisor power.

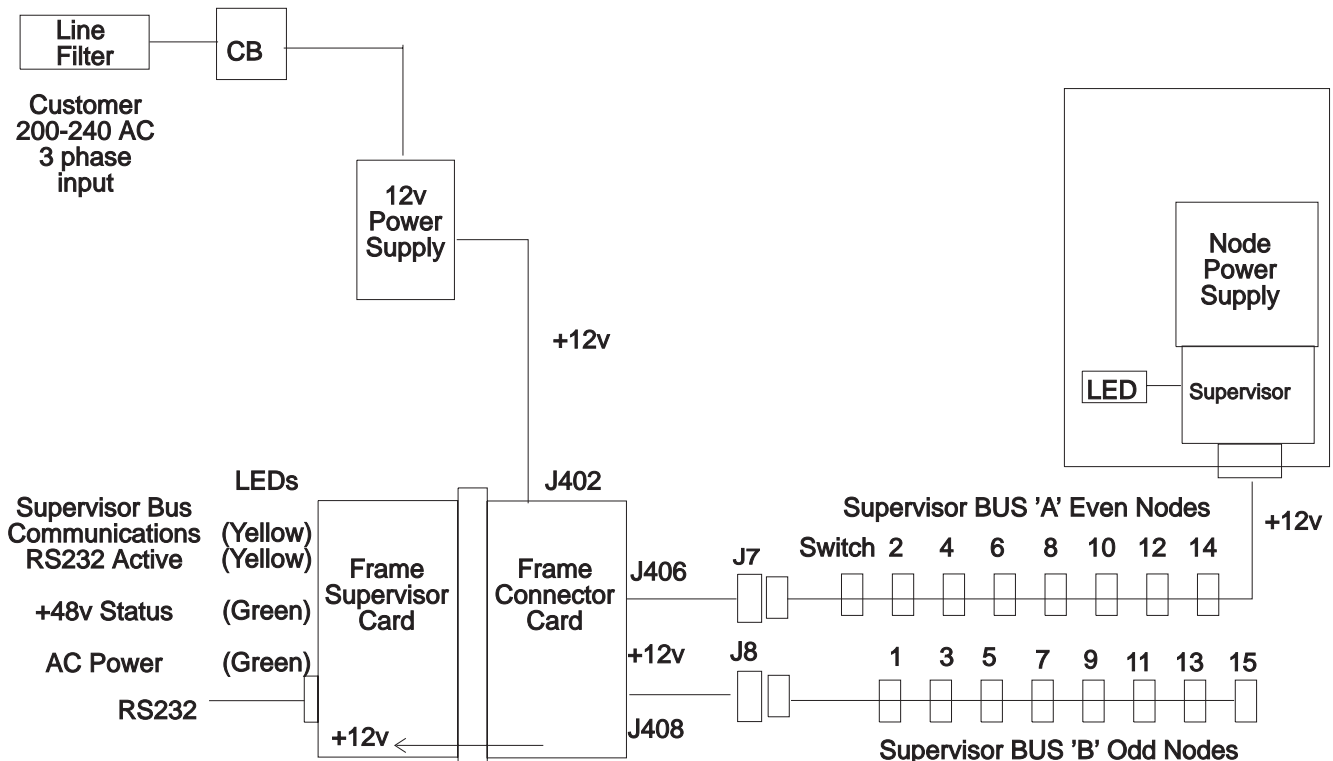


Figure 1-23. PDU supervisor power + 12 V dc diagram

Step 0480–001: You need to determine if the problem is in the PDU or in the supervisor.

1. Did you get here from “Frame supervisor not responding (MAP 0110)” on page 1-17?
 - If yes, go to “Step 0480–004” on page 1-83.
 - If no, go to “Step 0480–002” on page 1-83.

Step 0480–002: If you did not get to this point from the frame supervisor diagnostic MAPs, you need to determine if the supervisor or the PDU is at fault.

1. Check green and yellow LEDs on the processor nodes.
 - If any LEDs are lit, there is some 12 V dc power in the frame. Go to “Step 0110–002” on page 1-18.
 - If the LEDs **are not** lit, go to “Step 0480–003.”

Step 0480–003: If none of the processor node LEDs were lit, you need to run the Node Supervisor Self-Test.

1. Detach and then reinsert the supervisor harness from one processor node.
 - This causes the Node Supervisor Self-Test to run.
 - Refer to “Node/switch supervisor self-test” on page 3-19 for more information on this procedure.
2. Did any green or yellow LEDs on any processor node light during this test?
 - If yes, there is some 12 V dc power in the frame. Go to “Step 0110–002” on page 1-18.
 - If no, go to “Step 0480–004.”

Step 0480–004: Since the LEDs on the frame supervisor card and node supervisor cards do not light, you do not have any 12 V dc supervisor power available.

DANGER

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

1. Open Power Distribution Unit ac and dc power sections.
2. Check connection of cable PDU-FC-P402 at connector card.
3. If cable PDU-FC-P402 was already seated properly, disconnect cable PDU-FC-P402 at connector card and check continuity of cable between PDU-FC-P402 and 12 V dc supervisor power supply.
4. Does the cable appear okay and show continuity?
 - If yes, go to “Step 0480–005” on page 1-84.
 - If the cable is not okay or if it does not have continuity:
 - a. Fix cable PDU-FC-P402 problem.
 - b. If necessary, to replace this cable, replace the entire PDU.
 - c. Go to “Step 0480–023” on page 1-88 to verify fix.

PDU 12 V dc supervisor power problem (MAP 0480)

Step 0480–005: Since cable PDU-FC-P402 appears to be okay, check the card connector.

1. Using a multimeter, check resistance between connector card PDU-FC-J402 pin 1 and pin 2.
2. Is the resistance less than 5.0 ohms?
 - If yes, go to “Step 0480–009” on page 1-84.
 - If no, go to “Step 0480–006” on page 1-84.

Step 0480–006: The resistance between connector card PDU-FC-J402 pin 1 and pin 2 was greater than 5.0 ohms.

1. Check all cables from a 12 V dc supply for a problem such as a poor cable connection or open cable.
2. Do the cables and connections from the 12 V dc supply appear to be okay?
 - If yes, go to “Step 0480–007.”
 - If no, fix or replace cable as necessary. Go to “Step 0480–023” on page 1-88 to verify fix.

Step 0480–007: Since the cables and connections from the 12 V dc supply appear to be okay, the frame supervisor power supply may be at fault.

1. For RS/6000 SP frames, replace the +12 V dc supervisor power supply.
2. For 9076 SP1 frames, replace supervisor power supply.
3. Reinstall covers over Power Distribution Unit ac and dc sections.
4. Reconnect ac and put the main circuit breaker in the On (1) position.
5. Do any frame supervisor LEDs light?
 - If yes, you have resolved the power problem. Go to “End of call” on page 1-144.
 - If no, go to “Step 0480–008.”

Step 0480–008: If the frame supervisor LEDs still **do not** light, the connector card may be at fault.

DANGER

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

1. Open Power Distribution Unit dc section.
2. Replace connector card.
3. Go to “Step 0480–023” on page 1-88 to verify fix.

Step 0480–009: You arrived at this step from “Step 0480–005” where you checked the resistance between connector card PDU-FC-J402 pin 1 and pin 2 and found a value of less than 5 ohms. This means there may be an electrical short in the 12 V dc distribution system.

1. Disconnect supervisor harnesses PDU-BH-P7 and PDU-BH-P8 from the Power Distribution Unit.
2. Check for an electrical short between connector card PDU-FC-J402 pin 1 and pin 2.
3. Does the electrical short disappear with both cables removed?
 - If yes, go to “Step 0480–013” on page 1-85.
 - If no, go to “Step 0480–010” on page 1-85.

Step 0480–010: With the supervisor harness removed from the PDU, you are still detecting an electrical short between connector card PDU-FC-J402 pin 1 and pin 2.

1. Disconnect supervisor tailgate cables at connector card PDU-FC-J406 and PDU-FC-J408.
2. Check for an electrical short between connector card PDU-FC-J402 pin 1 and pin 2.
3. Does the electrical short disappear with both cables removed?
 - If yes,
 - Replace the tailgate cables (PDU-FC-P406, PDU-FC-P408, or both) causing the short condition.
 - Go to “Step 0480–022” on page 1-88 to verify fix.
 - If no, go to “Step 0480–011.”

Step 0480–011: You disconnected the supervisor tailgate cables but you are still detecting an electrical short. This indicates that there is an electrical short in frame supervisor card cage.

1. Unscrew connector card faceplate and unseat connector card from backplane card.
2. Check for an electrical short between connector card PDU-FC-J402 pin 1 and pin 2.
3. Has the electrical short disappeared?
 - If yes, go to “Step 0480–012.”
 - If the electrical short **has not** disappeared:
 - a. Replace connector card.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–012: The electrical short in the frame supervisor card cage disappears when you unseat the connector card from the backplane card. This indicates that the electrical short is either in the frame supervisor card or in the backplane card.

1. Reseat connector card.
2. Unscrew frame supervisor card faceplate and unseat frame supervisor card from backplane card.
3. Check for an electrical short between connector card PDU-FC-J402 pin 1 and pin 2.
4. Is there any indication of an electrical short?
 - If yes, replace the backplane card. Go to “Step 0480–022” on page 1-88 to verify fix.
 - If no, replace the frame supervisor card. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–013: You arrived at this step from “Step 0480–009” on page 1-84 where you determined that there is an electrical short in the 12 V dc distribution system. At that step, you disconnected supervisor harnesses PDU-BH-P7 and PDU-BH-P8 from the Power Distribution Unit and the electrical short disappeared. This indicates that there is an electrical short in the supervisor harness.

1. Reconnect cables PDU-BH-P7 and PDU-BH-P8 one-at-a-time.
2. Check for an electrical short between connector card PDU-FC-J402, pin 1 and pin 2 after each cable is reconnected.
3. Do you detect a short condition after reconnecting either cable?
 - If yes, go to “Step 0480–014” on page 1-86.
 - If you **do not** detect an electrical short, call the next level of support.

PDU 12 V dc supervisor power problem (MAP 0480)

Step 0480–014: Since you detect a short condition after reconnecting a supervisor harness cable, you have isolated the electrical short to that cable.

1. One-at-a-time, disconnect the shorted supervisor harness from the processor nodes N00-BH-J8 and any switch assemblies HPS-BH-J2
2. Continue disconnecting until the electrical short disappears, or the supervisor harness is entirely disconnected.
3. Does the electrical short disappear when you disconnect the supervisor harness from a processor nodes or switch assembly?
 - If yes, go to “Step 0480–015.”
 - If no:
 - a. Replace the supervisor harness.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–015: Since the electrical short disappeared when you disconnected the supervisor harness, the problem is inside a processor node or switch assembly.

1. Does the problem seem to be related to a processor node?
 - If yes, go to “Step 0480–016.”
 - If no, go to “Step 0480–018” on page 1-87.

Step 0480–016: The problem seems to be related to a processor node.

1. Remove processor node from the system.
 - Refer to "Service position procedures" in the applicable node service guide.
2. Disconnect supervisor cable at supervisor card NS-J101 or SP-J101.
3. Check for a short between supervisor card NS-U102 or SP-U102 pin 1 and pin 2.
4. Has short disappeared?
 - If yes, go to “Step 0480–017.”
 - If the short **does not** disappear:
 - a. Replace the node supervisor card.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–017: The electrical short disappeared after you disconnected the supervisor cable from the supervisor card.

1. Reattach supervisor cable at supervisor card J101.
2. Access rear connector panel at rear of assembly.
3. Detach supervisor bus card from cable SB-P102.
4. Check for an electrical short between node supervisor card NS-U102 or SP-U102 pin 1 and pin 2.
5. Has the electrical short disappeared?
 - If yes:
 - a. Replace supervisor cable N00-NS-P101 or S00-SP-P101.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

- If no:
 - a. Replace the supervisor bus card.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–018: The problem seems to be related to an SP Switch.

1. Remove switch assembly from the system.
 - Refer to "Service position procedures" in the applicable node service guide.
2. Disconnect the switch inner chassis cable connections P4, P5, and P6.
3. Check for a short between connector P3 pin p1 and pin p2.
4. Has short disappeared?
 - If yes, go to “Step 0480–019.”
 - If no:
 - a. Replace the switch inner chassis cable.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–019: The electrical short disappeared when you disconnected the switch inner chassis cable.

1. Reattach switch inner chassis cable connector P5.
2. Recheck for an electrical short at P3 pins p1 and p2.
3. Is the electrical short still absent?
 - If yes, go to “Step 0480–020.”
 - If no:
 - a. Replace the switch supervisor power card.
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–020: The electrical short is still absent with the switch inner chassis cable connector attached at P5.

1. Reattach switch inner chassis cable connector P4.
2. Recheck for an electrical short at P3 pins 1 and 2.
3. Is the electrical short still absent?
 - If yes, go to “Step 0480–021.”
 - If no:
 - a. Replace the switch power card (PS2).
 - b. Go to “Step 0480–022” on page 1-88 to verify fix.

Step 0480–021: The electrical short is still absent with the switch inner chassis cable connector attached at P4.

1. Reattach switch inner chassis cable connector P6.
2. Recheck for an electrical short at P3 pins 1 and 2.
3. Is the electrical short still absent?

PDU 24 V dc supervisor power problem (MAP 0490)

- If yes, you have resolved the problem. Go to “Step 0480–022” on page 1-88.
- If no:
 - a. Replace the switch power card (PS1).
 - b. Go to “Step 0480–022” to verify fix.

Step 0480–022: You have replaced a faulty component and you need to verify that the 12 V dc supervisor power system is fixed.

1. Replace processor nodes and switch assemblies from the service position.
 - Refer to "Service position procedures" in the applicable node service guide.
2. Make sure all cables are reconnected at all:
 - a. Processor nodes
 - b. Switch assemblies
 - c. The Power Distribution Unit dc section
 - d. **DO not** reconnect cables at connector card PDU-FC-J402
3. Check for an electrical short between connector card PDU-FC-J402 pin 1 and pin 2.
4. Is there still an electrical short condition at PDU-FC-J402?
5.
 - If yes, another electrical short exists in the 12 V dc distribution system. Return to “Step 0480–009” on page 1-84.
 - If no, go to “Step 0480–023.”

Step 0480–023: You have removed all electrical short and open conditions from 12 V dc distribution system.

1. Reinstall the covers over Power Distribution Unit sections panel.
2. Reapply power to the frame.
3. Check the frame supervisor card LEDs.
4. Are any LEDs lit on frame supervisor card?
5.
 - If yes, you have resolved the problem. Go to “End of call” on page 1-144.
 - If the LEDs **are not** lit, the problem is not resolved. Return to “Step 0480–004” on page 1-83.

PDU 24 V dc supervisor power problem (MAP 0490)

You have detected a problem with the 24 V dc supervisor power supply. The symptoms are:

- Main power switch LED is On
- **-AND-** PDU rear panel LED is Off
- **-BUT-** some frame supervisor LEDs are On.

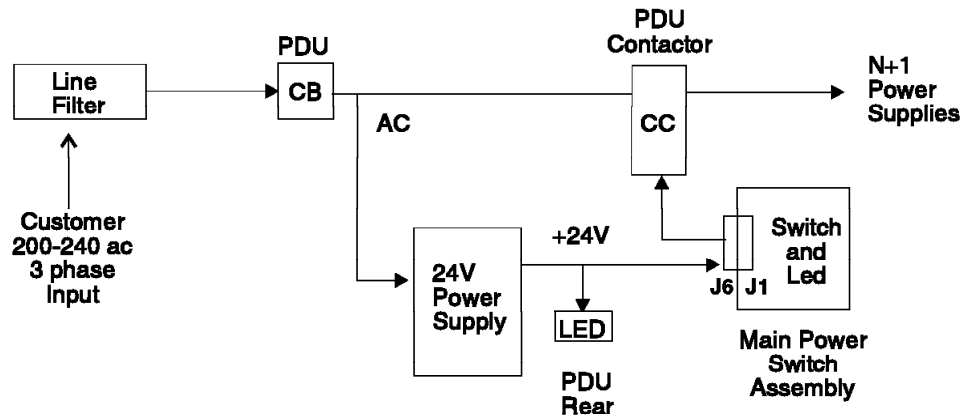


Figure 1-24. PDU + 24 V dc circuit diagram

Step 0490–001: You have determined that there is a problem with the 24 V dc supervisor power supply.

DANGER

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

1. Open Power Distribution Unit ac power section.
2. Check all cables from 24 V dc supply for a problem such as a poor cable connection or open cable.
3. Do the cables and connections from the 24 V dc supply appear to be okay?
 - If yes, go to “Step 0490–003.”
 - If no, go to “Step 0490–002.”

Step 0490–002: A cable or a connector attached to the 24 V dc supply appears to have a problem.

1. Fix cable problem.
2. Reconnect ac and put the frame's main circuit breaker in the On ('1') position.
3. Check PDU rear panel LED.
4. Is the PDU rear panel LED lit?
 - If yes, you have resolved the problem. Go to “End of call” on page 1-144.
 - If no, the problem is not resolved. Go to “Main power (MAP 0450)” on page 1-66.

Step 0490–003: The cables and connections from the 24 V dc supply appear to be okay.

1. Using a multimeter, measure resistance between contactor coil pin A1 (positive lead) and A2 (negative lead).
2. Is the resistance less than 40 ohms?
 - If yes, go to “Step 0490–006” on page 1-90.
 - If no, go to “Step 0490–004” on page 1-90.

PDU 24 V dc supervisor power problem (MAP 0490)

Step 0490–004: You are measuring a high resistance between contactor coil pin A1 and A2.

1. For RS/6000 SP frames, replace +24 V supervisor power supply.
2. Replace supervisor power supply.
3. Reconnect ac and put main circuit breaker in the On ('1') position.
4. Does the Power Distribution Unit rear panel LED light?
 - If yes, go to "Step 0490–005."
 - If no:
 - a. Check for a cable problem.
 - b. Replace Power Distribution Unit if necessary.
 - c. Go to "End of call" on page 1-144.

Step 0490–005: You now have 24 V dc supervisor power in system.

1. Is the problem resolved?
 - If yes, go to "End of call" on page 1-144.
 - If no, go to "Main power (MAP 0450)" on page 1-66.

Step 0490–006: All cables and connections in the 24 V dc supply appear to be okay and you measure less than 40 ohms between contactor coil pin A1 and A2.

1. Disconnect wire from contactor coil pin A1 or A2.
2. Measure resistance between contactor pin A1 and A2.
3. Does the resistance measure less than 40 ohms?
 - If yes, go to "Step 0490–007."
 - If no, return to "Step 0490–002" on page 1-89.

Step 0490–007: You measured a resistance value greater than 40 ohms between contactor coil pin A1 or A2.

1. Replace contactor.
2. Reinstall cover over Power Distribution Unit ac section.
3. Reconnect ac power
4. With the main circuit breaker in the On ('1') position, check Power Distribution Unit rear panel LED.
5. Is the Power Distribution Unit rear panel LED lit?
 - If yes, you have resolved the problem. Go to "End of call" on page 1-144.
 - If no, go to "Step 0490–008."

Step 0490–008: The Power Distribution Unit rear panel LED **does not** light.

DANGER

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

1. Open Power Distribution Unit ac power section.
2. Return to “Step 0490–004” on page 1-90 and resume the diagnostic procedure.

PDU main power switch problem (MAP 0500)

You have detected a problem with the Main Power Switch LED. The indication is:

- The main power switch LED is Off.

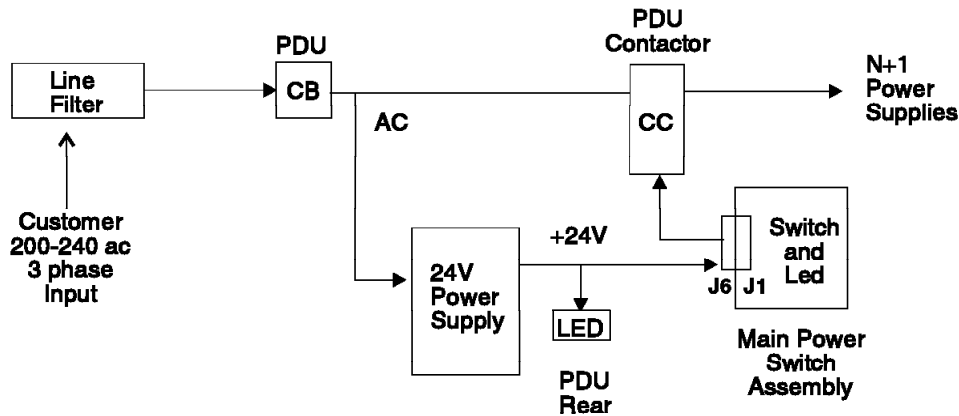


Figure 1-25. PDU + 24 V dc circuit diagram

Step 0500–001: LED on Main Power Switch is not lit.

1. Check Main Power Switch position.
2. Is Main Power Switch in On ('1') position?
 - If yes, go to “Step 0500–003.”
 - If no, go to “Step 0500–002.”

Step 0500–002: The Main Power Switch was not in the On ('1') position.

1. Put Main Power Switch in On ('1') position.
2. Check the conditions listed in Table 1-24 on page 1-73.
3. Do any of these conditions exist?
 - If yes, go to “Step 0460–001” on page 1-73 to continue service.
 - If no, go to “End of call” on page 1-144.

Step 0500–003: The Main Power Switch was in the On ('1') position but the LED on the switch is not lit.

1. Check processor nodes for any Power (green) LEDs On or flashing.
2. If no Power LEDs are lit, make sure that the circuit breakers on at least one processor node are in the On ('1') position.
3. Are any Power LEDs On or Flashing on any processor nodes (excluding those due to self-test)?
 - If yes, go to “Step 0500–009” on page 1-93.
 - If no, go to “Step 0500–004” on page 1-92.

PDU main power switch problem (MAP 0500)

Step 0500–004: None of the processor node Power LEDs are On or flashing. This indicates that 48 V dc power is not available.

1. Check cable PDU-BH-P6 for an obvious problem.
2. Does the cable appear to be okay?
 - If yes, go to “Step 0500–005” on page 1-92.
 - If no:
 - a. Fix the obvious cable problem.
 - b. Go to “End of call” on page 1-144.

Step 0500–005: Cable PDU-BH-P6 appears to be okay but 48 V dc power is not available to the processor nodes.

1. Disconnect cable PDU-BH-P6 from Power Distribution Unit.
2. With main power switch in On (‘1’) position:
 - Check for continuity on connector PDU-BH-P6 between pin 2 and pin 5.
 - Check for continuity on connector PDU-BH-P6 between pin 3 and pin 4.
3. Is there continuity between both sets of pins on connector PDU-BH-P6?
 - If yes, go to “Step 0500–008.”
 - If no, go to “Step 0500–006.”

Step 0500–006: You did not have electrical continuity between pins 2 and 5 and between pins 3 and 4 on connector PDU-BH-P6. This indicates that there is a problem with the main power switch.

1. Open the main power switch assembly.
2. Disconnect the white connector of the main power switch from the main power switch cable PDU-SW-P1.
3. With main power switch in the On (‘1’) position, check for continuity between the two pins of the white main power switch connector.
4. Is there continuity between these two pins?
 - If yes, replace the main power switch cable PDU-BH-P6. Return to “Step 0500–002” on page 1-91 to verify fix.
 - If no, go to “Step 0500–007.”

Step 0500–007: The main power switch **did not** have continuity between the two pins of the white main power switch connector.

1. Replace main power switch.
2. Make sure to connect main power switch connector to the main power switch cable PDU-SW-P1.
3. Reconnect main power switch cable PDU-BH-P6 at Power Distribution Unit.
4. Reconnect ac power and power on system.
5. Go to “Step 0500–002” on page 1-91 to verify fix.

Step 0500–008: You have continuity on both sets of pins on connector PDU-BH-P6. This indicates that the main power switch is not getting 24 V dc power from the connector.

DANGER

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

1. Open Power Distribution Unit ac power section.
2. Check for continuity between contactor pin A1 and PDU-BH-J6 pin 2 and pin 5.
3. Check for continuity between the 24 V supervisor power supply + terminal and PDU-BH-J6 pin 4.
4. Is there continuity in all cases?
 - If yes, call the next level of support.
 - If no:
 - a. Replace cables as required.
 - b. Reconnect ac power and power on system.
 - c. Go to "Step 0500–002" on page 1-91 to verify fix.

Step 0500–009: You arrived at this step from "Step 0500–003" on page 1-91 where you found processor node Power LEDs On or flashing but the main power LED was not lit.

1. Main power LED card should be replaced.
 - **Note:** this action requires powering off all processor nodes.
2. Are there other problems requiring this frame to be powered off?
 - If yes:
 - a. Replace main power LED card.
 - b. Go to "End of call" on page 1-144.
 - If no:
 - a. Schedule maintenance to replace main power LED card.
 - b. Go to "End of call" on page 1-144.

PDU dc power loss from bulk dc power supplies (MAP 0510)

System monitor log reports "dc Power Loss" for any bulk dc power supplies:

- Refer to Figure 1-26 on page 1-94 to view the dc bulk power supplies.

PDU dc power loss from bulk dc power supplies (MAP 0510)

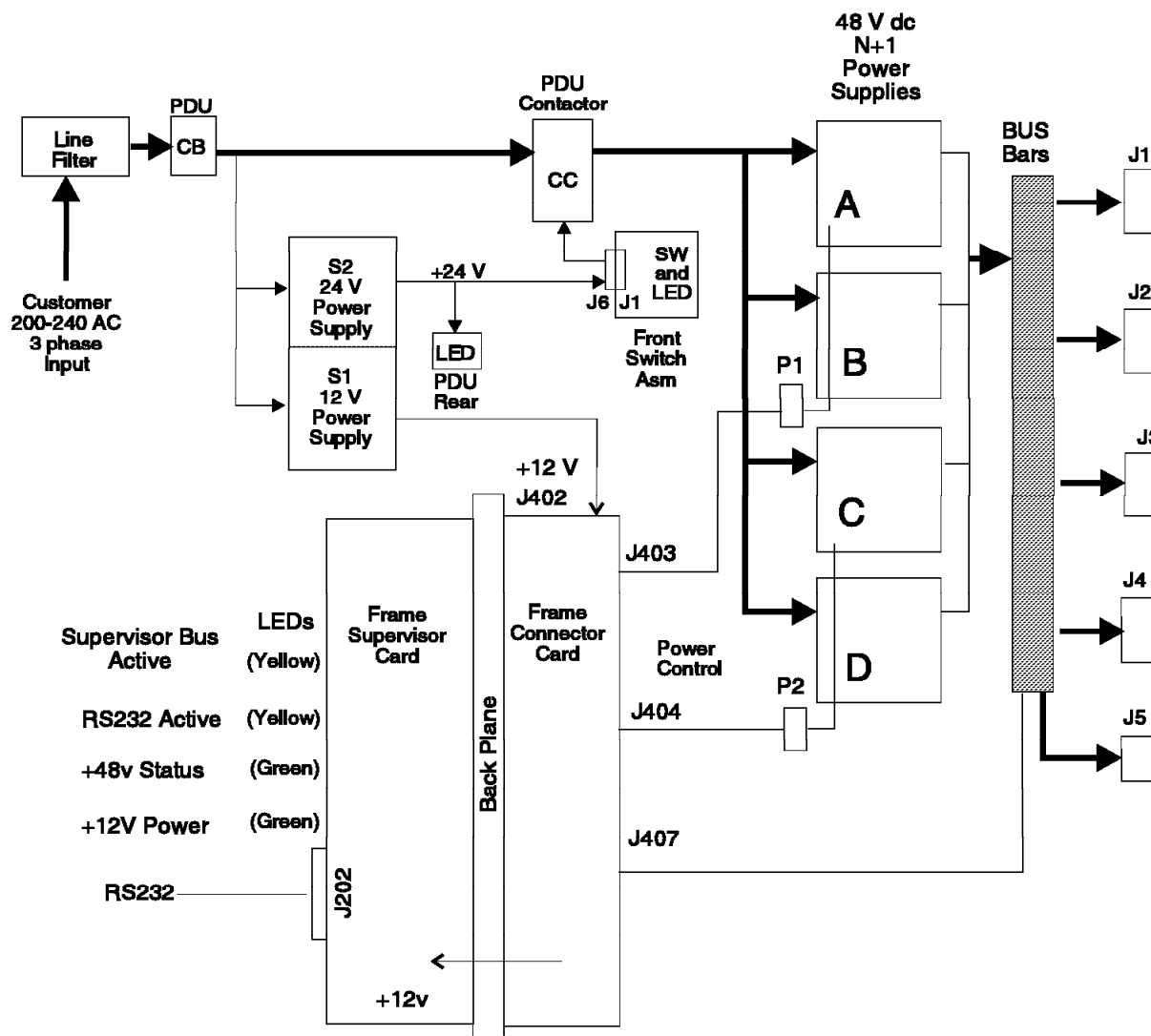


Figure 1-26. PDU + 48 V dc power diagram

Step 0510–001: You have a dc power loss.

1. From Perspectives interface on the control workstation, open the Frame Environment window.
2. Check for dc Power Loss (red) condition for all four power supplies.
 - If all four show dc Power Loss, then open Global commands window and power-off all processor nodes in this frame.
 - If only one shows dc Power Loss, then order another supply for use in isolating the failing part.
3. From the Frame Environment window, attempt to power on any bulk dc power supplies which are indicating a dc Power Loss (red) condition, by clicking on the On button corresponding to the power supplies.
4. Does the system monitor still indicate dc Power Loss (red) for the supplies?
 - If yes, go to “Step 0510–002” on page 1-95.
 - If no, then the power supply is enabled.

PDU dc power loss from bulk dc power supplies (MAP 0510)

- a. If you replaced any components or you completed a service action, refer to “Procedures for Skirts and Main Power Switch” on page 4-23 to replace the air filter assembly and acoustic skirts.
- b. Go to “End of call” on page 1-144.

Step 0510–002: One or more of the bulk dc power supplies shows a dc failure.

1. Remove the acoustic skirts and air filter assembly.
 - Refer to “Procedures for Skirts and Main Power Switch” on page 4-23.
2. Check the LEDs on the front of the bulk dc power supplies.

Yellow LED: ac In - Indicates power supply is getting ac power and power switch is in On (‘1’) position.
Green LED: dc OK - Indicates power supply is supplying 48 volt dc power.
3. Are yellow LEDs unlit on any bulk dc power supplies?
 - If some of the yellow LEDs **are not** lit, go to “Step 0510–004.”
 - If **all** of the yellow LEDs **are** lit, go to “Step 0510–003.”

Step 0510–003: All of the yellow LEDs are lit on the bulk dc power supplies.

1. This indicates that the ac input is okay and all power supplies are enabled.
2. Are **some** or **all** of the green LEDs lit on the bulk dc power supplies?
 - If yes, go to “Step 0510–013” on page 1-97.
 - If **none** of the green LEDs are lit:
 - a. Probable short in 48 V dc power distribution.
 - b. Go to “PDU short in 48 V dc power distribution (MAP 0520)” on page 1-100.

Step 0510–004: You found that some of the yellow LEDs on the bulk dc power supplies were not lit.

1. Remove filter bracket and ensure that switches for all power supplies are in the On (‘1’) position.
 - Put switches in the On (‘1’) position if necessary.
2. Check LEDs on front of bulk dc power supplies.
3. Are yellow LEDs unlit on **any** of the bulk dc power supplies?
 - If yes, go to “Step 0510–006” on page 1-96.
 - If **all** of the yellow LEDs **are** lit, go to “Step 0510–005.”

Step 0510–005: All of the yellow LEDs on the bulk dc power supplies **are** lit. This indicates that you do not have an ac input problem.

1. Did you just put a switch in the On (‘1’) position?
 - If yes, go to “Step 0510–013” on page 1-97 to continue service.
 - If no, return to “Step 0510–001” on page 1-94 to verify fix.

PDU dc power loss from bulk dc power supplies (MAP 0510)

Step 0510–006: Some of the yellow LEDs on the bulk dc power supplies **are not** lit. This indicates that one or more bulk dc power supplies showing ac input problem.

1. Are **all** yellow LEDs unlit?
 - If yes, go to “Step 0510–008” on page 1-96.
 - If no, go to “Step 0510–007” on page 1-96.

Step 0510–007: Some but not all of the bulk dc power supply yellow LEDs are unlit. This indicates that some of the bulk dc power supplies have failed.

1. Replace the bulk dc power supplies where yellow LEDs are not lit.
2. Put the switch in the On ('1') position.
3. Check the LEDs on the front of this supply.
4. Is the yellow LED lit?
 - If yes, return to “Step 0510–001” on page 1-94 to verify fix.
 - If no, you have a problem in the power chassis. Go to “Step 0510–012” on page 1-97.

Step 0510–008: All of the yellow LEDs on the bulk dc power supplies **are not** lit. This indicates that the 48 V power chassis is not getting ac power.

DANGER

High voltage present. Use high voltage test probes.

1. Check phase-to-phase ac voltage at ac filter test points.
 - Measure ac voltage from O1 to O2, O1 to O3, and O2 to O3.
2. Is ac voltage present and between 180-254 volts ac for all phases?
 - If yes, go to “Step 0510–009.”
 - If no:
 - a. You have an ac power problem.
 - b. Go to “Main power (MAP 0450)” on page 1-66.

Step 0510–009: You are measuring between 180-254 volts ac for all phases. However, the 48 V power chassis is not getting ac power.

DANGER

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

1. Open Power Distribution Unit ac section.
2. Check cables from contactor for an obvious problem such as a poor connection or damaged cable.
3. Do cables from the contactor appear okay?
 - If yes, go to “Step 0510–011” on page 1-97.

- If no, go to “Step 0510–010” on page 1-97.

Step 0510–010: The PDU contactor cables appear to have a problem.

1. Replace cables as required.
2. Reinstall covers over Power Distribution Unit ac section.
3. Reconnect ac power and power on the system.
4. Go to “Step 0510–001” on page 1-94 to verify fix.

Step 0510–011: The PDU contactor cables appear to be okay.

1. Replace the contactor.
2. Reinstall covers over Power Distribution Unit ac section.
3. Reconnect ac power and power on system.
4. Check yellow LEDs on bulk dc power supplies.
5. Do the yellow LEDs light on **any** bulk dc power supplies?
 - If yes, go to “Step 0510–001” on page 1-94 to verify fix.
 - If no, go to “Step 0510–012.”

Step 0510–012: Yellow LEDs **do not** light on bulk dc power supplies. This indicates that you have a problem in the power chassis.

1. Replace power supply chassis.
2. Reinstall covers over Power Distribution Unit ac and dc sections.
3. Reconnect ac power and power on system.
4. Go to “Step 0510–001” on page 1-94 to verify fix.

Step 0510–013: You have arrived at this step because **all** of the yellow and **some** or **all** of the green bulk dc power LEDs are lit. However, the Perspectives system interface indicates a dc power loss.

1. Bulk dc power supplies getting ac power, but the system indicates an ac problem or “dc Power Loss” condition.
2. Make a note of which power supplies (A, B, C, or D) is indicating a problem.
3. Try swapping a power supply indicating an ac or “dc Power Loss” with a good supply.

Note: This step may be done while system is in use; however, at least three bulk dc power supplies must be operating at all times to ensure adequate power for full system utilization.

4. Does the good supply give the same indication?
 - If yes, go to “Step 0510–014” on page 1-98.
 - If no:
 - a. The original bulk dc power supply is bad.
 - b. Replace the original bulk dc power supply.
 - c. Go to “Step 0510–001” on page 1-94 to verify fix.

PDU dc power loss from bulk dc power supplies (MAP 0510)

Step 0510–014: With the replacement bulk dc power supply, the system still indicates an ac or “dc Power Loss” problem.

DANGER

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

1. Open Power Distribution Unit dc section.
2. Check the following point-to-point connections between the 48 V power chassis and the connector card for an obvious problem such as a poor connection or a damaged cable:
 - Cable PDU-FC-P403 to ADC-BH-P1
 - Cable PDU-FC-P404 to ADC-BH-P2
3. Check for an obvious short between the +48 V and +48 VRtn busbars.
4. Do the cables and connections appear to be okay?
5.
 - If yes, go to “Step 0510–015.”
 - If no:
 - a. Fix the obvious problem.
 - b. Go to “Step 0510–020” on page 1-100 to verify fix.

Step 0510–015: You have installed a replacement bulk dc power supply and all of the cables appear to be okay but you are still receiving an indication that the system has a power problem.

1. Bulk dc power supplies A and B share the same cable, while bulk dc power supplies C and D share a different cable.
 - A, B: share cable PDU-FC-P403 to ADC-BH-P1
 - C, D: share cable PDU-FC-P404 to ADC-BH-P2
2. Is the ac problem or “dc Power Loss” (red) indication limited to a single supply or both supplies on a single cable?
 - If yes, go to “Step 0510–017” on page 1-99.
 - If no, go to “Step 0510–016.”

Step 0510–016: The ac problem or “dc Power Loss” **is not** limited to a single supply or a single cable.

1. Problem is in one of the following components:
 - Frame supervisor card (can be replaced with system powered on.)
 - Connector card
 - Backplane card
2. Replace components one by one
 - a. Power off system (except where indicated)
 - b. Replace the component
 - c. Power on system (where necessary)

d. Check Perspectives to see if the dc Power Loss has cleared (green instead of red)

Were you able to correct the problem?

- If yes, you have resolved the problem. Go to “End of call” on page 1-144.
- If no, call the next level of support.

Step 0510–017: The ac problem or “dc Power Loss” is limited to a single supply or a single cable.

1. Swap cables PDU-FC-P403 and PDU-FC-P404 **at the connector card end only**.
2. Reconnect ac power and power on system.
3. From the Frame Environment window, check the Power dc indicator for red, which indicates a dc Power Loss condition.
4. Are the same supplies (A, B, C, or D) identified in “Step 0510–013” on page 1-97 reporting a problem?
 - If yes:
 - a. Swap cables PDU-FC-P403 and PDU-FC-P404 **at the connector card end** to return to the cables to their original connections.
 - b. Return to “Step 0510–016” on page 1-98 to continue service.
 - If no, go to “Step 0510–018.”

Step 0510–018: After you swapped cables PDU-FC-P403 and PDU-FC-P404 at connector card, **different** power supplies (than those identified in “Step 0510–013” on page 1-97) reported a problem.

1. Swap cables ADC-BH-P1 and ADC-BH-P2 **at the 48 V power chassis end only**.
2. Reconnect ac power and power on the system.
3. Check the Frame Environment window for a dc Power Loss (red) condition.
4. Are the original supplies reporting a dc Power Loss (red) condition again?
5.
 - If yes replace the power supply chassis. Go to “Step 0510–001” on page 1-94.
 - If no, go to “Step 0510–019.”

Step 0510–019: After swapping cables ADC-BH-P1 and ADC-BH-P2 at the chassis end of the 48 V power chassis, you did not see a change in which power supplies were reporting a dc power loss. This indicates that you have a cable problem.

1. Swap cables PDU-FC-P403 and PDU-FC-P404 at **both** the connector card end and at the 48 V power chassis end.
 - This returns the cables to the original connections as shown below.
 - A, B: Cable PDU-FC-P403 to ADC-BH-P1
 - C, D: Cable PDU-FC-P404 to ADC-BH-P2
2. Replace the problem cable.
3. Go to “Step 0510–020” on page 1-100 to verify fix.

PDU short in 48 V dc power distribution (MAP 0520)

Step 0510–020: You have completed all of the diagnostic steps and need to verify that the system is okay.

1. Power on system and check the Frame Environment window for dc Power Loss (red) condition.
2. Is the problem resolved?
 - If yes, go to “End of call” on page 1-144.
 - If no, return to “Step 0510–015” on page 1-98 to continue service.

PDU short in 48 V dc power distribution (MAP 0520)

You have arrived at this MAP from “Step 0510–003” on page 1-95 where you found that **none** of the yellow or green LEDs were lit on **any** of the bulk dc power supplies. This indicates that you probably have an electrical short in the 48 V dc power distribution system. Refer to Figure 1-27 for a diagram of the RS/6000 SP frame 48-volt distribution.

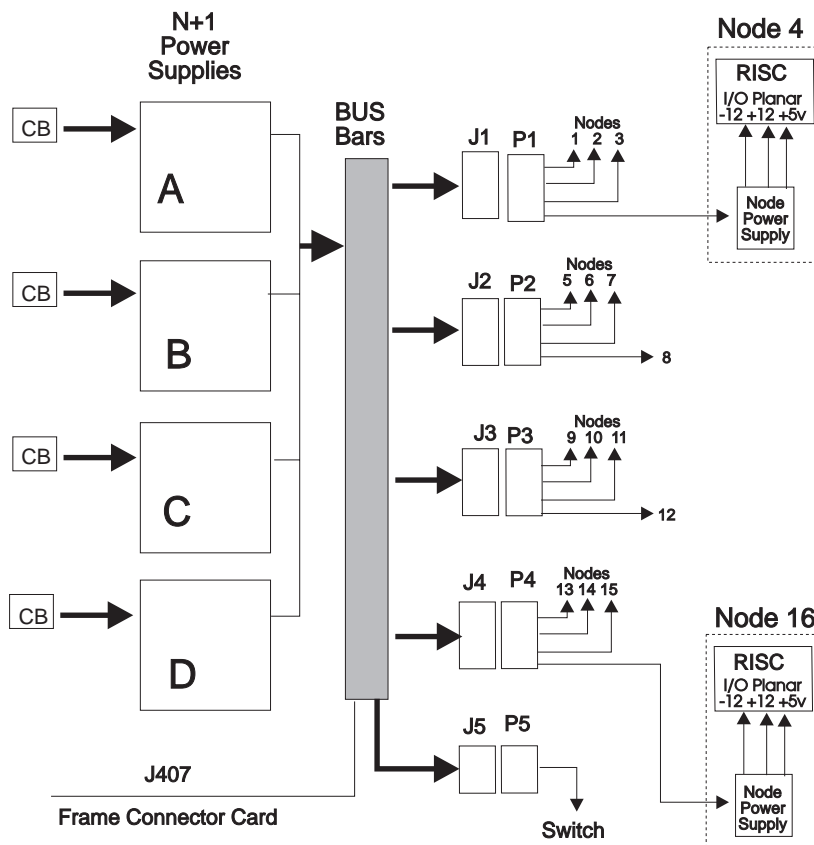


Figure 1-27. PDU 48 Volts distribution diagram

Step 0520–001: Probable electrical short in the 48 V dc power distribution system.

1. Switch all processor node and switch assembly circuit breakers to Off ('0') position.
2. Disconnect dc distribution cables PDU-BH-P1, PDU-BH-P2, PDU-BH-P3, PDU-BH-P4, and PDU-BH-P5 at the Power Distribution Unit.
 - This isolates 48 V dc to the Power Distribution Unit only.
3. Remove front skirt assembly and air filter bracket.
4. Turn on all bulk power supplies from the control workstation.

5. Check green LEDs on all bulk power supplies.
6. Are green LEDs lit on **all** bulk power supplies?
 - If yes, go to “Step 0520–009” on page 1-103.
 - If no, go to “Step 0520–002.”

Step 0520–002: Green LEDs **are not** lit on **all** bulk power supplies. This indicates that a dc short exists in the Power Distribution Unit section.

DANGER

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

1. Remove rear panel of the Power Distribution Unit dc section.
2. With **all** power removed from the system:
 - a. Disconnect the busbars from 48 V power chassis dc lugs.
 - b. Check continuity between the +48 V and the -48 VRtn busbars.
3. Is there continuity between those busbars?
 - If yes, go to “Step 0520–006” on page 1-102.
 - If no, go to “Step 0520–003.”

Step 0520–003: You **did not** have continuity between the +48 V and the -48 VRtn busbars.

1. Reconnect busbars to 48 V power chassis lugs.
2. Reinstall Power Distribution Unit dc section cover.
3. Unseat all bulk dc power supplies.
4. Reconnect ac power and power on the system.
5. Put main circuit breaker in the On ('1') position.
6. One at a time:
 - a. Reseat each bulk dc power supply
 - b. Flip the bulk power supply's circuit breaker to the On ('1') position
 - c. Check that **both** the yellow and green LEDs are lit when resealed.
7. Do any of the bulk power supplies light **both** the yellow and green LEDs?
 - If yes, go to “Step 0520–005” on page 1-102.
 - If no, go to “Step 0520–004.”

Step 0520–004: None of the bulk power supplies had **both** the yellow and green LEDs lit.

DANGER

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

PDU short in 48 V dc power distribution (MAP 0520)

1. Replace power supply chassis.
2. Reconnect ac power and power on the system.
3. Go to “End of call” on page 1-144.

Step 0520–005: Some or all of the bulk power supplies had **both** the yellow and green LEDs lit.

1. Replace all bulk dc power supplies which cause the bulk dc power supply green LEDs to go off or cause main circuit breaker to trip to Off ('0') position.
2. Go to “End of call” on page 1-144.

Step 0520–006: You detected an electrical short in the PDU but you have continuity between the +48 V and the -48 VRtn busbars.

1. Remove plastic cover over busbars.
2. Check for an obvious electrical short between the +48 V and -48 VRtn busbars.
3. Is there an obvious electrical short between the +48 V and -48 VRtn busbars?
 - If yes, go to “Step 0520–008.”
 - If no, go to “Step 0520–007.”

Step 0520–007: You **were not** able to find an obvious electrical short between the +48 V and -48 VRtn busbars. This indicates that there is an electrical short in one or more of the tailgate cables PDU-BH-J1, PDU-BH-J2, PDU-BH-J3, PDU-BH-J4, or PDU-BH-J5.

1. Set multimeter to constantly check continuity between the +48 V and -48 VRtn busbars.
2. Starting from closest connection, remove cable connections to the '+' busbar.
3. Continue removing connections until there is no longer continuity.
4. Replace the dc tailgate cable connected to the wire you just removed.
5. While checking continuity, start reattaching the cable connections you removed above.
6. Replace any other cables which cause continuity between the +48 V and +48 VRtn busbars.
7. Go to “Step 0520–008.”

Step 0520–008: You found an obvious electrical short between the +48 V and -48 VRtn busbars.

1. If necessary, reconnect the busbars.
2. Remove the obvious short between busbars.
3. Reinstall plastic cover over the busbars.
4. Reinstall panel over Power Distribution Unit dc section.
5. Reconnect ac power and power on system.
6. Go to “Step 0520–009” on page 1-103.

Step 0520–009: You need to determine if there is an electrical short in dc distribution cables.

1. One at a time, reconnect dc distribution cables PDU-BH-P1, PDU-BH-P2, PDU-BH-P3, PDU-BH-P4, and PDU-BH-P5 at Power Distribution Unit.
2. After each connection, check frame supervisor green LED #2 for an OFF condition, indicating an electrical short.
3. Are you able to reconnect all cables without indication of an electrical short?
 - If yes, go to “Step 0520–015” on page 1-104.
 - If no, go to “Step 0520–010.”

Step 0520–010: You were reconnecting the dc distribution cables, you received an indication of an electrical short.

1. Replace the cable that caused the electrical short indication.
2. From the control workstation, turn on any bulk dc power supplies that are off.
3. Check the frame supervisor green LED #2 for an OFF condition.
 - This indicates an electrical short.
4. Is there still an electrical short indicated following replacement of this cable?
 - If yes, go to “Step 0520–011.”
 - If no, you have resolved the problem.
 - a. Make sure all cables in “Step 0520–009” are reconnected.
 - b. Go to “End of call” on page 1-144.

Step 0520–011: You replaced the dc distribution cable that seemed to be causing the electrical short. However, you are still detecting an electrical short. This indicates that you have an electrical short inside one of the processor nodes or switch assemblies.

1. Disconnect the dc distribution cable from all processor nodes.
2. From the control workstation, turn on any power supplies that are off.
3. One at a time, reconnect the dc distribution cable to any processor nodes or switch assemblies.
4. After each connection is made, check the bulk dc power supplies for indication of a short condition.
5. Check frame supervisor green LED #2 for an OFF condition, indicating a short condition.
6. Are you able to reconnect the cable to all processor nodes or switch assemblies without indication of a short condition?
 - If yes, return to “Step 0520–009” and connect the next cable.
 - If no, go to “Step 0520–012.”

Step 0520–012: As you were reconnecting the dc distribution cable to the processor nodes and switch assemblies, you detected an electrical short.

1. The last processor node or switch assembly you reconnected may be causing the electrical short. Remove that node or switch from the frame.
2. Check the 48 V dc power harness inside the processor node or switch assembly for an obvious problem such as a chafed or broken cable.
3. Is there an obvious problem with the 48 V dc power harness?

PDU short in 48 V dc power distribution (MAP 0520)

- If yes, go to “Step 0520–014” on page 1-104.
- If no, go to “Step 0520–013.”

Step 0520–013: You were not able to find an obvious problem with the 48 V dc power harness.

1. Replace the 48 V dc power harness.
2. Reconnect the processor node or switch assembly and check for a short condition again.
3. Return to the second bullet (powering on any bulk dc power supplies that are Off) of “Step 0520–011” on page 1-103 and continue service.

Step 0520–014: You found an obvious problem with the 48 V dc power harness.

1. Correct the obvious problem.
2. If necessary, replace the 48 V dc power harness.
3. Reconnect the processor node or switch assembly and check for an electrical short again.
4. Return to the second bullet (powering on any bulk dc power supplies that are Off) of “Step 0520–011” on page 1-103 and continue service.

Step 0520–015: You arrived at this step from “Step 0520–009” on page 1-103 where you were able to reconnect **all** dc distribution cables without indication of an electrical short. All green LEDs are lit on all bulk power supplies. This indicates that there is a possible electrical short in one of the processor nodes or switch assemblies.

1. One at a time, put all processor node and switch assembly circuit breakers in the On (‘1’) position.
2. Each time, check the frame supervisor green LED #2 for an OFF condition, indicating an electrical short.
3. Are you able to power on all processor nodes and switch assemblies without an electrical short indication?
 - If yes, either the electrical short condition was not detected or the electrical short was resolved. Go to “End of call” on page 1-144.
 - If no, go to “Step 0520–016.”

Step 0520–016: While you were powering on the processor nodes or switch assemblies, you received an indication of an electrical short.

1. The last processor node or switch assembly you powered on may be causing the electrical short. Remove that node or switch from the frame.
2. Check the 48 V dc power harness inside the processor node or switch assembly for an obvious problem which might be causing the short condition.
3. Is there an obvious problem which might be causing the electrical short?
 - If yes, go to “Step 0520–018” on page 1-105.
 - If no, go to “Step 0520–017” on page 1-105.

Step 0520–017: You cannot find an obvious problem which might be causing an electrical short.

1. Replace the node supervisor card or switch power card.

Note: If this is an HiPS 2.0 switch assembly, replace the entire switch assembly to fix problem.

2. Reconnect the processor node or switch assembly and put circuit breaker in the On ('1') position.
3. From the control workstation, enable any power supplies that are turned off.
4. Return to "Step 0520–015" on page 1-104.

Step 0520–018: You found an obvious problem which might be causing an electrical short.

1. Fix the obvious problem which might be causing the electrical short.
2. Reconnect the processor node or switch assembly and put circuit breaker in the On ('1') position.
3. Check the frame supervisor green LED #2 for an OFF condition, indicating an electrical short.
4. Is there an indication of an electrical short?
 - If yes, return to "Step 0520–017" to continue service.
 - If no, return to "Step 0520–015" on page 1-104.

PDU frame environment (MAP 0530)

The frame supervisor indicates that a problem exists. The symptoms are listed in Table 1-25.

Priority	Condition	Action
1	Frame supervisor green LED #2 (dc OK) is flashing.	Go to "Step 0530–001."
2	Frame temperature indicates over 40° C.	Go to "Step 0520–008" on page 1-102.

Step 0530–001: The frame supervisor green LED #2 (dc OK) is flashing. This indicates that the frame 48 V dc voltage is out of range.

DANGER

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

1. Remove rear panel of PDU dc section.
2. Unplug the 48 V dc sense cable PDU-FC-P407 at connector card.
3. Using a multimeter, measure the dc voltage between PDU-FC-P407 pin 1 and pin 3.
4. Replug the 48 V dc sense cable PDU-FC-P407 at connector card.
5. Is the measured voltage in the range 44-52 V dc?
 - If yes, go to "Step 0530–003" on page 1-106.
 - If no, go to "Step 0530–002" on page 1-106.

PDU frame environment (MAP 0530)

Step 0530–002: The measured voltage **is not** within the specified range.

DANGER

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

1. Replace the 48 V dc sense cable PDU-FC-P407.
2. Reconnect ac power and power on system.
3. Go to "End of call" on page 1-144.

Step 0530–003: The measured voltage **is** within the specified range.

1. Use Table 1-26 to continue service.

<i>Table 1-26. Frame environment hardware diagnostics</i>		
Priority	Condition	Action
1	Frame supervisor card	<ol style="list-style-type: none"> 1. Replace card (can be done with system powered) 2. Go to "Step 0530–005" on page 1-107.
2	Connector card	<p>DANGER</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>High voltage present. Perform "Lockout safety procedures" to remove primary power to the frame.</p> </div> <ol style="list-style-type: none"> 1. Replace card. Make sure to connect all cables. 2. Go to "Step 0530–004."
3	Backplane card	<p>DANGER</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>High voltage present. Perform "Lockout safety procedures" to remove primary power to the frame.</p> </div> <ol style="list-style-type: none"> 1. Replace card. Make sure to connect all cables. 2. Go to "Step 0530–004."
4	All replaced	Call next level of support.

Step 0530–004: You either had a connector card or backplane card problem that was fixed in Table 1-26.

1. Reconnect power to the frame.
2. Put main power switch in the On ('1') position.
3. From the control workstation, open the Frame Environment window and make sure that all indicators for the bulk dc power supplies show good status (green).
4. You may need to click on the On button to enable them.
5. Go to "Step 0530–005" on page 1-107.

Step 0530–005: You have replaced the frame supervisor card in Table 1-26 or other components in “Step 0530–004.”

1. Make sure the system is powered on.
2. Check frame supervisor green LED #2 for a solid ON condition.
3. Does frame supervisor green LED #2 show a solid ON condition?
 - If yes, go to “Step 0530–007” to verify fix.
 - If no, the problem is not resolved. Return to “Step 0530–003” on page 1-106 and replace the next priority part.

Step 0530–006: Frame supervisor has detected a temperature beyond an acceptable range for the system.

1. Check the air filter area (behind the front skirt) and around the Power Distribution Unit area for obvious airflow blockage or external source of heat.
2. Is there obvious blockage or external source of heat?
 - If yes, remove the blockage or heat source from area. Go to “End of call” on page 1-144.
 - If no:
 - a. The frame supervisor card may be reporting incorrect temperature.
 - b. Replace the frame supervisor card.
 - c. Go to “Step 0530–007” to verify fix.

Step 0530–007: You have arrived at this step because you need to verify that you have resolved the problem.

1. Reinstall cover over power distribution dc section if necessary.
2. Perform “Verification test for supervisor bus” on page 3-17.
3. Does verification test pass?
 - If yes, go to “End of call” on page 1-144.
 - If no, go to “Frame supervisor not responding (MAP 0110)” on page 1-17 to continue service.

SEPBU subsystem MAPs

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Scalable Electrical Power Base Unit diagnostics (MAP 0540)	1-109
SEPBU power control interface (MAP 0550)	1-125
48 V distribution problems	1-128
Open in 48 V dc distribution (MAP 0560)	1-128
Network MAPs	1-130

Purpose of these MAPs

The MAPs in this section provide information for diagnosing power subsystem problems.

The dc frame power is supplied by ac-dc power supplies in the base of each frame. There are two different implementations of the frame power:

1. Scalable Electrical Power Base Unit (SEPBU)

- Covered in this chapter
2. Power Distribution Unit (PDU)
- See “Power Distribution Unit (PDU) subsystem MAPs” on page 1-70

Scalable Electrical Power Base Unit notices

Note: SEPBU is an acronym for Scalable Electrical Power Base Unit.

DANGER

Both the SEPBU power chassis and the PDU 48 V 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.

Attention: When servicing frames in a parallel environment, powering off a frame will cause all parallel jobs to terminate. The switch network can not be re-initialized until power is restored to the frame, or the frame is removed from the active configuration in a multi-frame system. Refer to “Removing and restoring switch resources” on page 3-27, for these procedures.

Note: Connectors on the SEPBU still use “PDU” as assembly designations, (for example PDU-BH-J7).

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.

Attention: Be careful when working on a single-phase SEPBU power supply **without** N+1 (two) power modules, since there is no secondary power module.

The Scalable Electrical Power Base Unit (SEPBU) consists of the following components:

- ac line cord (connectorized)
- SEPBU power chassis
- SEPBU power modules
- Frame supervisor
- PCI card (see note below)
- Main power switch
- 48 V dc distribution cables.

A description of the Scalable Electrical Power Base Unit (SEPBU) can be found in “Main power (MAP 0450)” on page 1-66.

Note: For more information on PCI (power control interface) function, see “RS/6000 SP Function” in *RS/6000 SP: Installation and Relocation*.

If you have determined that there may be a problem with the SEPBU power subsystem, begin the diagnostic procedures at “Scalable Electrical Power Base Unit diagnostics (MAP 0540)” on page 1-109.

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

Step 0540–001: When you detect a problem concerning the power subsystem:

1. Refer to “Procedures for the Scalable Electrical Power Base Unit (SEPBU)” on page 4-16 when replacing SEPBU components.
2. Check the condition of the following LEDs:
 - Main power switch LED
 - SEPBU rear panel LED
 - Frame supervisor LEDs.
3. Table 1-27 contains a prioritized list of diagnostic conditions. To use the table:
 - Find the condition that describes your problem
 - Perform the suggested action

Note: From an AIX session **on the control workstation**, issue the following command to view the system error log:

```
errpt -a -N sphwlog | pg
```

Priority	Condition	Action
1	You observe all three of the following conditions: <ol style="list-style-type: none">1. Main power switch LED is Off2. SEPBU rear panel LED is Off3. Frame Supervisor LEDs are Off	Go to “Step 0540–002”
2	Main power switch LED is On -OR- SEPBU rear panel LED is On, -BUT- all frame supervisor LEDs are Off.	Go to “Step 0540–021” on page 1-115
3	Main power switch LED is Off	Go to “Step 0540–022” on page 1-116
4	Perspectives reports “dc Power Loss” for any power modules.	Go to “Step 0540–032” on page 1-118
5	Frame temperature is over 40° C.	Go to “Step 0540–055” on page 1-124
6	Problem with 48 V dc power distribution to processor nodes or switch assemblies.	Go to “Open in 48 V dc distribution (MAP 0560)” on page 1-128

Step 0540–002: The problem you detected in the power subsystem has the following symptoms:

- Main power switch LED is Off
- **-AND-** SEPBU rear panel LED is Off
- **-AND-** Frame Supervisor LEDs are Off.

DANGER

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

Determine if the problem is in the power coming to the frame:

1. Put main power switch in the Off ('0') position.

Note: Test points Z1, Z2, and Z3 (or test points A, B, and C) are current limited. Therefore the measured test point voltage will be slightly less than the actual line voltage. For example, the line voltage may be 208, and the measured test point voltage may be 193.

2. Using a multimeter, check ac phase-to-phase voltage between test points Z1, Z2, and Z3 (or test points A, B, and C).
3. Is the voltage between 180 and 415 V ac?
 - If the voltage between test points Z1, Z2, and Z3 (or test points A, B, and C) measures between 180 and 415 V ac, go to “Step 0540–011” on page 1-113.
 - If you are not measuring the proper voltage between test points Z1, Z2, and Z3 (or test points A, B, and C), go to “Step 0540–003.”

Step 0540–003: If you are not measuring the proper voltage between test points Z1, Z2, and Z3 (or test points A, B, and C), there is a problem with the power coming into the frame.

1. Put the circuit breaker at the front of each power module in the Off ('0') position.
2. Unseat all power modules from the SEPBU so that they are out at least three inches (10 centimeters) from the SEPBU power chassis.
3. Make certain that the customer has put the wall circuit breaker in the On position.
4. Check the state of the customer circuit breaker.
5. Does the customer's circuit breaker stay in the On position?
 - If yes, go to “Step 0540–007” on page 1-112.
 - If the wall circuit breaker **does not** stay in the On position, go to “Step 0540–004.”

Step 0540–004: If the wall circuit breaker **does not** stay in the On position:

1. Place the frame's main power switch in the Off ('0') position.
2. Disconnect ac line cord from SEPBU.
3. Check for an electrical short between the wires on the ac line cord.
 - If the ac line cord passes testing, go to “Step 0540–005.”
 - If the ac line cord has an electrical short, go to “Step 0540–006.”

Step 0540–005: If the customer's circuit breaker does not stay on with the SEPBU modules unseated and the ac line cord is not shorted, the problem may be in the Power Control Interface card.

1. Replace the Power Control Interface Card.
 - Refer to “Removing the SEPBU Power Control Interface (PCI) card” on page 4-19.
2. Go to “Step 0540–054” on page 1-124.

Step 0540–006: If you have detected an electrical short in the ac line cord:

1. Replace the ac line cord.
 - Refer to “Removing the SEPBU ac line cord” on page 4-21.
2. Go to “Step 0540–054” on page 1-124.

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

Step 0540–007: There is a problem with the power coming into the frame. At this point, you need to determine if the problem is in the ac line cord or in one of the SEPBU modules.

1. With the SEPBU modules unseated, repeat the ac voltage test.

DANGER

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

2. Put main power switch in the Off ('0') position.

Note: Test points Z1, Z2, and Z3 (or test points A, B, and C) are current limited. Therefore the measured test point voltage will be slightly less than the actual line voltage. For example, the line voltage may be 208, and the measured test point voltage may be 193.

3. Using a multimeter, check ac phase-to-phase voltage between test points Z1, Z2, and Z3 (or test points A, B, and C).
4. Is the voltage between 180 and 415 V ac?
 - If you are not measuring the proper voltage between test points Z1, Z2, and Z3 (or test points A, B, and C), go to "Step 0540–008."
 - If the voltage between test points Z1, Z2, and Z3 (or test points A, B, and C) measures between 180 and 415 V ac, go to "Step 0540–009."

Step 0540–008: If the second ac voltage test failed:

1. Replace the ac line cord.
 - Refer to "Removing the SEPBU ac line cord" on page 4-21.
2. Go to "Step 0540–054" on page 1-124.

Step 0540–009: If the voltage between test points Z1, Z2, and Z3 (or test points A, B, and C) measures between 180 and 415 V ac with the SEPBU modules unseated the problem may be in one of the SEPBU power modules. To determine which module may be at fault:

1. One-at-a-time, re-install power modules, after **each** module is installed:
 - a. Put the circuit breaker at the front of the power **module** in the On ('1') position
 - b. Repeat the ac voltage measurement between test points Z1, Z2, and Z3 (or test points A, B, and C)
 - Follow the same procedure you used in "Step 0540–007"
2. Was an ac voltage problem detected when any power module was reinstalled?
 - If all power modules were re-installed and you did not detect an ac problem, go to "Step 0540–054" on page 1-124 to verify the SEPBU.
 - If you detect an ac problem as a module is re-installed, go to "Step 0540–010"

Step 0540–010: If you detected an ac problem as a module was re-installed:

1. Replace the SEPBU power module.
 - Refer to "Replacing the SEPBU power module" on page 4-19.
2. Return to "Step 0540–009" to install next power module and verify the replacement.

Step 0540–011: You have arrived at this step from “Step 0540–002” on page 1-110 where you found:

- Main power switch LED is Off
- -AND- SEPBU rear panel LED is Off
- -AND- Frame Supervisor LEDs are Off.
- -AND- you were unable to measure voltage between test points Z1, Z2, and Z3 (or test points A, B, and C).

These symptoms indicate that you have a possible problem with 12 V dc supervisor power. To determine if the supervisor power is at fault:

1. Put main power switch in the On ('1') position.
2. Verify that the power module(s) circuit breaker(s) are in the On ('1') position.
3. Disconnect supervisor harness cables PDU-BH-P7 and PDU-BH-P8.
4. Check frame supervisor LEDs and SEPBU rear panel LED.
5. Are any LEDs lit?
 - If any frame supervisor or SEPBU rear panel LEDs are lit, go to “Step 0540–014.”
 - If no frame supervisor or SEPBU rear panel LEDs are lit, go to “Step 0540–012.”

Step 0540–012: If none of the frame supervisor or SEPBU rear panel LEDs are lit, check the number of power modules installed in the SEPBU.

- If there is **more than one** power module in SEPBU, go to “Step 0540–021” on page 1-115.
- If there is **only one** power module in SEPBU, go to “Step 0540–013.”

Step 0540–013: If there is only one power module in the SEPBU:

1. Replace the SEPBU power module
 - Refer to “Replacing the SEPBU power module” on page 4-19.
2. Go to “Step 0540–054” on page 1-124

Step 0540–014: With the cables at PDU-BH-P7 and PDU-BH-P8 disconnected, the frame supervisor or SEPBU rear panel LEDs were lit. You will now check to see if either of the cables have an electrical short.

1. Reconnect cables PDU-BH-P7 and PDU-BH-P8 one-at-a-time.
2. After each cable is connected, check the frame supervisor and SEPBU rear panel LEDs.
3. Do any of the LEDs go unlit?
 - If any of the LEDs go unlit, one of the cables has an electrical short. Go to “Step 0540–015” on page 1-114.
 - If all of the LEDs stay lit, no problem is found, go to “Step 0540–054” on page 1-124 and recheck the SEPBU.

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

Step 0540–015: If any of the frame supervisor or SEPBU rear panel LEDs go unlit when you reattached a cable, then that cable may have an electrical short.

1. One at a time, disconnect the supervisor harnesses from each of the processor nodes (N00-BH-J7) or from each switch assembly (S00-BH-J2).
2. Repeat this procedure until the supervisor harness is entirely disconnected or the LEDs indicate that the electrical short has disappeared.
3. Does the electrical short condition disappear by disconnecting the supervisor harness from the processor nodes or switch assemblies?
 - If the electrical short condition disappears, then the fault is inside a processor node or switch assembly. Go to “Step 0540–016.”
 - If the electrical short condition **does not** disappear when the cables are disconnected, then the fault is in the supervisor harness.
 - a. Replace the defective supervisor harness.
 - b. Go to “Step 0540–020” on page 1-115 to verify the fix.

Step 0540–016: Diagnostic procedures indicate an electrical short in either a processor node or a switch assembly. To further diagnose the problem:

1. Place the processor node or switch assembly into service position.
 - Refer to "Service position procedures" in the applicable node or switch service guide.
2. Is this a uniprocessor wide node, an SMP node, or an SPS or SPS-8 switch assembly?
 - If yes, go to “Step 0540–019” on page 1-115.
 - If you are working on any other node or switch type, go to “Step 0540–017.”

Step 0540–017: You have detected what may be an electrical short inside a uniprocessor thin node or an high performance type switch assembly. To diagnose the problem:

1. Disconnect cable N00-NS-P101 or S00-SP-P101 at supervisor card
2. Check for a short between pin 1 and 2 on component U102 (the large power transistor) on supervisor card. U102 **pin 1** is marked.
3. Do you detect an electrical short between U102 pins 1 and 2?
 - If you detect an electrical short between these pins, go to “Step 0540–019” on page 1-115.
 - If you **do not** detect an electrical short between these pins, go to “Step 0540–018.”

Step 0540–018: If you did not detect a short on the cable:

1. Reattach cable N00-NS-P101 or S00-SP-P101 at supervisor card.
2. If this is a thin processor node, access the connector panel at rear of processor node (near N00-BH-J7).
3. Detach cable N00-SB-P102 or S00-SB-P102 at supervisor bus card
4. Check for a short between pin 1 and 2 on component U102 (large power transistor) on supervisor card.
5. Do you detect an electrical short between U102 pins 1 and 2?
 - If you detect an electrical short between the pins, replace cable N00-NS-P101 or S00-SP-P101 and go to “Step 0540–020” on page 1-115 to verify the fix.

- If you **do not** detect an electrical short between the pins, replace the supervisor bus card and go to “Step 0540–020” on page 1-115 to verify the fix.

Step 0540–019: You have arrived at this step for one of the following reasons:

- Diagnostic procedures indicate an electrical short in either a wide processor node or a SPS type switch assembly
- You detected an electrical short between pins 1 and 2 on component U102 in either a thin processor node or a high performance type switch assembly

Based on the type of switch or processor node that you are working on, those symptoms indicate that you have to replace the appropriate supervisor card from the following list:

- Processor node supervisor card
- SP Switch-8 supervisor card
- SP Switch supervisor card

Note: Refer to "FRU removals and replacements" in the applicable node or switch service guide.

After replacing the appropriate supervisor card, go to “Step 0540–020.”

Step 0540–020: After you replace the component causing the short:

1. Make sure all cables are reconnected at the processor nodes, switch assemblies, and at the SEPBU.
2. Check frame supervisor and SEPBU rear panel LEDs.
3. Are any LEDs lit on the frame supervisor or SEPBU rear panel?
 - If any of the LEDs are lit, you have resolved the problem. Go to “Step 0540–056” on page 1-125.
 - If the LEDs still do not light, another short exists in the 12 V dc distribution subsystem. Return to “Step 0540–011” on page 1-113.

Step 0540–021: You have arrived at this step from either the diagnostics table (Table 1-27 on page 1-110) or from “Step 0540–011” on page 1-113. This indicates that there is a possible problem with the 12 V dc supervisor power **and** the system that you are working on has a SEPBU with more than one power module.

1. Before proceeding, check:
 - Main power switch LED is On
 - -OR- SEPBU rear panel LED is On,
 - -BUT- all frame supervisor LEDs are Off.
2. Replace the SEPBU Frame Supervisor Card.
 - Refer to “Replacing the SEPBU frame supervisor card” on page 4-20.
3. Recheck the LED conditions listed in the above step.
4. Are any frame supervisor LEDs lit?
 - If the frame supervisor LEDs are now lit, the problem has been resolved, go to “Step 0540–054” on page 1-124.
 - If the frame supervisor LEDs still **do not** light, replace the SEPBU power chassis then go to “Step 0540–054” on page 1-124.
 - Refer to “Replacing the SEPBU power chassis” on page 4-17.

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

Step 0540–022: The main power switch LED is not lit and the SEPBU power subsystem diagnostics table (Table 1-27 on page 1-110) directed you to this location. To determine what the problem is:

1. Check main power switch position
2. Is main power switch in On ('1') position?
 - If the main power switch is On, go to "Step 0540–024" on page 1-116.
 - If the main power switch is **not** in the On ('1') position, go to "Step 0540–023."

Step 0540–023: The main power switch LED is **not** lit and the main power switch **was not** in On position.

1. Put main power switch in On ('1') position.
2. Check conditions in the SEPBU power subsystem diagnostics table (Table 1-27 on page 1-110).
3. Do any of these conditions exist?
 - If any of the conditions in Table 1-27 on page 1-110 exist, go to "Step 0540–001" on page 1-110.
 - If none of the conditions listed in Table 1-27 on page 1-110 exist, then there is not a power problem. Go to "End of call" on page 1-144.

Step 0540–024: Before you arrived at this step, you found the main power switch in the On ('1') position but saw that the main power switch LED is not lit. To diagnose this problem:

1. Check processor nodes for any Power (green) LEDs On or flashing.
 - If none of these LEDs are lit, make sure that the circuit breakers on at least one processor node are in the On ('1') position
2. Are any green power LEDs lit or flashing on any processor nodes or switch assemblies (excluding those due to self-test)?
 - If you do see any of the green Power LEDs lit or flashing, go to "Step 0540–031" on page 1-117.
 - If **none** of the Power LEDs are lit or flashing, then you do not have any 48 V dc power. Go to "Step 0540–025."

Step 0540–025: If you do not have 48 V dc power at any of the processor nodes or switch assemblies:

1. Check cable PDU-BH-P6 for an obvious problem.
2. Does the cable appear to be okay?
 - If the cable does not have any apparent problems, go to "Step 0540–026."
 - If the cable appears to be defective:
 - a. Fix the obvious cable problem.
 - b. Go to "End of call" on page 1-144.

Step 0540–026: If you do not see any obvious problems with cable PDU-BH-P6:

1. Disconnect cable PDU-BH-P6 from SEPBU.
2. With main power switch in On (1) position, check for continuity between:
 - PDU-BH-P6 pin 2 and pin 5
 - PDU-BH-P6 pin 3 and pin 4

3. Is there continuity in both cases?
 - If you have continuity in both cases, go to “Step 0540–030.”
 - If you **do not** have continuity in both cases, go to “Step 0540–027.”

Step 0540–027: If you **do not** have continuity between PDU-BH-P6 pin 2 and pin 5 and between pin 3 and pin 4, then there is a problem with the main power switch.

1. Open the main power switch assembly.
2. Disconnect the white connector of the main power switch from the main power switch cable PDU-SW-P1.
3. With main power switch in On (1) position, check for continuity between the two pins of the white main power switch connector.
4. Is there continuity between these two pins?
 - If you have continuity between the two pins of the white main power switch connector, go to “Step 0540–029.”
 - If you **do not** have continuity between the two pins, go to “Step 0540–028.”

Step 0540–028: If you **do not** have continuity between the two pins of the white main power switch connector, the main power switch is defective.

1. Replace the main power switch.
 - Refer to “Replacing the main power switch or LED” on page 4-26 to replace the main power switch.
2. Reconnect cable PDU-BH-P6 to SEPBU and power on system.
3. Go to “Step 0540–023” on page 1-116.

Step 0540–029: If you **have** continuity between the two pins of the white main power switch connector, the main power switch **cable** PDU-BH-P6 is defective.

1. Replace the main power switch cable PDU-BH-P6.
2. Go to, “Step 0540–023” on page 1-116.

Step 0540–030: At this point you have determined that there is continuity between PDU-BH-P6 pin 2 and pin 5 and between pin 3 and pin 4. This indicates that there is a problem with the SEPBU Power Control Interface Card.

1. Replace the SEPBU Power Control Interface Card.
 - Refer to “Replacing the SEPBU Power Control Interface (PCI) card” on page 4-20.
2. Go to “Step 0540–054” on page 1-124.

Step 0540–031: You have arrived at this step because one or more green power LEDs are lit or flashing on any processor node or switch assembly (excluding those due to self-test). This indicates that the main power LED card should be replaced.

Note: This action requires powering off all processor nodes.

1. Are there other problems requiring this frame to be powered off?
 - If the frame has other problems and needs to be powered down anyway:
 - a. Replace the main power LED card.

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

- Refer to “Replacing the main power switch or LED” on page 4-26.
- b. Go to “End of call” on page 1-144.
- If the frame **does not** have any other problems and **does not** need to be powered down:
 - a. Schedule maintenance to replace main power LED card.
 - b. Go to “End of call” on page 1-144.

Step 0540–032: The SEPBU power subsystem diagnostics table (Table 1-27 on page 1-110) directed you here because Perspectives reports dc Power Loss for one or more power modules.

Note: Under light power-loading conditions, SEPBU power modules may enable/disable their outputs to maintain proper output. In this situation, you will see intermittent dc Power Loss conditions from the power modules. If this is a persistent problem, you may choose to put the circuit breaker of one power module in the Off (0) position.

To diagnose the dc Power Loss:

1. From Perspectives on the control workstation, open the Frame Environment window.
2. Allow the Frame Environment window a few minutes to refresh a few times.
3. Correlate this display with the error log to obtain an accurate condition.
4. Check for dc Power Loss (red) condition for all power modules.
 - If **all** power modules show dc Power Loss:
 - a. open the Global commands window
 - b. power-off all processor nodes and switch assemblies in the frame
 - If **only one** power module shows dc Power Loss, order another power module for use in isolating the failing part.
5. Does the Perspectives Frame Environment window indicate dc Power Loss (red) for any (or **all**) power modules?
 - If Perspectives indicates a dc Power Loss, go to “Step 0540–033.”
 - If Perspectives **does not** indicate a problem, go to “End of call” on page 1-144.

Step 0540–033: Perspectives indicates a dc Power Loss:

1. If the dc Power Loss is indicated in **all** power modules, go to “Step 0540–036” on page 1-119.
2. If the dc Power Loss is indicated in one or more power modules **but not** in all power modules, go to “Step 0540–034.”

Step 0540–034: Perspectives indicates a dc Power Loss in one or more power modules **but not** in all power modules.

1. Make a note of which power module(s) is indicating a problem.
2. Replace the SEPBU power module with the new power module obtained in “Step 0540–032.”
 - Refer to “Replacing the SEPBU power module” on page 4-19.

Note: This step may be done while system is in use if the SEPBU has N+1 power modules and there is never more than one module powered off or removed from the SEPBU at a time.

3. Wait for Perspectives to update the Frame Environment window, then check for dc Power Loss (red) indication.

4. Does the new power module give a dc Power Loss (red) indication?
 - If the new power module gives you a dc Power Loss (red) indication, go to “Step 0540–035.”
 - If the new power module **does not** give you a dc Power Loss (red) indication:
 - a. The original power module was defective
 - b. Replace all defective power modules
 - c. Go to “Step 0540–054” on page 1-124

Step 0540–035: Since the new power module did not correct the problem, the original power module was probably okay. This also indicates that the problem is likely to be located in either the Frame Supervisor Card or in the SEPBU Power Chassis. You will now determine which component is at fault.

1. Reinstall the original power module.
2. Replace the Frame Supervisor Card.
 - Refer to “Replacing the SEPBU frame supervisor card” on page 4-20.
3. Does the original power module give a dc Power Loss (red) indication with the new Frame Supervisor Card?
 - If you are still receiving a dc Power Loss (red) indication
 - a. Replace the SEPBU Power Chassis
 - Refer to “Replacing the SEPBU power chassis” on page 4-17.
 - b. Go to “Step 0540–054” on page 1-124.
 - If you **do not** see a dc Power Loss indication, then you have resolved the problem.
 - a. Go to “Step 0540–056” on page 1-125.

Step 0540–036:

1. From the Frame Environment window, power on the power modules by clicking on the On button corresponding to the first power module.
2. Wait for Perspectives to update the Frame Environment window, then check for dc Power Loss (red) conditions for all power modules.
3. Are **all** power modules still indicating a dc Power Loss (red) condition?
 - If yes, there is a possible short in 48 V dc power distribution, go to “Step 0540–038” on page 1-120.
 - If some power modules are active, go to “Step 0540–037.”

Step 0540–037: Looking at the active power modules, are any indicating a dc Power Loss (red) condition?

1. If yes, other problems exist, go to “Step 0540–034” on page 1-118.
2. If no, you have resolved the problem, go to “Step 0540–054” on page 1-124.

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Step 0540–038: You have arrived at this point because **all** power modules indicate a dc Power Loss and you suspect there is a possible short in the 48 V dc power distribution system.

1. Switch all processor node and switch assembly circuit breakers to Off (0) position.
2. Disconnect dc distribution cables PDU-BH-P1, PDU-BH-P2, PDU-BH-P3, PDU-BH-P4, and PDU-BH-P5 at SEPBU.
 - This isolates 48 V dc to the SEPBU only
3. From the Frame Environment window, power on the power modules by clicking on the On button corresponding to the first power module.
4. Wait for Perspectives to update the Frame Environment window, then check for dc Power Loss (red) conditions for all power modules.
5. Are **all** power modules still indicating a dc Power Loss (red) condition?
 - If yes, go to “Step 0540–049” on page 1-123
 - If no, there may be an electrical short in the dc distribution cables, go to “Step 0540–039”

Step 0540–039: Some but not all of the power modules still indicating a dc Power Loss (red) and you suspect that there might be an electrical short in the dc distribution cables.

1. One at a time, reconnect dc distribution cables PDU-BH-P1, PDU-BH-P2, PDU-BH-P3, PDU-BH-P4, and PDU-BH-P5 at the SEPBU.
2. After each connection, check frame supervisor green LED #2 for an OFF condition, indicating a short condition.
3. Are you able to reconnect all cables without indication of a short condition?
 - If yes, go to “Step 0540–045” on page 1-122
 - If no, go to “Step 0540–040”

Step 0540–040: As you reconnected the dc distribution cables, LED #2 on the frame supervisor indicated a short.

1. Replace the cable that caused the short condition.
2. From the control workstation, turn on any bulk dc power supplies that are off.
3. Check frame supervisor green LED #2 for an OFF condition, indicating a short condition.
4. Is there still a short condition following replacement of this cable?
 - If an electrical short is still indicated, go to “Step 0540–041” on page 1-121.
 - If no electrical shorts are indicated:
 - a. Problem resolved
 - b. Make sure all cables in “Step 0540–039” are reconnected
 - c. Go to “End of call” on page 1-144.

Step 0540–041: After you replaced the dc distribution cable, LED #2 on the frame supervisor still indicates an electrical short. This indicates that a processor nodes or switch assembly may have an electrical short.

1. Disconnect the replacement dc distribution cable from all processor nodes.
2. From the control workstation, turn on any power supplies that are off.
3. Reconnect the dc distribution cable to the processor nodes or switch assemblies one at a time.
 - As connection is made, check the bulk dc power supplies for indication of an electrical short.
4. Check frame supervisor green LED #2 for an OFF condition, indicating a short condition.
5. Are you able to reconnect the cable to all processor nodes or switch assemblies without indication of a short condition?
 - If yes, go to “Step 0540–039” on page 1-120 and reconnect the next cable.
 - If no, go to “Step 0540–042.”

Step 0540–042: With the power supplies off, you still received indication of an electrical short when you reconnected the dc distribution cable to one processor node or switch assembly.

1. Remove the processor node or switch assembly causing the short condition from the frame.
2. Check the 48 V dc power harness inside the processor node or switch assembly for an obvious problem such as a chafed or broken cable.
3. Is there an obvious problem with the 48 V dc power harness?
 - If yes, go to “Step 0540–044”
 - If no, go to “Step 0540–043”

Step 0540–043: The processor node's (or switch assembly's) 48 V dc power harness does not have an obvious problem but the system still indicates an electrical short.

1. Replace the 48 V dc power harness.
2. Reconnect the processor node or switch assembly and check for a short condition again.
3. Return to “Step 0540–041” and continue at the second bullet (powering on any bulk dc power supplies that are Off).

Step 0540–044: The processor node's (or switch assembly's) 48 V dc power harness has an obvious problem and the system still indicates an electrical short.

1. Correct the obvious problem with the 48 V dc power harness.
 - If necessary, replace the 48 V dc power harness.
2. Reconnect the processor node or switch assembly and check for a short condition again.
3. Return to “Step 0540–041” and continue at the second bullet (powering on any bulk dc power supplies that are Off).

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

Step 0540–045: You determined that you do not have a short in the dc distribution cables. The next thing to look for is a possible short in a processor node or switch assembly.

1. Put each processor node and switch assembly circuit breaker in the On (1) position, one device at a time.
2. As each device is powered on, check the frame supervisor green LED #2 for an OFF condition.
 - Indicates an electrical short
3. Are you able to power on all processor nodes and switch assemblies without indication of an electrical short?
 - If yes, then either you did not have an electrical short or the condition was resolved. Go to “End of call” on page 1-144.
 - If no, go to “Step 0540–046.”

Step 0540–046: If you received an indication of an electrical short when you powered on the processor nodes and switch assemblies one at a time, the processor node or switch assembly that caused the indication may be defective.

1. Remove the processor node or switch assembly causing the electrical short indication from the frame.
2. Check the 48 V dc power harness inside the processor node or switch assembly for an obvious problem which might be causing the short condition.
3. Is there an obvious problem which might be causing the short condition?
 - If yes, go to “Step 0540–048.”
 - If no, go to “Step 0540–047.”

Step 0540–047: If you can not see an obvious problem with the 48 V dc power harness, but you are still detecting an electrical short:

1. Replace the node supervisor card or switch power card.
2. Reconnect the processor node or switch assembly and put circuit breaker in the On (1) position.
3. From the control workstation, enable any power supplies that are turned off.
4. Return to “Step 0540–045.”

Step 0540–048: If you detect an obvious problem with the 48 V dc power harness,

1. Fix the obvious problem which might be causing the short condition.
2. Reconnect the processor node or switch assembly and put circuit breaker in the On (1) position.
3. Check the frame supervisor green LED #2 for an OFF condition.
 - This indicates there is an electrical short
4. Is there an indication of an electrical short?
 - If yes, go to “Step 0540–047.”
 - If no, go to “Step 0540–045.”

Step 0540–049: You have disconnected the dc distribution cables but **all** power modules are still indicating a dc Power Loss.

1. Is the power control interface card switch (in the rear of the SEPBU, next to the frame supervisor card) in the AUX position?
 - If yes, there may be a problem related to the Power Control Interface, go to “SEPBU power control interface (MAP 0550)” on page 1-125.
 - If no, go to “Step 0540–050.”

Step 0540–050: If the power control interface card switch is in the AUX position and **all** power modules are still indicating a dc Power Loss, then there is a probable dc short in the SEPBU.

1. Put the circuit breaker in the front of each power module in the Off (0) position.
2. Unseat all power modules from the SEPBU so that they are out at least three inches (10 centimeters) from the SEPBU power chassis.
3. One-at-a-time, reseat the power modules and put the power module's circuit breaker in the On (1) position.
4. After you reseat each power module, check the frame supervisor LED #1 and LED #2 for an OFF condition.
5. Do frame supervisor LED #1 and LED #2 remain OFF following reseating of a power module?
 - If yes, “Step 0540–052.”
 - If no, “Step 0540–051.”

Step 0540–051: You reseated a power module and frame supervisor LED #1 or LED #2 lit.

1. No problem detected for this power module.
2. Have all power modules been reseated?
 - If yes, go to “Step 0540–054” on page 1-124.
 - If no, continue at the last procedural step in “Step 0540–050.”

Step 0540–052: You reseated a power module and frame supervisor LED #1 or LED #2 **did not** light. This indicates that the module you just reseated may have a problem.

1. Is this the first power module to be reseated?
 - If yes, go to “Step 0540–053.”
 - If this **is not** the first power module to be reseated:
 - a. Replace this power module.
 - Refer to “Replacing the SEPBU power module” on page 4-19.
 - b. Return to the last procedural step in “Step 0540–050.”

Step 0540–053: The first power module that you reseated **did not** light Frame supervisor LED #1 or LED #2.

1. Unseat this power module.
2. Reseat a different power module.
3. Put the circuit breaker of the reseated power module in the On (1) position.
4. Check frame supervisor LEDs #1 and #2 for an OFF condition.

Scalable Electrical Power Base Unit diagnostics (MAP 0540)

5. Do frame supervisor LED #1 and LED #2 remain OFF following reseating of the second power module?
 - If the LEDs remain Off:
 - a. Replace the SEPBU Power Control Interface Card.
 - Refer to “Replacing the SEPBU Power Control Interface (PCI) card” on page 4-20.
 - b. Go to “Step 0540–054.”
 - If the LEDs light:
 - a. There may be a problem with original power module.
 - b. Return to the last procedural step in “Step 0540–050” on page 1-123.

Step 0540–054: SEPBU has been serviced.

1. Make sure all cables are reconnected at the rear of the SEPBU.
2. Make sure the customer circuit breaker is in the On position.
3. Make sure all power modules are installed in the SEPBU power chassis.
4. Make sure the circuit breaker at the front of all power modules is in the On (1) position.
5. Make sure the main power switch is in the On (1) position.
6. From the Frame Environment window, make sure all installed power module indicators show good status (green).
7. From the Frame Environment window, check frame supervisor green LEDs and make sure both LEDs are constant On.
8. Are both conditions met?
 - If yes, you have resolved the problem. Go to “End of call” on page 1-144.
 - If no, one or more problems still exists. Return to “Step 0540–001” on page 1-110 to continue service.

Step 0540–055: The SEPBU power subsystem diagnostics table (Table 1-27 on page 1-110) directed you here because the frame supervisor has detected a temperature beyond an acceptable range for the system.

1. Check the air filter area (behind the front skirt) and around the SEPBU for obvious airflow blockage or external source of heat.
2. Is there obvious blockage or external source of heat?
 - If yes, remove blockage or source of heat from area. Go to “End of call” on page 1-144.
 - If no, the frame supervisor card may be reporting incorrect temperature.
 - a. Replace the SEPBU Frame Supervisor Card.
 - Refer to “Replacing the SEPBU frame supervisor card” on page 4-20.
 - b. Go to “Step 0540–056” on page 1-125.

Step 0540–056: You have replaced components and need to verify that the problem has been resolved.

1. Perform “Verification test for supervisor bus” on page 3-17.
2. Does verification test pass?
 - If yes, you have resolved the problem. Go to “Step 0540–054.”
 - If no, go to “Frame supervisor not responding (MAP 0110)” on page 1-17 to continue service.

SEPBU power control interface (MAP 0550)

Purpose of this MAP:

This MAP contains the diagnostic procedures for determining problems with the SEPBU Power Control Interface (PCI) card.

Step 0550–001: You have arrived at this MAP because a condition in “Step 0540–049” on page 1-123 indicated that there was a problem in the Power Control Interface card.

1. Locate the Power Control Interface card on the SEPBU rear panel.
2. Record the location of all power control cables connected to the Power Control Interface card before continuing.
3. Check the position of the local/auxiliary switch.
4. Is that switch in the local position?
 - If yes, go to “Step 0550–003.”
 - If the switch is in the auxiliary position, does the customer have remote power control interface cables installed?
 - If yes, go to “Step 0550–006” on page 1-126.
 - If no, go to “Step 0550–002.”

Step 0550–002: Before you can continue diagnostics, the local/auxiliary switch must be in the local position.

1. Put the local/auxiliary switch in the local position.
2. Check frame supervisor green LED #2 (dc OK) for a solid ON condition.
3. Does frame supervisor green LED #2 (dc OK) show a solid ON condition?
 - If yes, you have resolved problem. Go to “Step 0550–011” on page 1-127.
 - If no, go to “Step 0550–003.”

Step 0550–003: Frame supervisor LED #2 **is not** solidly On. This indicates that the problem could be in either the:

- SEPBU Power Control Interface card
- SEPBU Frame Supervisor Card
- SEPBU power chassis

To determine which component is at fault:

1. Put the main power switch in the Off (0) position.

SEPBU power control interface (MAP 0550)

2. Replace the SEPBU Power Control Interface Card
 - Refer to “Replacing the SEPBU Power Control Interface (PCI) card” on page 4-20.
3. Ensure the Power Control Interface card switch is in the original position.
4. Put the main power switch in the On (1) position.
5. Check frame supervisor green LED #2 (dc OK) for a solid ON condition.
6. Does frame supervisor green LED #2 (dc OK) show a solid ON condition?
 - If yes, you have resolved problem. Go to “Step 0550–011” on page 1-127.
 - If no, go to “Step 0550–004.”

Step 0550–004: You replaced the SEPBU Power Control Interface Card but frame supervisor LED #2 still **does not** show a solid On condition. This indicates that the SEPBU Frame Supervisor card may also have a problem.

1. Replace the SEPBU Frame Supervisor Card.
 - Refer to “Replacing the SEPBU frame supervisor card” on page 4-20.
2. Check frame supervisor green LED #2 (dc OK) for a solid ON condition.
3. Does frame supervisor green LED #2 (dc OK) show a solid ON condition?
 - If yes, you have resolved problem. Go to “Step 0550–011” on page 1-127.
 - If no, go to “Step 0550–005.”

Step 0550–005: You replaced the SEPBU Power Control Interface Card and the SEPBU Frame Supervisor Card. However, frame supervisor LED #2 still **does not** show a solid On condition. This isolates the problem to the SEPBU power chassis.

DANGER

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

1. Power off the system.
2. Replace the SEPBU Power Chassis.
 - Refer to “Replacing the SEPBU power chassis” on page 4-17.
3. Reconnect ac power and power on the system.
4. Go to “Step 0550–011” on page 1-127.

Step 0550–006: You have arrived at this step because the customer has a system with remote power control interface cables installed and the local/auxiliary switch is in the auxiliary position.

1. Trace power control cables back until you find the first remote unit that is powered on or in the local position.
2. Is this remote unit powered on?
 - If yes, go to “Step 0550–008” on page 1-127.
 - If no, go to “Step 0550–007” on page 1-127.

Step 0550–007: As you traced the remote power control interface cables, you came to a remote unit that has the local/auxiliary switch in the auxiliary position but was not powered on:

1. Power on the remote unit.
2. Check frame supervisor green LED #2 (dc OK) for a solid ON condition.
3. Does frame supervisor green LED #2 (dc OK) show a solid ON condition?
 - If yes, you have resolved problem. Go to “Step 0550–011.”
 - If no, go to “Step 0550–001” on page 1-125.

Step 0550–008: As you traced the remote power control interface cables, the first remote unit you came to was powered on.

1. Check the power control cable from this powered remote unit to the next unpowered unit.
 - If there is an obvious problem, such as a loose cable, fix the problem; otherwise, replace the power control cable.
2. After fixing or repairing the cable, are you able to power on the remote unit?
 - If yes, go to “Step 0550–007.”
 - If no, go to “Step 0550–009.”

Step 0550–009: If you are unable to power on the remote unit,

1. There may be a problem with this unpowered unit's power control interface.
2. Is this unit an RS/6000 SP?
 - If yes, go to “Step 0550–010.”
 - If the remote unit **is not** an RS/6000 SP:
 - a. Service the unit using the **manufacturer's** documentation.
 - b. Return to “Step 0550–007” when you are done servicing the unit.

Note: As a temporary work-around, you may enable frames by putting their local/auxiliary switch in the local position.

Step 0550–010: The failing remote unit is an RS/6000 SP and you are not able to power on the unit.

1. Is this the same frame that you were originally servicing in this PCI MAP?
 - If yes, go to “Main power (MAP 0450)” on page 1-66.
 - If no, go to the Main Power MAP for the remote unit.
 - Return to “Step 0550–007” when you are done servicing the remote unit.

Step 0550–011: The SEPBU frame supervisor LED #2 is On.

1. Reconnect any power control cables at the PCI card as recorded in “Step 0550–001” on page 1-125.
2. Go to “Step 0550–012” on page 1-128.

Open in 48 V dc distribution (MAP 0560)

Step 0550–012: SEPBU has been serviced.

1. Make sure all cables are reconnected at the rear of the SEPBU.
2. Make sure the customer circuit breaker is in the On position.
3. Make sure all power modules are installed in the SEPBU power chassis.
4. Make sure the circuit breaker at the front of all power modules is in the On (1) position.
5. Make sure the main power switch is in the On (1) position.
6. From the Frame Environment window, make sure all installed power module indicators show good status (green).
7. From the Frame Environment window, check frame supervisor green LEDs and make sure both LEDs are constant On.
8. Are both conditions met?
 - If yes, you have resolved the problem. Go to “End of call” on page 1-144.
 - If no, one or more problems still exists. Return to “Step 0540–001” on page 1-110 to continue service.

48 V distribution problems

Open in 48 V dc distribution (MAP 0560)

Purpose of this MAP:

This MAP is used to diagnose problems in the 48 V dc power distribution subsystem. This subsystem supplies power to processor nodes and switch assemblies in frames equipped with either a SEPBU or a PDU.

Step 560–001: Attention: The following step requires powering off up to three additional processor nodes or one additional switch assembly. If the switch feature is present, it will interrupt jobs on all switch features attached to the switch assembly on this frame.

Attention: If a 604 or 604e high node is present in this frame, it is possible that the 48 Volt power distribution is spread across more than one power harness. Check physical connections from circuit breaker(s) to 48 V bulkhead connectors for actual power distribution.

Replacing the power harness requires powering off up to four units. The sets are as follows:

PDU-BH-P1: Frame slots 1, 2, 3, 4
PDU-BH-P2: Frame slots 5, 6, 7, 8
PDU-BH-P3: Frame slots 9, 10, 11, 12
PDU-BH-P4: Frame slots 13, 14, 15, 16
PDU-BH-P5: Frame slot 17

- If other processor nodes or switches on this power harness are in use, schedule time with the customer where the entire set can be removed from the active configuration. If the customer decides to defer maintenance, go to “End of call” on page 1-144; otherwise, continue this step.
- Have customer remove the set of processor nodes or switch assemblies from the active configuration.
- Put circuit breakers on the processor nodes or switch assemblies in the Off (0) position.
- Replace the appropriate power harness PDU-BH-P1, PDU-BH-P2, PDU-BH-P3, PDU-BH-P4, or PDU-BH-P5.

- After the power harness is replaced, put circuit breakers on the processor nodes or switch assemblies in the ON (1) position.
- Check Power (green) LED of the original processor nodes or switch assemblies for an ON condition.
- Is the Power (green) LED OFF for the original processor nodes or switch assemblies?
 - If yes, go to “Step 560–002.”
 - If no, you have resolved the problem. Go to “Step 560–006” on page 1-130.

Step 560–002: There is a problem in the SEPBU dc section.

Attention: The following steps require interruption of all processor nodes and switch assemblies in the frame. If the switch feature is present, it will interrupt jobs on all switches attached to the switch assemblies in this frame.

1. Schedule time with customer where the frame can be powered off.
 - If the customer decides to defer maintenance, go to “End of call” on page 1-144; otherwise continue this step.
2. Put main power switch at front of frame in the Off (0) position.

DANGER

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

Does this frame contain a Power Distribution Unit (PDU)?

- If yes, go to “Step 560–003.”
- If no, go to “Step 560–004” on page 1-130.

Step 560–003: Frame contains a Power Distribution Unit.

1. Open Power Distribution Unit dc section.
2. Find the tailgate cable associated with the failing processor nodes in the following table:

PDU-BH-P1:	Frame slots	1, 2, 3, 4
PDU-BH-P2:	Frame slots	5, 6, 7, 8
PDU-BH-P3:	Frame slots	9, 10, 11, 12
PDU-BH-P4:	Frame slots	13, 14, 15, 16
PDU-BH-P5:	Frame slot	17
3. Replace the appropriate tailgate cable PDU-BH-J1, PDU-BH-J2, PDU-BH-J3, PDU-BH-J4, or PDU-BH-J5 to the bus bars.
4. Reinstall cover of Power Distribution Unit dc section.
5. Go to “Step 560–005” on page 1-130.

Step 560–004: Frame contains a SEPBU.

1. Remove power modules and frame supervisor card from power chassis.
2. Replace SEPBU power chassis.
3. Reinstall frame supervisor card and power modules.
4. Go to “Step 560–005” on page 1-130.

Step 560–005: If you are servicing either a SEPBU equipped frame or a PDU equipped frame, you have replaced some parts and the main power is disconnected.

1. Reconnect power to the system.
2. Put main power switch at front of frame in the On (1) position.
3. Put circuit breakers on the processor nodes and switch assemblies in the On (1) position.
4. Do the processor nodes or switch assemblies power on?
 - If yes, you have resolved the problem. Go to “Step 560–006”
 - If no, call the next level of support.

Step 560–006: You were able to power on the processor nodes and switches in the frame.

- If the frame contains **only** switches, go to “Step 560–007”
- If the frame contains processor nodes, go to “Step 560–008.”

Step 560–007: If the frame contains only switches:

1. Have customer verify that the switch code is running on all processor nodes **OR** from the control workstation, enter:
Estart
2. Check `/var/adm/SPlogs/css/out.top` file.
3. Go to the "Switch function" MAP in *RS/6000 SP: SP Switch Service Guide* to verify that there are no other switch problems.

Step 560–008: If the frame contains processor nodes:

1. Check the 3-digit LEDs for the processor nodes to make sure they are all IPLing okay.
2. Do all processor nodes IPL okay?
 - If yes, go to “Step 560–009.”
 - If the processor nodes do not IPL correctly, go to “Starting a service call (MAP 0100)” on page 1-1 to continue service.

Step 560–009: If the processor nodes IPL correctly and if:

- The frame contains a switch assembly, go to “Step 560–007.”
- If the frame **does not** contain a switch assembly, go to “End of call” on page 1-144.

Network MAPs

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Purpose of these MAPs

The MAPs in this chapter provide information needed to diagnose network communication problems.

“Network problems (MAP 0570)”

- Provides information needed to start the diagnostic procedures

“Ethernet LAN (MAP 0580)” on page 1-132

- Provides information needed to diagnose Ethernet LAN problems

Network problems (MAP 0570)

There are several communication adapters supported for node-to-node (network) communication, including:

Ethernet Thin (Coax)	Mandatory: Used for installation/boot LAN
Ethernet Thick	Mandatory: Used for installation/boot LAN
Ethernet TTP	Mandatory: Used for installation/boot LAN
Switch Adapter	Application high-speed node-to-node communication
Token-Ring	Customer use
FDDI (Fiber Optic)	Customer use

Step 0570–001: Review **all** of the information in this step and then go to “Step 0570–002” on page 1-132.

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 from the control workstation, or defer maintenance until all jobs are completed. Powering off a processor nodes in a parallel environment will cause all jobs to flush from the queue and switch initialization to rerun.

Attention: Servicing a processor node with the Scalable POWERparallel Switch (SPS) feature installed, will impact the entire switch network, unless the processor node has already been powered off (or fenced) and the switch data cable has been disconnected.

Ethernet LAN (MAP 0580)

- Refer to "Service position procedures" in the applicable node service guide for placing processor nodes into the service position or removing them from the service position.
- Refer to "Viewing switch partitions" on page 3-28 for locating and fencing (or unfencing) nodes within a switch partition.
- In order to service the LAN, you must determine the topology (wiring) of the LAN. Contact the System Administrator to obtain a copy of the machine's Ethernet topology. The topology tells you which processor nodes are connected together inside the frame, and where groups of processor nodes are connected outside the frame.
- Perform "Checking network (LAN) status" on page 3-23.

Step 0570–002: Based on the type of adapter, use Table 1-28 to continue service:

<i>Table 1-28. Network Diagnostic Information</i>		
Adapter Name	Network Type	Action
en	Ethernet Thin, Thick, TTP	Go to "Ethernet LAN (MAP 0580)."
css	Switch	Go to the "Switch description and problem determination" MAP in <i>RS/6000 SP: SP Switch Service Guide</i> .
tr	Token Ring	Use the <i>Diagnostic Information for Multiple Bus Systems</i> (SA38-0509) and <i>Adapters, Devices and Cable Information for Multiple Bus Systems</i> (SA38-0516) or reference the related publications in the bibliography in <i>RS/6000 SP: Installation and Relocation</i> . Note: Return to this procedure to continue service.
fi	FDDI (Fiber Optic)	Use the <i>Diagnostic Information for Multiple Bus Systems</i> (SA38-0509) and <i>Adapters, Devices and Cable Information for Multiple Bus Systems</i> (SA38-0516) or reference the related publications in the bibliography in <i>RS/6000 SP: Installation and Relocation</i> . Note: Return to this procedure to continue service.
Note: You must review the information in "Step 0570–001" on page 1-131 before proceeding.		

Ethernet LAN (MAP 0580)

Each processor node has at least one Ethernet LAN connection:

- Standard RS/6000 SP system (and coexistence 9076 SP1 system):

Thin processor nodes: Integrated Ethernet connection (N00-BH-J5). Connects this processor node to the customer's LAN.

Important Note for Thin Nodes with TTP

The Ethernet riser card port on the thin node (and thin node 2) must be set to the "thick" position. See "Setting the Ethernet Riser Card Jumpers" in the removal and replacement section of *7012 POWERstation and POWERserver: Install and Service Guide* (SA23-2624) for details.

Wide processor nodes: Micro Channel Ethernet connection (N00-MC-0/1). Connects this processor node to the customer's LAN.

604 or 604e high processor nodes:

Micro Channel Ethernet connection (N00-MC-1/1). Connects this processor node to the customer's LAN.

SP-Attached Server S70, S7A, and S80

PCI Ethernet connection (ent0). Connects this processor node to the customer's LAN.

332 MHz SMP or POWER3 SMP Thin and Wide nodes:

Integrated Ethernet connection (not riser card). Connects this processor node to the customer's LAN.

- Additional Ethernet cards may be present in the I/O adapter slots.

Items covered in this MAP are for cabling with coax (BNC) connections or TTP connections:

- Integrated Ethernet card
- Micro Channel Ethernet card
- PCI Ethernet card
- Ethernet cabling inside the RS/6000 SP frame
- Ethernet connections outside the RS/6000 SP frame.
- Ethernet transceiver (TTP)
- MAU (TTP)

Step 0580–001: After reviewing the network topologies in this step, go to “Step 0580–002” on page 1-134.

The factory default wiring topology for coax is similar to the following:

Terminator → Customer's LAN

→ (N02 → N01) → (N03 → N04) → (N06 → N05) → (N07 → N08)

→ (N10 → N09) → (N11 → N12) → (N14 → N13) → (N15 → N16)

→ Terminator

where: N## refers to processor node number,

Processor node pairs are in '()'s.

The wiring topology for TTP is similar to the following figure:

Ethernet LAN (MAP 0580)

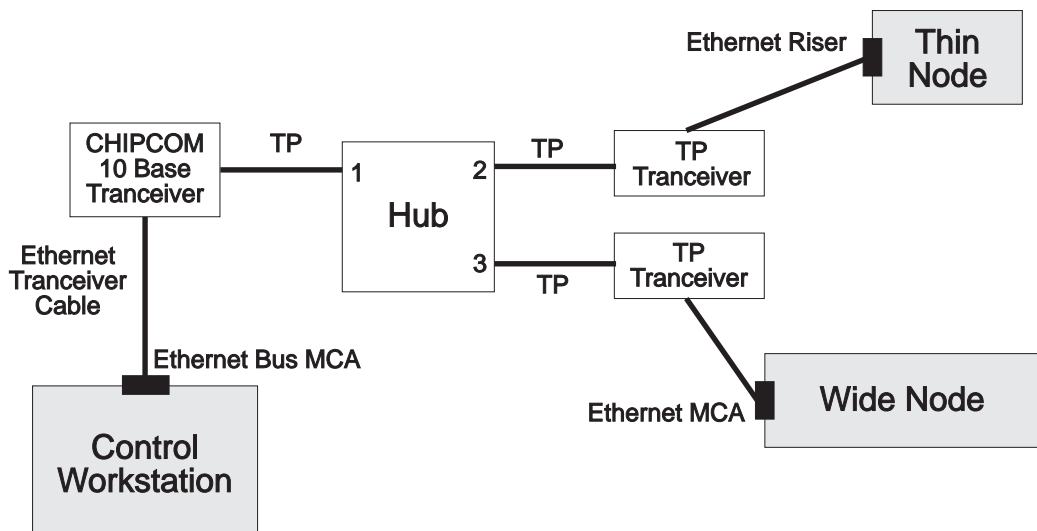


Figure 1-29. Typical Ethernet TTP topology

Notes:

1. Actual customer topologies may differ from the diagrams above.
2. Both ends of the coax network must have a terminator.
3. If a problem is affecting multiple processor nodes, you need to know the topology (wiring) of the LAN to perform service. The topology should be shown on a worksheet attached in this manual. Any changes to the topology should be updated on this worksheet. If necessary, you may hand trace the Ethernet cabling in the system, where possible, to determine the topology. Keep in mind that a customer's configuration may consist of fewer processor nodes per LAN than the factory default shown above.

Step 0580–002: Note which processor nodes indicate a problem then use Table 1-29 and the Ethernet LAN cabling information in “Step 0580–001” on page 1-133 to continue service.

Priority	Condition	Action
1	Problem affecting all powered processor nodes on a single Ethernet LAN.	Go to “Step 0580–003.”
2	Problem affecting an individual thin/wide processor node’s integrated Ethernet connection.	Go to “Step 0580–007” on page 1-135.
3	Problem affecting an individual processor node I/O adapter card connection.	Go to “Step 0580–009” on page 1-137.

Step 0580–003: You have a problem that is affecting all powered processor nodes on a single Ethernet LAN.

1. Check cable components along the affected network and all terminators at both ends of the LAN for any cabling or connector problems. Look for:
 - Damaged components
 - Missing components

- Poor connections
2. Are there any cable or connector problems?
 - If yes, go to “Step 0580–006.”
 - If no, go to “Step 0580–004.”

Step 0580–004: You have a network problem that affects all powered nodes but all cables and connectors appear to be okay.

1. Attempt to isolate the failing cables, terminators, MUX connector, MAU connector, or T-adaptors by performing “Ethernet LAN isolation procedure” on page 3-25.
 - After completing the LAN isolation procedure, return to this step.
2. Did the LAN isolation task locate a failing part?
 - If yes, go to “Step 0580–006.”
 - If no, go to “Step 0580–005.”

Step 0580–005: After running the LAN isolation procedure, you **could not** locate the failing part.

1. Check system monitor on control workstation for continuing communication problem.
2. Is there still a communication problem?
 - If yes, call the next level of support.
 - If no:
 - a. You have resolved the problem.
 - b. Go to “End of call” on page 1-144.

Step 0580–006: You found problems with either the LAN cables or the connectors.

1. Replace or reseal the failing part.
2. Check the topology Frame window on the control workstation for indication that the Ethernet LAN problem has been resolved (Ethernet LAN connections for all powered processor nodes show green status).

Note: Refresh of this window may take up to five minutes.

3. Does the topology “Frame” window indicate green status for Ethernet LAN connections to all processor nodes that are powered on?
 - If yes:
 - a. You have resolved the problem.
 - b. Go to “End of call” on page 1-144.
 - If no, go to “Step 0580–001” on page 1-133.

Step 0580–007: You have a problem affecting the integrated Ethernet in an individual thin or wide processor node and Table 1-29 on page 1-134 directed you to this location.

1. Open the rear cover of the RS/6000 SP frame, and locate the proper processor node.
2. Use Table 1-30 on page 1-136 to reseal or replace components.

Ethernet LAN (MAP 0580)

Table 1-30. Diagnostics for integrated Ethernet in Thin and Wide Nodes		
Priority	Component	Action
1	T-adaptor (coax) or TTP transceiver (N00-BH-J5)	<ol style="list-style-type: none"> 1. Check the connection at the T-adaptor (coax) or TTP transceiver on the integrated Ethernet card (N00-BH-J5), and tighten as necessary. For TTP, also check cable and connection at the TTP HUB, and verify correct plug position. 2. Verify that internal and external cables are connected to the correct integrated or Micro Channel Ethernet card, respectively. 3. If no problem was found continue at Priority 2; otherwise, verify fix at "Step 0580-011" on page 1-137.
2	T-adaptor (coax) or TTP transceiver (N00-BH-J5)	Replace component. If no problem is found, go to Priority 3.
3	Planar power problem	<ol style="list-style-type: none"> 1. From the control workstation, reset this processor node. 2. Check 3-digit LEDs for any non-blank condition during IPL. 3. If the 3-digit LEDs are always blank, go to the "Thin Node/Thin Node 2 environment" MAP in <i>RS/6000 SP: Uniprocessor Node Service Guide</i> to fix the planar power problem. Otherwise, continue at Priority 4.
4	Ethernet riser card	<ol style="list-style-type: none"> 1. Put circuit breakers on the processor node in the Off ('0') position, then remove processor node from frame. 2. Remove processor node cover. 3. If a 332 MHz SMP or POWER3 SMP Thin and Wide node, go to Priority 5. If other node, continue with next step. 4. Replace the integrated Ethernet riser card. 5. Continue at "Step 0580-008" on page 1-136.
5	I/O planar card	<ol style="list-style-type: none"> 1. Replace the I/O planar card. Make sure that all cards and cables are reinstalled properly following replacement. 2. Continue at "Step 0580-008" on page 1-136.
6	All replaced	Call next level of support.

Step 0580-008: You have reseated or replaced a component.

1. Reinstall processor node top cover.
2. Reinstall processor node in frame.
3. Make sure to reconnect cables at back of processor node.
4. Put circuit breakers on the processor node in the On ('1') position.
5. Go to "Step 0580-011" on page 1-137 to verify fix.

Step 0580–009: You have a problem affecting an individual processor node I/O adapter card connection and Table 1-29 on page 1-134 directed you to this location.

1. Verify with customer that jobs on this processor node are completed.
2. **SP-Attached Servers** (RS/6000 Machine Types 7017 S70, S7A, and S80), consult the *RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide* to perform the required service action and return to this MAP “Step 0580–011” on page 1-137.

Note: Before disconnecting cables or performing service actions on an SP-Attached Server, perform “Decoupling and coupling code for SP-Attached Servers” on page 3-35.

3. Open the rear cover of the RS/6000 SP frame, and locate the proper processor node.
4. Use Table 1-31 to reseal or replace components:

Table 1-31. I/O adapter connection diagnostics		
Priority	Component	Action
1	T-adaptor (coax) or TTP transceiver on Micro Channel Ethernet card	<ol style="list-style-type: none"> 1. Check the connection at the T-adaptor (coax) or TTP transceiver on the Micro Channel Ethernet card and tighten as necessary. 2. If no problem was found continue at Priority 2; otherwise, verify fix at “Step 0580–011.”
2	Planar power problem	<ol style="list-style-type: none"> 1. From the control workstation, reset this processor node. 2. Check 3-digit LEDs for any non-blank condition during IPL. 3. If the 3-digit LEDs are always blank, go to the “Wide Processor Node environment” MAP in <i>RS/6000 SP: Uniprocessor Node Service Guide</i> to fix the planar power problem. Otherwise, continue at Priority 3.
3	Ethernet adapter card	<ol style="list-style-type: none"> 1. Put any circuit breakers on the processor node into the Off (‘0’) position. If this is a thin node, remove processor node from frame. 2. Remove processor node cover or open drawer. 3. Replace the Ethernet adapter card. 4. Continue at “Step 0580–010.”
4	All replaced	Call next level of support.

Step 0580–010: You have repaired or replaced a component.

1. If this is a thin or wide processor node, reinstall processor node top covers.
2. Reinstall processor node in frame.
 - Make sure to reconnect cables at back of processor node.
3. Put the circuit breakers on the processor node into the On (‘1’) position.
4. Go to “Step 0580–011” to verify fix.

Step 0580–011: This step contains the information needed to verify that the LAN is fixed.

1. If you just replaced either the I/O planar on a thin or wide processor node or the Ethernet adapter card, then perform “Updating the Ethernet hardware address” on page 3-13 before continuing.
2. If you just reseated or replaced an Ethernet adapter card, the customer **must also** log into the processor node, using the TTY console. Log in as “root:”.
 - a. Enter one of the following commands:

Dependent nodes (MAP 0630)

- **ifconfig en0 up**
 - **ifconfig en1 up**
- b. From control workstation, issue **ping** command to this processor node.
- **ping nodename**
- c. Check for responses indicating communication with the processor node.
3. Does the **ping** command indicate communication with this processor node?
- If yes, go to “Step 0580–013.”
 - If no, go to “Step 0580–012.”

Step 0580–012: You **are not** able to establish communication with the processor node using the **ping** command.

1. Put any circuit breakers on the processor node into the Off ('0') position.
2. Remove processor node from frame.
3. Remove processor node cover.
4. Return to Table 1-30 on page 1-136 or Table 1-31 on page 1-137 to continue service.

Step 0580–013: You were able to establish communications with the processor node.

1. Are there any other processor nodes with an Ethernet connection problem?
2.
 - If yes, return to “Step 0580–001” on page 1-133.
 - If there are not any other processor nodes with LAN problems, you have resolved the problem.
 - Go to “End of call” on page 1-144.

Dependent node MAP

Dependent nodes (MAP 0630)

A dependent node is a general term which refers to a switch adapter installed externally to the 9076 SP, but connected to the SP switch. In the current implementation, a dependent node refers to each RS/6000 SP Switch Router Adapter installed in the RS/6000 SP Switch Router (machine type 9077). There may be several SP Switch Router Adapters (dependent nodes) in each SP Switch Router, but each occurrence is called a dependent node.

Purpose of this MAP

This MAP resolves problems specific to switch communication between the SP Switch Router Adapter and the SP switch. For any other problem with the SP Switch Router, refer to the "SP Switch Router Adapter Guide" or other documentation supplied with the SP Switch Router.

Note: If there are multiple SP Switch Router Adapters in the system, you can find out configuration information and identify them by using the following commands:

SDRGetObjects DependentNode	(returns more information)
SDRGetObjects DependentAdapter	(returns IP address and netmask)

By referring to the dependent node_number, you can identify the location of the SP Switch Router Adapter as follows:

"reliable_hostname" indicates hostname of the SP Switch Router

"extension_node_identifier" indicates two-digit slot number of the SP Switch Router Adapter in the SP Switch Router.

Step 0630–001: A message in Perspectives indicated that you have a switch problem related to a dependent node and the "Switch function" MAP in *RS/6000 SP: SP Switch Service Guide* directed you to this MAP.

1. Check for an obvious problem with the switch cable between the switch assembly and the SP Switch Router Adapter card, such as a loose or broken cable.
2. Fix any obvious problem.
3. Was there an obvious problem with the switch cable?
 - If yes, go to "Step 0630–004."
 - If no, go to "Step 0630–002."

Step 0630–002: You did not find an obvious problem with the switch cable.

1. Make sure the system administrator performed all problem determination procedures in the *RS/6000 SP: Diagnosis and Messages Guide* and checked the configuration of the SP Switch Router Adapter.
2. Was the customer able to fix a configuration problem?
 - If yes:
 - a. The problem was resolved.
 - b. Go to "Step 0630–004."
 - If no, go to "Step 0630–003."

Step 0630–003: The customer **was not** able to fix the configuration problem.

1. Continue service with the SP Switch Router or the SP Switch Router Adapter.
2. If you are responsible for the SP Switch Router, check connectivity to the SP using *SP Switch Router Adapter Guide*.
3. Was there a problem found and corrected with the SP Switch Router or SP Switch Router Adapter?
 - If yes:
 - a. The problem was resolved.
 - b. Go to "Step 0630–004."
 - If no, go to "Step 0630–005" on page 1-140.

Step 0630–004: Problem may have been resolved by a fix.

1. Issue **Eunfence** command for the dependent node.
2. Issue **SDRGetObjects switch_responds** to see if the value of "switch_responds" is "0" for this dependent node.
3. Does "switch_responds" show a value of "0" for this dependent node?
 - If yes:

Block Multiplexer Channel Adapter (MAP 0640)

- a. The problem **was not** resolved.
 - b. Go to "Step 0630–002" on page 1-139.
- If "switch_responds" **did not** show a value of "0" for this dependent node, then you have resolved the problem:
 - If there are other switch problems, return to "Switch function" MAP in *RS/6000 SP: SP Switch Service Guide*.
 - If you **do not** have other switch problems, go to "End of call procedures (MAP 0650)" on page 1-144.

Step 0630–005: You were not able to find and correct the problem with the SP Switch Router or the SP Switch Router Adapter.

1. Replace the SP switch cable between the SP Switch Router Adapter and the SP switch.
2. Issue an **Eunfence** command for this dependent node to attempt to bring this adapter on-line.
3. Issue **SDRGetObjects switch_responds** to see if the value of "switch_responds" is "0" for this dependent node.
4. Does "switch_responds" show a value of "0" for this dependent node?
 - If yes:
 - a. The system **was not** able to find a problem with the SP Switch Router or the SP Switch Router Adapter.
 - b. Call next level of support.
 - If the switch assembly must be replaced, go to the "Switch function" MAP in *RS/6000 SP: SP Switch Service Guide* to replace the SP switch assembly.
 - If "switch_responds" **did not** show a value of "0" for this dependent node, then you have resolved the problem:
 - If there are other switch problems, return to "Switch function" MAP in *RS/6000 SP: SP Switch Service Guide*.
 - If you **do not** have other switch problems, go to "End of call procedures (MAP 0650)" on page 1-144.

Block Multiplexer Channel Adapter (BMCA) MAP

Block Multiplexer Channel Adapter (MAP 0640)

Purpose of this MAP

This MAP resolves problems specific to the Block Multiplexer Channel Adapter.

Notes:

1. The cables and wrap plugs that are shipped with the BMCA feature are different than the standard RS/6000 cables and wrap plugs.
2. Ensure that customer jobs have been canceled on the BMCA feature and the associated I/O addresses are varied off-line before servicing.
3. If multiple nodes are failing on the same channel, that parallel channel on the mainframe should be varied off-line.

4. The maximum allowable adapters on a chain is eight.
5. Refer to *Diagnostic Information for Micro Channel Bus Systems* (SA38-0532), Map 0020 (Problem Determination Procedure), Step 3, for additional information on performing diagnostics.

Note: Return to this procedure to continue service.

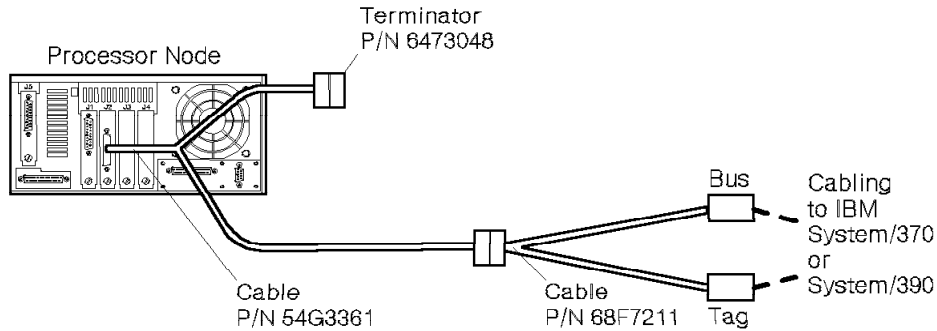


Figure 1-30. BMCA cabling to single processor node

Step 0640–001: You have detected a problem with the Block Multiplexer Channel Adapter.

1. Are multiple processor nodes failing on this channel?
 - If yes, go to “Step 0640–005” on page 1-142.
 - If no, go to “Step 0640–002.”

Step 0640–002: Only one processor node is failing on this channel.

1. Put the cable connector's Select-out Bypass Switch of the suspect BMCA card in the Bypass (“B”) position.
2. Remove cable from the suspect BMCA card connector.
3. Install the BMCA card wrap plug P/N 71F1184 on the card connector.
4. Run advanced diagnostics on this BMCA (“cat0”) through the card wrap test.
5. Did the card and card wrap diagnostics complete successfully?
 - If yes, go to “Step 0640–004” on page 1-142.
 - If no, go to “Step 0640–003.”

Step 0640–003: The card and card wrap diagnostics **did not** complete successfully.

1. Replace the BMCA card.
2. Install the BMCA card wrap plug P/N 71F1184 on the new card connector.
3. Run advanced diagnostics on this BMCA (“cat0”) through the card wrap test.
4. Did the card and card wrap diagnostics complete successfully?
 - If yes, you have resolved the problem and need to restore the node to the channel.
 - a. Remove the card wrap plug P/N 71F1184 from the adapter connector.
 - b. Install the cable on the new BMCA card connector.
 - c. Restore the Select-out Bypass Switch to the Select (“S”) position.
 - d. Inform the Customer that the channel resource is available.

Block Multiplexer Channel Adapter (MAP 0640)

- e. Go to “End of call” on page 1-144.
- If the card and card wrap diagnostics **did not** complete successfully after you replaced the BMCA card, you must call the next level of support.

Step 0640–004: Only one processor node was failing on the BMCA channel and when you removed the cable from the suspect BMCA connector, you were able to successfully complete the card and card wrap diagnostics. This indicates that a potential cable problem exists. To complete the diagnostics, you must restore node to channel.

1. Remove the card wrap plug P/N 71F1184 from the adapter connector.
2. Install the cable on the new BMCA card connector.
3. Restore the Select-out Bypass Switch to the Select (“S”) position.
4. Inform the Customer that the channel resource is available.
5. Go to “Step 0640–005” to continue service.

Step 0640–005: You have arrived at this step because you either have multiple processor nodes failing on a BMCA channel or you suspect that the channel has cable problems. Continue the diagnostic procedure by opening the channel interface.

1. Ensure that:
 - The customer does not have any applications running on the failing channel
 - The parallel channel on the mainframe is varied off-line
2. Trace and note all BMCA cable connections from the cable entering the frame (P/N 54G3361) to each succeeding node in the daisy chain.
 - Make special note of which processor node is “first” on the chain; it should be the one with cable P/N 54G3361 (Y-cable with one nine-foot leg) attached.
 - Continue tracing until you reach the cable terminator.
3. Verify that the Select-out Bypass Switch (labeled S/B) at each adaptor is placed in the Select (“S”) position.
4. Check for obvious problems in the cabling chain, such as loose cable connections or missing terminator.
5. Were all the BMCA interface cables and terminators properly connected?
 - If yes, go to “Step 0640–006.”
 - If no:
 - a. Fix the obvious problem.
 - b. Does this correct the customer's reported problem?
 - If yes, you have resolved the problem.
 - 1) Inform the customer that the channel resource is available.
 - 2) Go to “End of call” on page 1-144.
 - If this **does not** correct the reported problem, go to “Step 0640–006” to test cables.

Step 0640–006: You were not able to find any obvious cabling problems. Continue diagnostics by testing the interface cables (refer to Figure 1-31 on page 1-143).

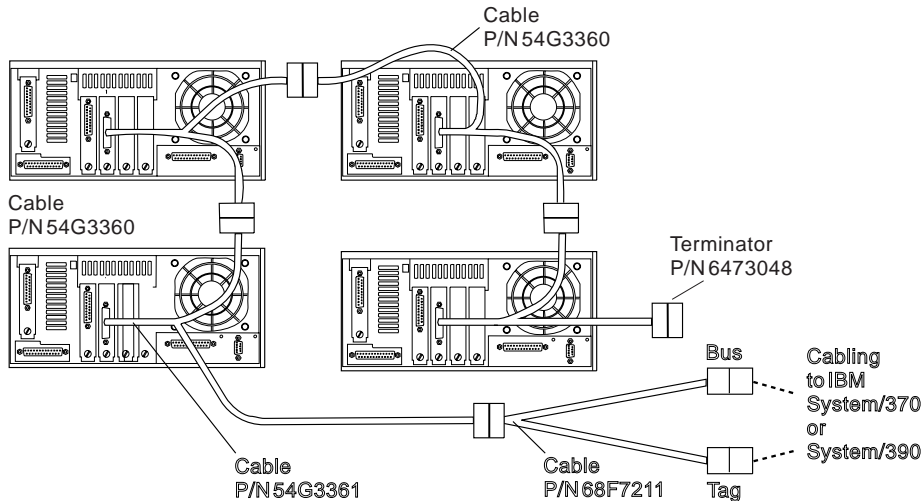


Figure 1-31. BMCA Cabling to Multiple Processor Nodes

1. Remove the channel-attach (mainframe) cables from the end of cable P/N 68F7211 (the cable furthest from the frame).
2. Install wrap plugs, P/N 8575337 (Bus) and P/N 8575338 (Tag) on that end of the cable P/N 68F7211.
3. Test all RS/6000 SP BMCA cables and terminator on this channel interface.
4. Run advanced diagnostics on the suspect BMCA ("cat0"), including the cable wrap test.
5. Did the diagnostics fail?
 - If yes, go to "Step 0640-009" on page 1-144.
 - If no, go to "Step 0640-007."

Step 0640-007: The diagnostics **did not** fail on a specific channel interface, however the diagnostics must be run on **all** failing nodes.

1. Have diagnostics been run from all failing nodes?
 - If yes, go to "Step 0640-008."
 - If no:
 - a. Select the next failing BMCA node as the suspect node.
 - b. Go to "Step 0640-006" on page 1-142 to continue testing cables.

Step 0640-008: You did not find any obvious cable problems and when you ran the advanced diagnostics from all **failing** nodes, all RS/6000 SP adapters and cables tested okay. The following list contains potential problems that the advanced diagnostics may not have found:

- If all processor nodes but one fail on this channel, suspect the BMCA in the passing node. That adapter may be causing the other adapters to show errors.
- Problem might exist with channel IOCDS or application defined BMCA addressing.
- Make sure all BMCA nodes on this channel are using different address ranges.
- Problem may exist with channel interface cables to host or attaching unit.

After you have considered the potential problems listed above:

1. Remove wrap plugs, P/N 8575337 (Bus) and P/N 8575338 (Tag) from end of the cable P/N 68F7211.

End of call procedures (MAP 0650)

2. Reconnect the channel-attach (mainframe) cables to the end of cable P/N 68F7211 (the cable furthest from the frame).
3. Continue analysis from mainframe channel or call next level of support.

Step 0640–009: The advanced diagnostics **failed** when you ran them on the suspect BMCA (“cat0”). This indicates that a problem was detected with the BMCA 78-pin cables or terminator connecting the BMCA cards.

1. Isolate the failing cable by moving the terminator and swapping or deleting cables from string.
 - Reminder: defective terminators or wrap plugs can cause failure.
 - Refer to Figure 1-31 on page 1-143, while isolating fault.
2. Were you able to isolate the failing component?
 - If yes, go to “Step 0640–010.”
 - If no, call the next level of support.

Step 0640–010: You were able to isolate the failing component.

1. Replace defective component.
2. Restore cables, wrap plugs, and terminator to original configuration.
3. Rerun advanced diagnostics on the suspect BMCA (“cat0”) to verify repair.
4. Did the card and cable wrap diagnostics complete successfully?
 - If yes, you have resolved the problem.
 - a. Remove wrap plugs, P/N 8575337 (Bus) and P/N 8575338 (Tag) from end of the cable P/N 68F7211.
 - b. Reconnect the channel-attach (mainframe) cables to the end of cable P/N 68F7211 (the cable furthest from the frame).
 - c. Inform the customer that the channel resource is available.
 - d. Go to “End of call.”
 - If the card and cable wrap diagnostics **were not** successful, go to “Step 0640–009” and retest the cables.

End of call

End of call procedures (MAP 0650)

Purpose of this MAP

This MAP is referenced upon completion of a service action. This MAP indicates the information to be logged, actions required by the customer to utilize fix, and actions required to verify that the hardware is left in a usable state.

Step 0650–001: Check Table 1-32 on page 1-145 for any further steps required to complete service actions and then continue at “Step 0650–002” on page 1-145.

<i>Table 1-32. End of call actions</i>	
Service action	Steps to complete recovery
<ul style="list-style-type: none"> • Processor node fixed disk replaced • Processor node I/O planar replaced • Processor node I/O adapter replaced • Node supervisor power was removed during service. 	Have customer perform the appropriate steps in <i>IBM RS/6000 SP: Administration Guide</i> under "Recovery Procedures."

Step 0650–002: You have completed a service action.

1. Was a Field Replaceable Unit (FRU) replaced, or any service action taken (such as reseating a cable or card), and the fix verified?
 - If yes, go to "Step 0650–004."
 - If no, go to "Step 0650–003."

Step 0650–003: You **did not** replace and verify a FRU.

1. Was the service action an EC or regular upgrade?
 - If yes:
 - a. Record action in account log against all appropriate nodes or the EC number.
 - b. Go to "Step 0650–009" on page 1-147 and refer to Table 1-33 on page 1-147 for the proper serial number to use when recording the EC.
 - If no:
 - a. Record action taken in account log.
 - b. Open a Tracking Problem Management Record (PMR) through support center (RETAIN).
 - c. Record time service action as appropriate service code **Incomplete** against Machine Type/Serial Number.
 - d. Go to "Step 0650–009" on page 1-147 and refer to Table 1-33 on page 1-147 for the proper serial number to use when recording the EC.

Step 0650–004: You either replaced a FRU or took a service action and verified the fix.

1. Reboot the node in NORMAL mode.
2. Check for missing resources.
 - Run the command **diag -a**
3. Verify the replaced FRU is functioning properly by performing "System Verification Tests" from the advanced diagnostics menu.
4. Did the Resource Repair Action menu (801015) display?
 - If yes, go to "Step 0650–006" on page 1-146.
 - If no, go to "Step 0650–005" on page 1-146.

End of call procedures (MAP 0650)

Step 0650–005: When you performed the System Verification Test, the "Resource Repair Action" menu (801015) **did not** display.

1. Did the "Testing Complete, no trouble found" menu (801010) display?
 - If yes:
 - a. Exit diagnostics.
 - b. Go to "Step 0650–007."
 - If no:
 - a. A problem still exists.
 - b. Return to "Starting a service call (MAP 0100)" on page 1-1.

Step 0650–006: You performed the System Verification Test and the "Resource Repair Action" menu (801015) displayed. This indicates that the AIX error log contains an entry showing that a monitored FRU has been replaced and that you must reset the error log. To reset the error log:

1. From the Resource Repair Action menu, select the FRU you replaced.
2. After you have made all required FRU selections, click **Commit**.
Note: To exit the menu without selecting an item, click **Exit**.
3. When the No Trouble Found menu appears:
 - a. Exit the diagnostics.
 - b. Go to "Step 0650–007."

Step 0650–007: You must now record the service actions and complete a final check.

1. Record the action completed in the account log.
2. Properly account for all parts utilized in this service call.
3. Record the time as complete on Machine Type/Serial Number.
 - Go to "Step 0650–009" on page 1-147 and refer to Table 1-33 on page 1-147 for the proper serial number to use when recording the service action.
4. Record the hardware addresses for any Ethernet cards or I/O planar cards replaced.
 - This information is used for updating the customer's **bootptab.info** and other files.
5. Review "Step 0100–002" on page 1-5 and check the conditions listed in Table 1-2 on page 1-6.
6. Are any of the conditions in "Step 0100–002" on page 1-5 present?
 - If yes:
 - a. Further service action is required.
 - b. Go to "Step 0100–002" on page 1-5.
 - If no, go to "Step 0650–008."

Step 0650–008: Service call is complete.

1. Unfence any nodes that were fenced for service action.
 - Refer to "Viewing switch partitions" on page 3-28.
2. Check "Preventive maintenance" on page 3-34 for preventive maintenance procedures.

Step 0650–009: Refer to Table 1-33 on page 1-147 to obtain the serial numbers needed for recording service actions.

<i>Table 1-33. Proper Serial Number to Record</i>	
Fault Isolated To	Serial Number to Record
RS/6000 SP <ul style="list-style-type: none"> • Base Frame: <ul style="list-style-type: none"> – Power distribution – Frame supervisor – Supervisor harness – Frame cabling • Switch Feature: <ul style="list-style-type: none"> – Multi-Switch Frame (F/C 2030/1) – Switch assembly – Switch adaptors – Switch cables • Processor node components 	Controlling frame serial number (see note)
Other: <ul style="list-style-type: none"> • Control workstation • File server (not included in RS/6000 SP frame network) 	Do NOT record time against RS/6000 SP when trouble is isolated to another Machine Type.
Note: Controlling frame serial number is the RS/6000 SP Model frame (the first frame) of a multiple frame configuration.	

Main power MAP

Main power (MAP 1520)

Step 1520–001: If you came to this book looking for a 1520 main power MAP, go to one of the following MAPs:

Single node problem “Processor node diagnostics and descriptions (MAP 0130)” on page 1-33

Multiple node problems “Main power (MAP 0450)” on page 1-66

Minimum configuration MAPs

Minimum node configurations (MAP 1540)

Step 1540–001: If you came to this book looking for a 1540 Minimum configuration MAP, go to one of the following MAPs:

Uniprocessor thin and wide nodes “Processor node diagnostics and descriptions (MAP 0130)” on page 1-33

604 and 604e high nodes The "Minimum configuration" MAP in *RS/6000 SP: 604 and 604e SMP High Node Service Guide*

SSA Maintenance Analysis Procedures

332 MHz SMP thin and wide nodes The applicable "Minimum configuration" MAP in *RS/6000 SP: SMP Thin and Wide Node Service Guide*

POWER3 SMP Thin and Wide nodes The applicable "Minimum configuration" MAP in *RS/6000 SP: SMP Thin and Wide Node Service Guide*

POWER3 SMP High Node The "Minimum configuration" MAP in *RS/6000 SP: POWER3 SMP High Node Service Guide*

SSA Maintenance Analysis Procedures

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

How to use these MAPs

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

1. Use the system-management task menus to make the disk drive modules unavailable.
2. If the system unit has more than one SSA adapter, make the SSA Hot-Swap Disk Drive modules unavailable to the system for each of the paths to the SSA Hot-Swap Disk Drive.

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

- To isolate the FRUs associated with in the failing SSA Hot-Swap Disk Drive, perform the actions and answer the questions given in this MAP.
- When instructed to exchange two or more FRUs in sequence:
 1. Exchange the first FRU in the list for a new one.
 2. Verify that the problem is solved. For some problems, verification means running the diagnostic programs (see the using-system service procedures).
 3. If the problem remains:
 - a. Reinstall the original FRU.
 - b. Exchange the next FRU in the list for a new one.
 4. Repeat steps 2 and 3 until either the problem is solved, or all the related FRUs have been exchanged.
 5. Perform the next action indicated by the MAP.
- Table 1-34 explains the meaning of the four SSA status LEDs and Figure 1-32 on page 1-149 shows their locations.

LED # (color)	Status indicated	State	Definition
1 (yellow)	Not used	Not used	NA
2 (green)	Power status	On	Disk power on
		Off	Disk power off

Table 1-34 (Page 2 of 2). SSA status LED definitions

LED # (color)	Status indicated	State	Definition
3 (green)	Link status	On	Both SSA output loops connected
		Blinking	One SSA output loop connected
		Off	No SSA output loops connected
		Rapid flicker	Drive is executing a command
4 (yellow)	Check status	On	POST or disk error
		Blinking	Identify enabled
		Off	Normal operation

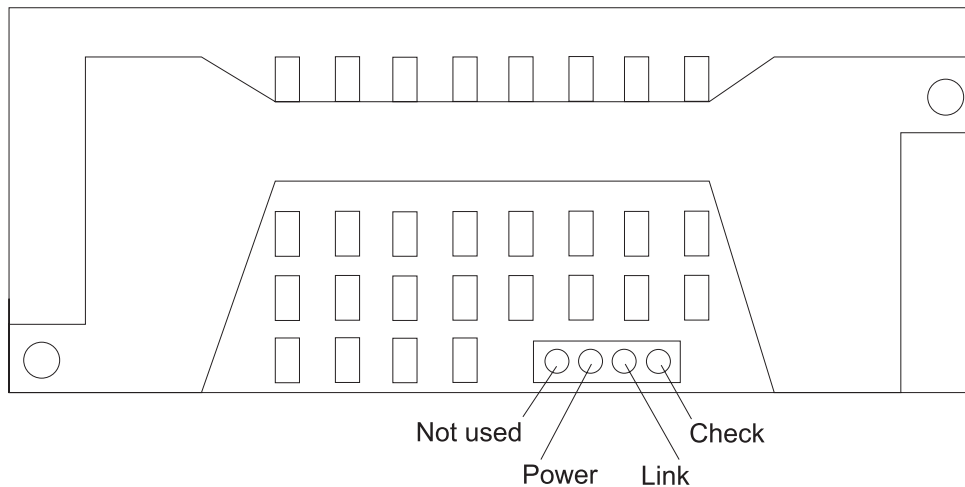


Figure 1-32. SSA DASD LED locations

SSA hot-swap disk drive-start (MAP 2010)

This MAP is the entry point to the MAPs for the SSA Hot-Swap Disk Drive.

If you get a five digit SRN but are not sure which SSA Hot-Swap Disk Drive may be defective, run the Link Verification Service Aid.

You might have been sent here because:

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

Step 2010-1: Have you been sent to this MAP from the Configuration Verification Service Aid?

NO Go to "Step 2010-3".

YES Go to "Step 2010-2".

SSA hot-swap disk drive-start (MAP 2010)

Step 2010-2: One of the following conditions exists. Take the action described.

1. You have an hdisk that has no associated pdisk.
 - a. Issue the system **cfgmgr** command.
 - b. Retry the Configuration Verification Service Aid.
 - c. If the problem remains, a software error has probably occurred. Call your support center for assistance.
2. You have a pdisk that has no associated hdisk.
 - a. Run diagnostics (using system verification mode) to the pdisk.
 - b. If you get a five digit SRN, go to Appendix A, "SSA software and microcode errors" on page A-1 and follow the actions described.

If you do not get a five digit SRN, the disk formatting may be incompatible with the system (the disk was formatted on a different type of using system).

 - 1) Format the pdisk.
 - 2) Issue the system **cfgmgr** command.
 - 3) Retry the Configuration Verification Service Aid.
3. If the problem remains, a software error has probably occurred. Call your support center for assistance.

Step 2010-3: Have the system diagnostics or problem determination procedures given you a five digit SRN for the SSA Hot-Swap Disk Drive?

NO Go to "Step 2010-4".

YES See Appendix A, "SSA software and microcode errors" on page A-1 for a listing of service request numbers and their associated service actions.

Step 2010-4: If the system diagnostics are available, go to "Step 2010-5".

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

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

Step 2010-5: Run the diagnostics in the problem determination mode.

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

NO Go to "Step 2010-6".

YES See Appendix A, "SSA software and microcode errors" on page A-1 for a listing of service request numbers and their associated service actions.

Step 2010-6: Are all LEDs on the drives off?

NO Go to step "Step 2010-9".

YES Go to "Step 2010-7".

Step 2010-7: Are any power cables loose or in need of replacement?

NO Go to "Step 2010-8".

YES Fix or replace the power cables as required. Go to "SP Expansion I/O Unit power" MAP in *RS/6000 SP: POWER3 SMP High Node Service Guide*. to verify the repair.

Step 2010-8:

1. Replace the DASD docking card.
2. Replace the DASD controller card.
3. Go to "End of call" on page 1-144.

Step 2010-9: Is there only one drive with no LEDs on?

NO Go to step "Step 2010-10".

YES Replace the following FRUs:

1. DASD docking card
2. Replace the DASD controller card
3. Disk drive assembly

Go to "End of call" on page 1-144.

Step 2010-10: Is the ready (middle) LED on any of the disk drives on a backplane off?

NO Go to step "Step 2010-11".

YES Replace the following FRUs:

1. Disk drive assembly
2. DASD docking card
3. Replace the DASD controller card
4. DASD power cable

Go to "End of call" on page 1-144.

Step 2010-11: Is the ready (middle) LED in SSA drive one or SSA drive four flashing?

NO Go to step "Step 2010-8".

YES Go to step "Step 2010-12".

Step 2010-12: Replace all external SSA cables and the internal SSA cable and recheck the ready LED. Did the LED stop flashing?

NO Go to step "Step 2010-13".

YES Go to "End of call" on page 1-144.

Step 2010-13: Replace the following:

1. DASD docking card
2. Disk drive with the second LED flashing

Go to "End of call" on page 1-144.

SSA hot-swap disk drive-start (MAP 2010)

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.

SP Frame locations (2.01 m and 1.93 m frames) - front view

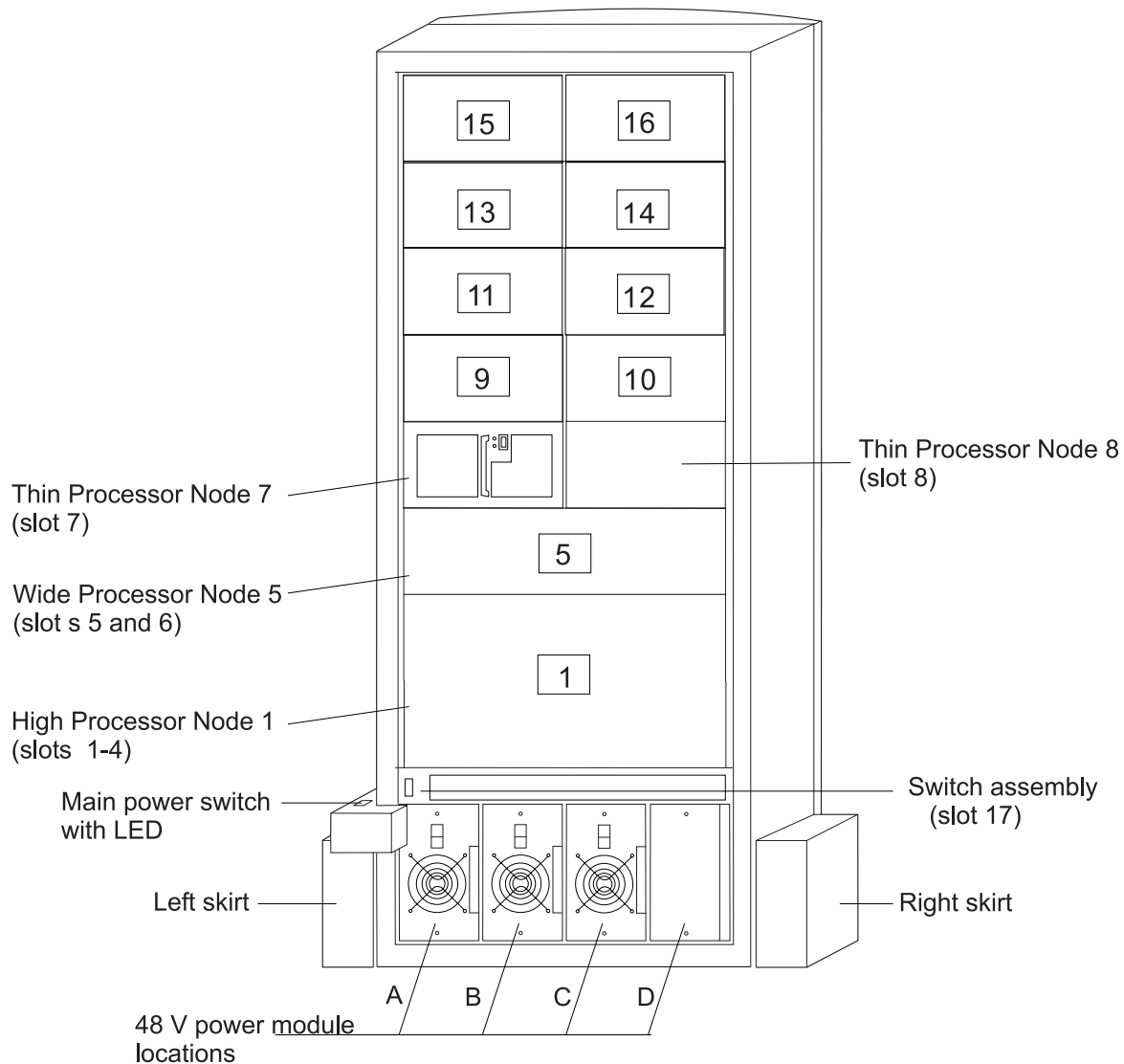
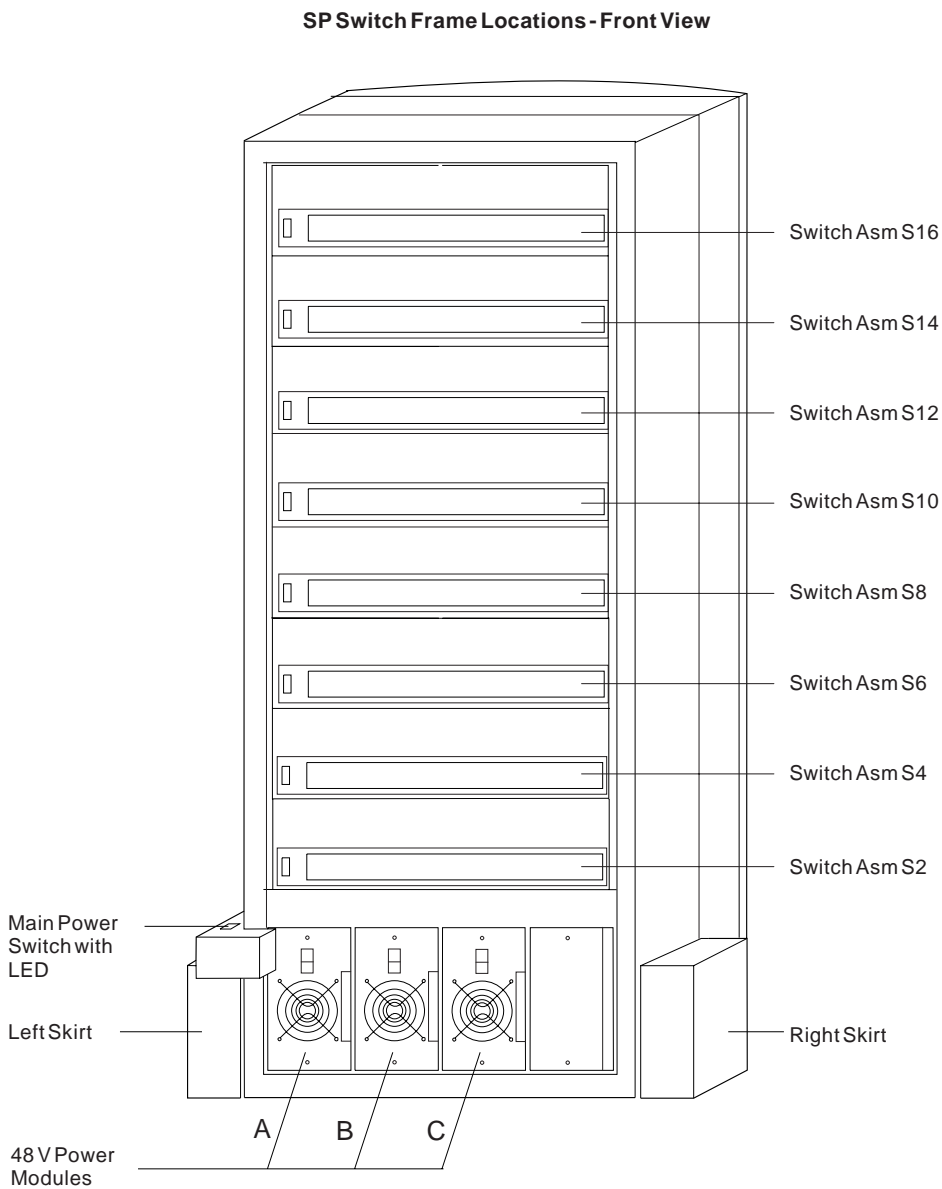


Figure 2-1. Front view of frame locations. See notes below.

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.



(Front Cover and Skirt, and Air Filter Removed)

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 (1.25 m) frame.

SP Frame locations (1.25 m and 1.4 m frames) - front view

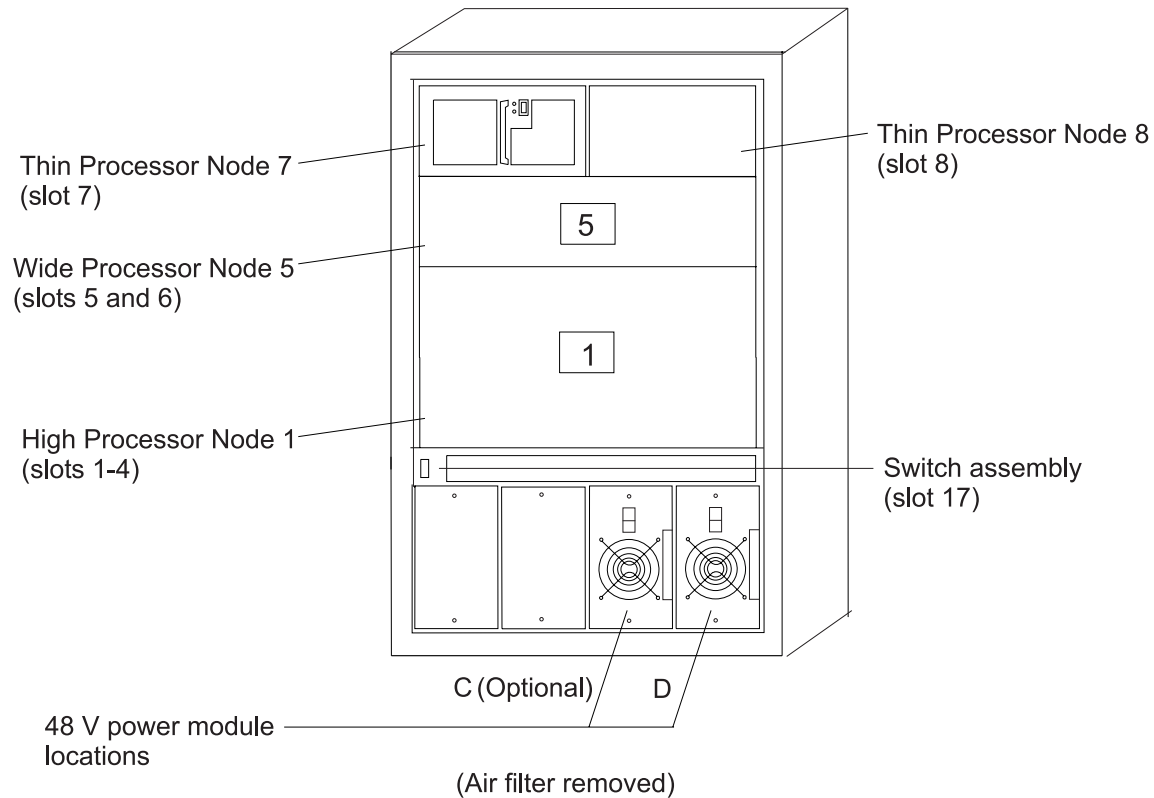


Figure 2-3. Front view of 1.25 m frame locations. See notes below.

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 1.25 m 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 1.36 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

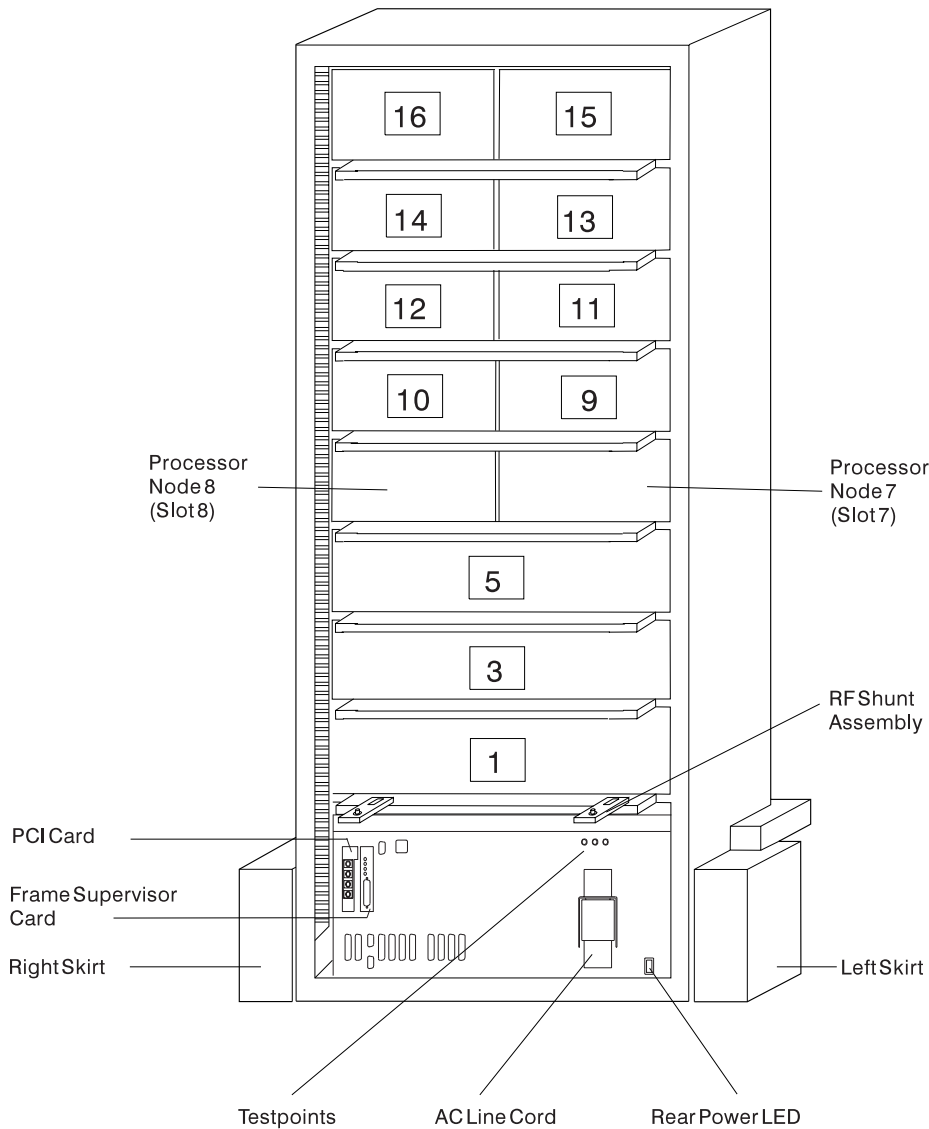


Figure 2-4. Rear view of frame locations

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

Power Distribution Unit (PDU) locations

Figure 2-5 shows a rear view of the RS/6000 SP power distribution unit with the access covers removed. “Power Distribution Unit (PDU)” on page 2-8 shows the power distribution unit assembly designations.

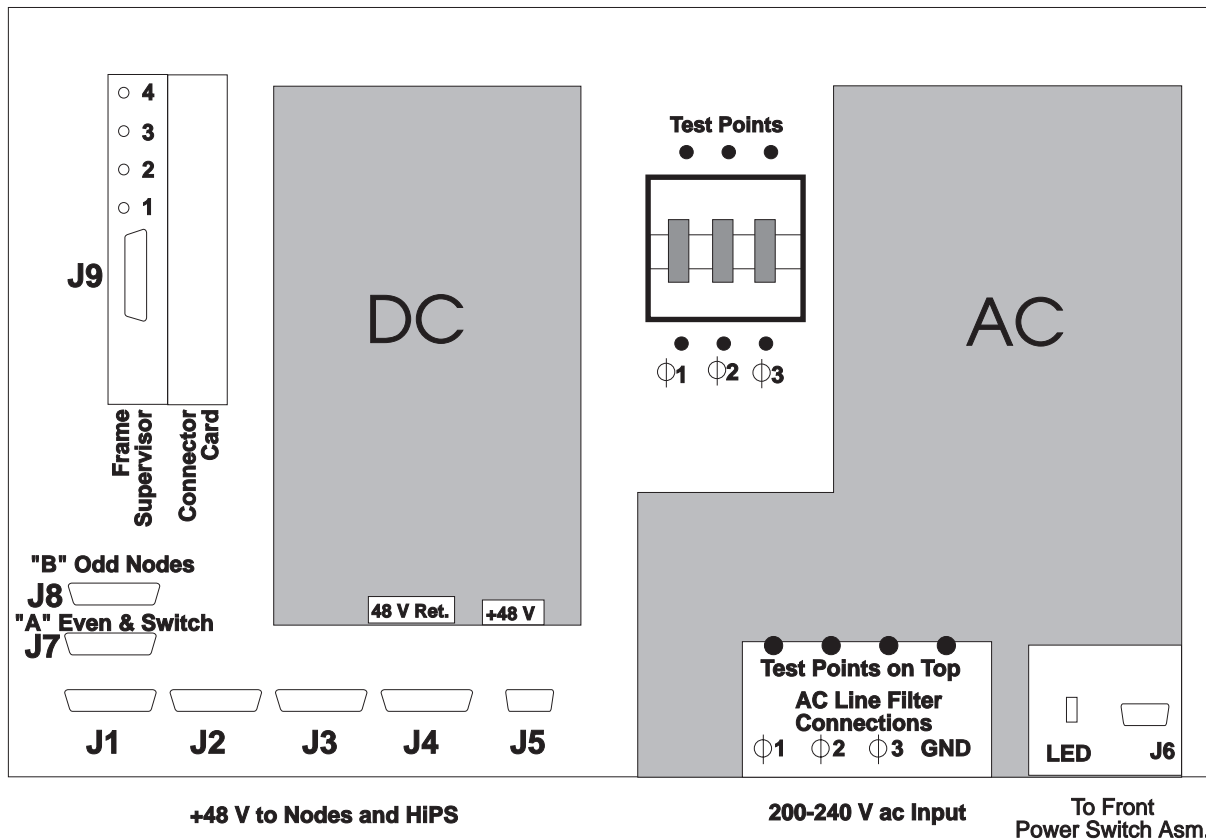


Figure 2-5. Rear view of power distribution unit

Figure 2-6 on page 2-8 shows a top view of the RS/6000 SP power distribution unit:

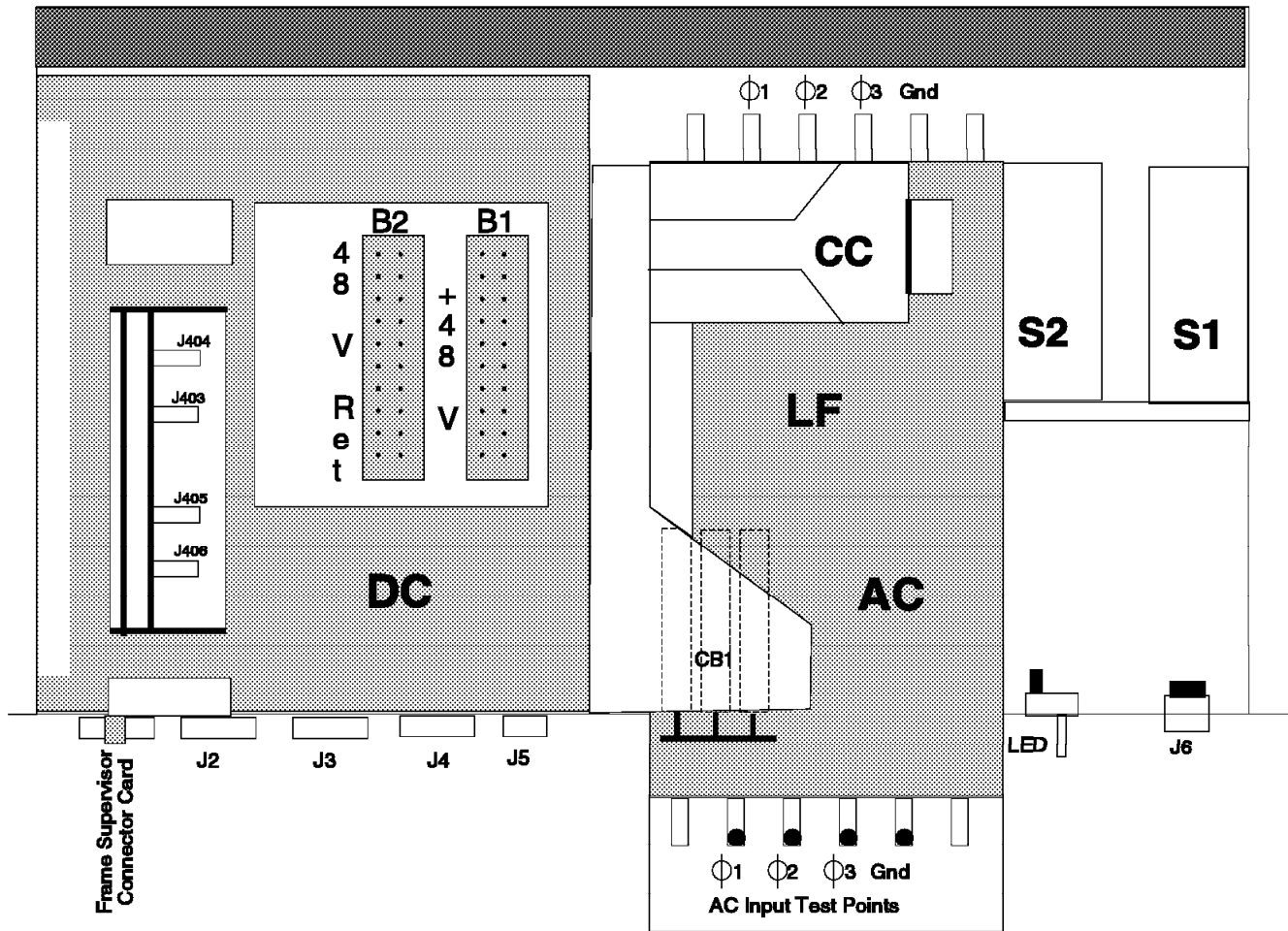


Figure 2-6. Top view of RS/6000 SP primary power compartment

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

- B1-B2: Busbar 1-2
- FC: Frame connector card
- FS: Frame supervisor card
- BP: Frame supervisor backplane
- BH: Bulkhead
- LF: Line Filter
- CC: Contactor
- S1: 12 V Lambda
- S2: 24 V Lambda
- LD: LED card
- CB: Circuit breaker
- CH: Chassis (for chassis ground)

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

- TB: TB1, terminal block
- S1 - S4: Power supply modules (numbered from left to right, when facing)
- V1: dc output
- BH: Bulkhead

Scalable Electrical Power Base Unit (SEPBU) locations

Figure 2-5 on page 2-7 shows a rear view of the RS/6000 SP power distribution unit with the access covers removed. Figure 2-7 shows the scalable electrical power base unit assembly designations.

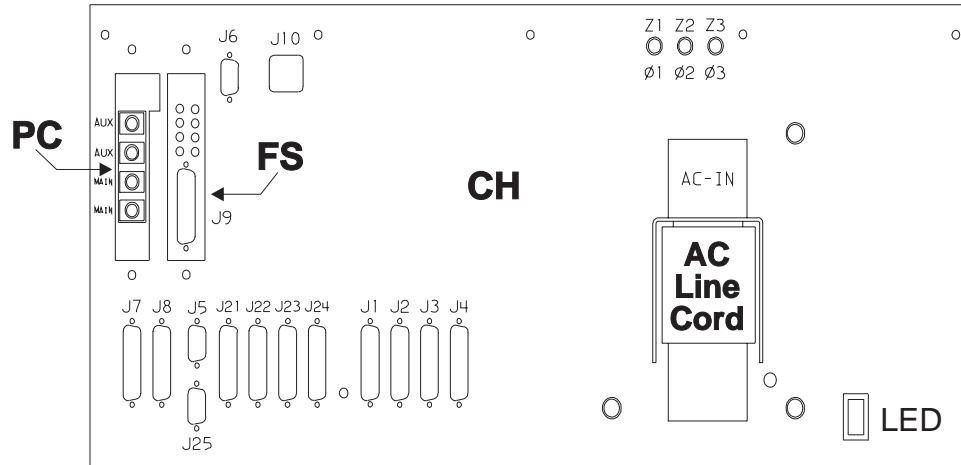


Figure 2-7. Rear view of Scalable Electrical Power Base Unit

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

- FS: Frame supervisor card
- PC: PCI (power control interface) card
- BH: Bulkhead
- CH: Chassis
- S1-S4: Power supply modules (numbered from left to right, when facing)

Connector details

Figure 2-8 on page 2-10 shows RS/6000 SP component connector details.

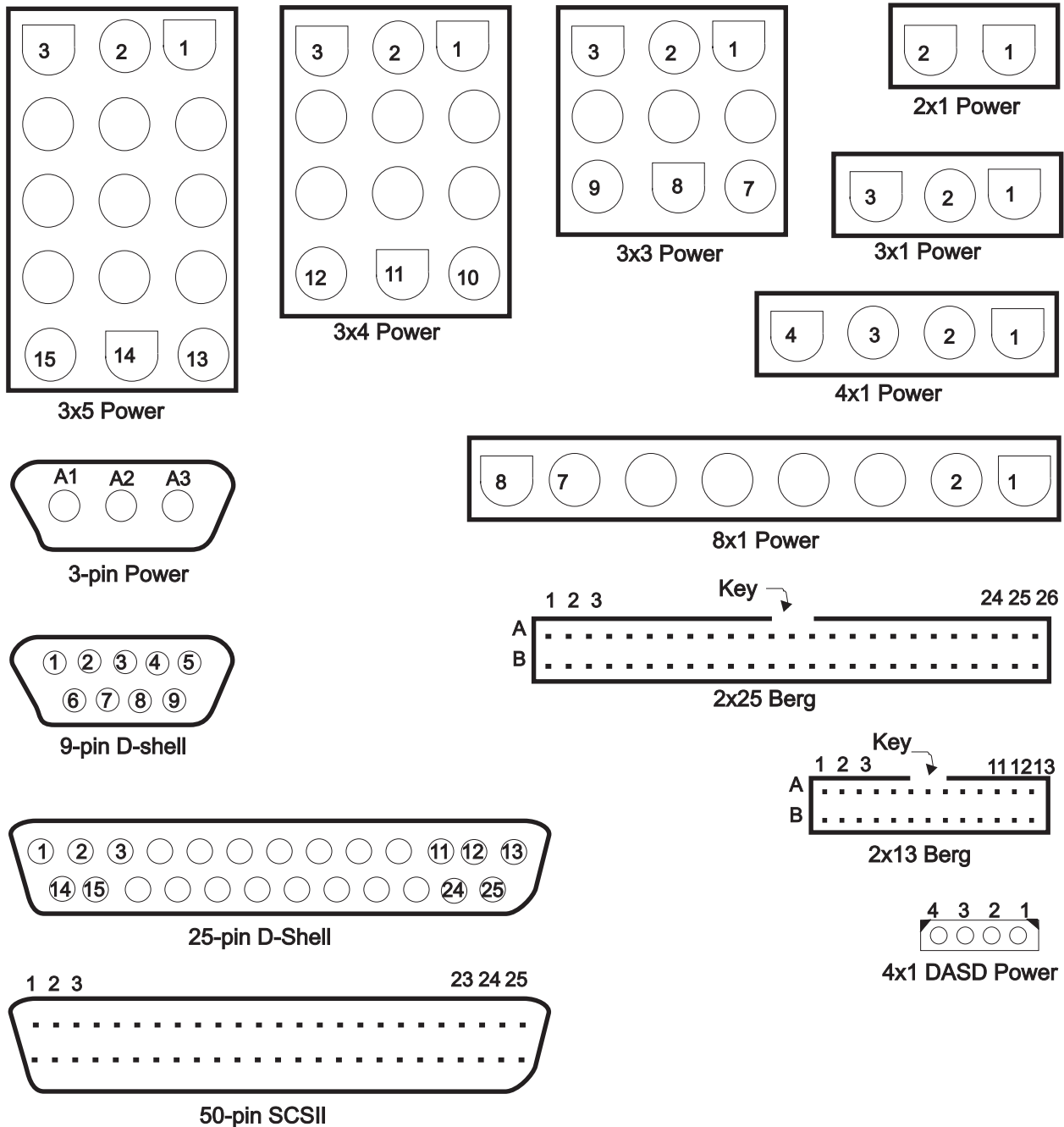


Figure 2-8. RS/6000 SP connector details (as seen at receiving ends, not at cable ends)

Cable routing

Figure 2-9 on page 2-11 and Figure 2-10 on page 2-11 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.

Note: When attaching exterior and interior cables to a POWER3 SMP High Node allow for enough cable for a 2-foot service loop for node movement into service position.

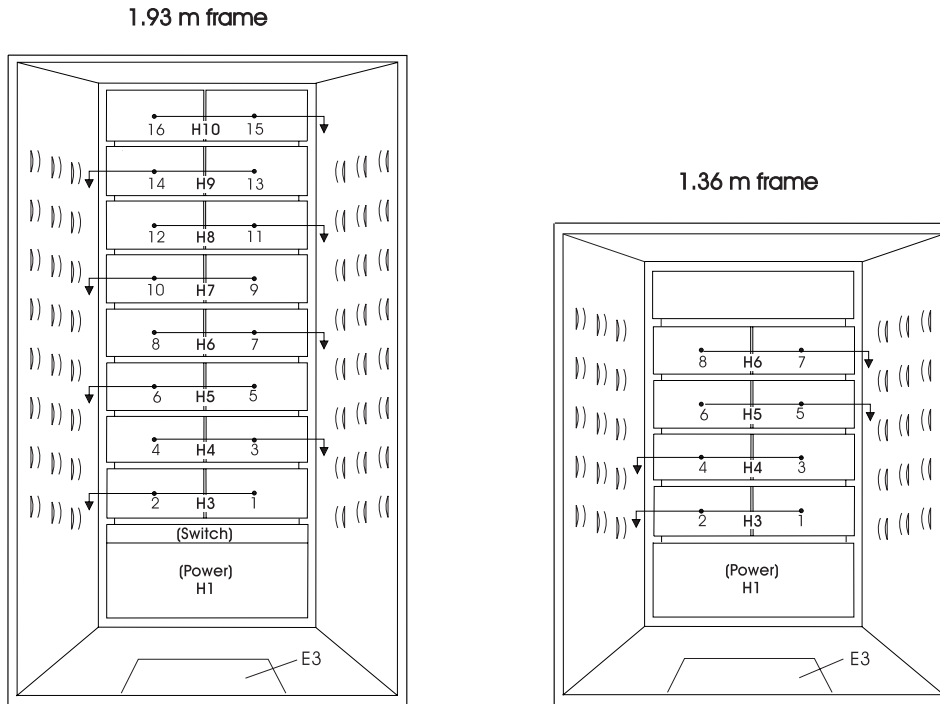


Figure 2-9. Frame cabling routing path in rear of 1.93 m and 1.36 m RS/6000 SP frames

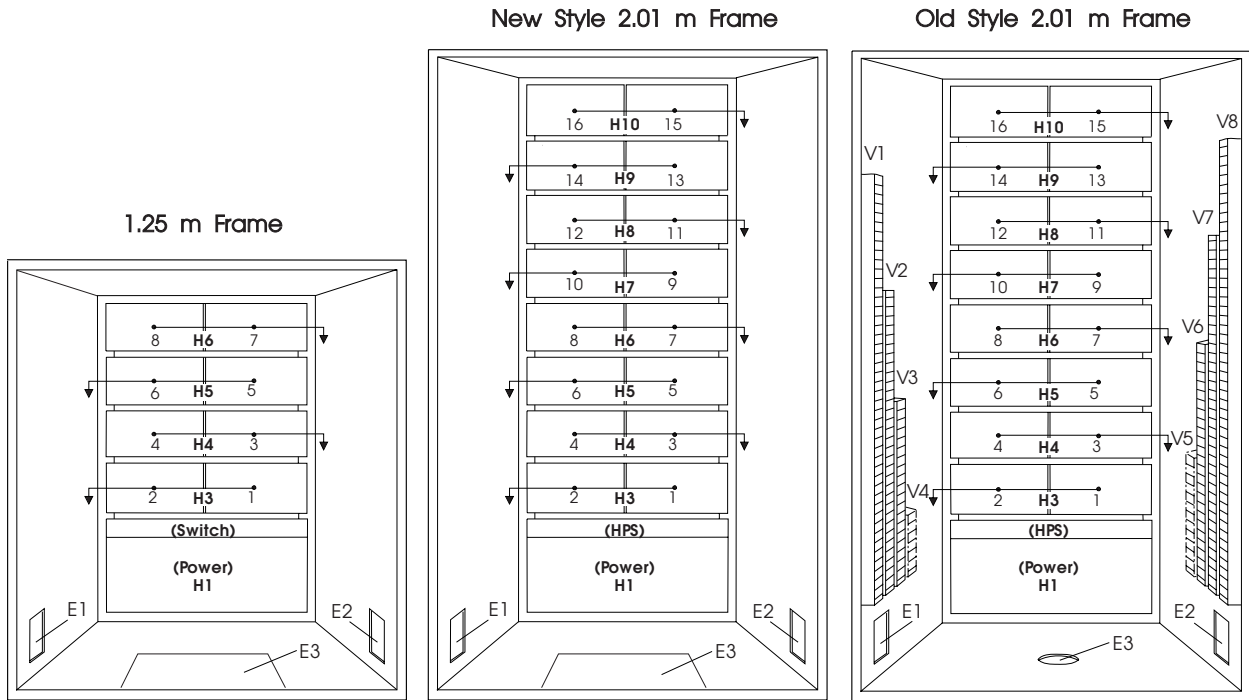


Figure 2-10. Frame cabling routing path in rear of 2.01 m and 1.25 m RS/6000 SP frames

Note: For a multi-switch frame (F/C 2030/1), refer to Figure 2-9.

Table 2-1 on page 2-12 shows external cable routing in a RS/6000 SP frame populated with 16 processor nodes. (Refer to “Cable routing” on page 2-10 to see the routing paths.)

Table 2-1. External cable routing

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

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Tools and files overview

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

Table 3-1. Service procedure tools

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

<i>Table 3-2. Setup output files</i>		
File (see note)	Location	Description
rc.switch.log	All nodes	Logs all information on the last run of rc.switch . It will indicate if this is a primary or secondary node, the associated switch chip information, and IP address information.
rc.switch.log.previous	All nodes	A copy the previous run of rc.switch .
expected.top.no_comments	All nodes	Used by rc.switch to more easily parse out chip connection information.
fs_daemon_print.file	All nodes	A log of the daemon.
fs_monitor.log	All nodes	A log of the monitor daemon.
css.snap	All nodes	Log files created by the switch support code.
Note: The directory for these utilities is /var/adm/SPlogs/css .		

<i>Table 3-3. Tuning output files</i>		
File (see note)	Location	Description
daemon.stdout	Primary	Keeps a detailed account of the tuning process initiated by the Estart command. It includes data from every tuning operation since the current daemon on the primary node was initiated.
daemon.results	Primary	A record of how many nodes were initialized.
daemon.stderr	Primary	A record of which nodes were not initialized.
out.top	Primary	Reports errors from the last tuning procedure. It begins as a copy of the topology file and errors are indicated to the right of each entry.
out.top.old	Primary	A copy of out.top from the previous run.
router.log	Primary	The router log file generated by the route table generator after initialization.
router.log.x	All nodes	The route information for a particular node x.
Note: Unless otherwise noted, the directory for these utilities is /var/adm/SPlogs/css .		

Using the **css.snap** script

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

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

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

Under normal circumstances, it will collect the following:

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

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

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

- If less than 10% of **/var** is free, **css.snap** exits.
- If the CSS portion of **/var** is more than 30% of the total space in **/var**, **css.snap** erases old snap files until the CSS share sinks below 30%. If successful, **css.snap** proceeds. If not, it exits.

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

Kerberos authentication (SP code level 1.02 and higher)

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

Overview

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

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

Functions

klist **Checking your access list**

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

kinit **Obtaining access**

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

Helpful hints

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

Running diagnostics in a processor node

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

Note: If resource is not available, you must use “SERVICE mode (from disk)” on page 3-6 or “Basic stand-alone mode (from network boot)” on page 3-7 to test the device.

NORMAL mode (concurrent diagnostics)

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

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

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

TTY console:

- a. From the 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
 - b. For 604 or 604e High Node:
 - 1) Open the TTY console
 - 2) Issue **ssb**
 - 3) Select “1 Set Flags”
 - 4) Check for “1 BUMP Console Present disabled”
 - 5) Change “2 Autoserve IPL” to “ENABLE”
 - 6) Change “6 FAST IPL” to “DISABLE”
 - 7) Exit the BUMP menu
 - 8) Power on the node
 - 9) When the diagnostic menu appears, it might ask you to set the terminal type. If so, select “Initialize Terminal” option, and define the terminal type as “LFT”.
 - c. For 332 MHz Symmetric MultiProcessor (SMP) and POWER3 SMP Thin and Wide Nodes:
 - 1) Reboot the node (power the node off, wait briefly, then power the node on)
 - 2) Immediately after the words “memory” and “keyboard” are displayed, press and hold the **6** key (for a few seconds) on the TTY console
 - 3) Enter any requested passwords
 - 4) When the diagnostic menu appears, it might ask you to set the terminal type. If so, select “Initialize Terminal” option, and define the terminal type as “LFT”.
3. If booting from Ethernet LAN (“maintenance” image), make sure that the processor node has been set up to boot using a “maintenance” image. See “Selecting a processor node boot response” on page 3-9.
 - 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 3-5

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 3-9.

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 3-9 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 3-11, using the manual method
4. From the TTY console(s), you might have to press the **1** and **Enter** keys to enable the console
5. In this TTY console, enter the following command:

```
diag
```

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

Cleaning up the control workstation: Perform the following procedures to return the control workstation to its original state:

1. Unexport the directories:
 - a. Enter:

```
smitty rnmfsexp
```
 - 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
- If the *response* field is “disk”, check the *install_disk* field to determine which disk it will IPL from.
 - Determine which boot response (*response*) you need to use:

<i>Table 3-4. 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.	

- 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
```

- Make sure that the tty is closed before performing the network boot.
- 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.
- If selecting a response of “disk”: From the system monitor, power off/on processor node.
- 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" on page 3-11
- "Method two: manual (hand-conditioning) method" on page 3-11

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: On POWER3 SMP High Nodes, the LED/LCD value stops at **E1F1** for an extended time and will appear to be hung. This is a normal stop. If necessary to monitor and verify activity, open a read-only TTY connection to that node.

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.

604 and 604e High Nodes

On the Maintenance Menu:

- Enter "6" to select System Boot

Note: Refer to "System Guard maintenance menu access" in the "*RS/6000 SP: 604 and 604e SMP High Node Service Guide*."

332 MHz SMP or POWER3 SMP Thin and Wide Node

On the System Management Services Menu:

1. Enter **2** to select Multiboot
2. Enter **4** to select Boot Devices
3. Enter **3** to select 1st Boot Device.

Note: For menu display format and other information, refer to "Service processor menus" in the "RS/6000 SP: SMP Thin and Wide Node Service Guide."

POWER3 SMP High Node

1. Open TTY connection to the node
2. Switch on node power
3. When the RS/6000 banner scrolls across the screen, immediately press **1** after the word "Keyboard" shows on the bottom line

Note: Only press the **1** key one time.

4. Select option **3** "Remote Initial Program Load Setup"
5. Select option **1** to set IP parameters. The parameters are normally found in the customers */etc/hosts* file
6. Select option to verify adapter setup. This option helps verify the data rate is set correctly
7. Select option **3** to do a test "ping"

If all parameters are set correctly, the test ping returns the message "Ping Success"

8. Return to the Main Menu and select option **8** "Multiboot"
9. At the prompt, enter **5** "OK Prompt" and answer **yes** to the question
10. At the **0>** prompt, enter **boot** and press **Enter**

The packet count advances and a screen defining the system console appears. Follow normal diagnostic procedures.

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)**
 - 604 or 604e High Node: **Ethernet: Slot 0/1, BNC connector (1-pin)**

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

 - 332 MHz SMP or POWER3 SMP Thin or Wide Node: **Ethernet: Built-In**
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 **sphrdwr** 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:

```
sphrdwr 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 3-15.

Date/Time Date and time that event was logged.

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

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

- PERM (Permanent)—Used to indicate higher priority errors where service is required (for example, shutdown condition or frame supervisor not responding)

- TEMP (Temporary)—Used to indicate lower priority errors, where a momentary or minimal impact condition has occurred; maintenance could be deferred (for example, warning condition)
- UNKN (Unknown)—Used for informational messages (for example, node has been powered off)
- PEND (Pending)—Used to indicate conditions expected to impact system availability soon.

Resource Name

“sphwlog” refers to items logged for RS/6000 SP-specific errors.

Error Description/Probable Causes/Failure Causes/Recommended Actions

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

Diagnostic Explanation

To interpret, look for the following key items:

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

Sample “errpt -a ...” output report

ERROR LABEL: SPMON_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.

Diagnosing a machine check

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

Determining validity

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

Machine_Check_604

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

Determining type of machine check

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

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

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

1002 9030

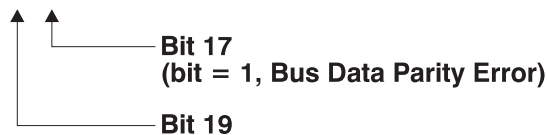
The left-most bit is **bit 31**. The right-most bit (least-most bit) is **bit 0**. Bits 21, 20, 17, and 16 represent the type of checkstop that occurred:

- Bit 21 = 1** CPU internal data cache parity error
- Bit 20 = 1** CPU internal instruction cache parity error
- Bit 17 = 1** CPU data bus parity error
- Bit 16 = 1** CPU address bus parity error

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

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

0001 0000 0000 0010



Determining which CPU caused the machine check

Note: Retain HSF H163707 shows how to evaluate machine checks using surveillance timeout data collection for the 332 MHz SMP Thin and Wide Node.

A stanza in the Machine Check Error Log labeled:

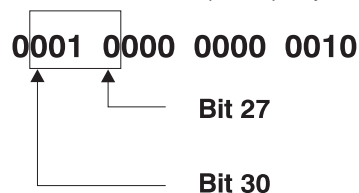
Central Processing Unit Number

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

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

1002 A030

The first 16 bits (1002) represent:



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

Correcting a 604 or 604e machine check

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

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

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

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

- If there is one, handle the problem as a memory error.
- If there is none, assume the problem is caused by the processor. Replace the processor card containing the CPU that caused the error.

Supervisor bus swap procedure

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

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

Verification test for supervisor bus

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

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

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

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

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.

Node/switch supervisor self-test

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

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

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

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

Self-test Conditions

Pass sequence

1. Both LEDs light (about 10 seconds)
2. Green LED stays lit, while yellow LED goes off (about two seconds)
3. Green LED stays lit, while yellow LED flashes node address
4. Both LEDs turn off (about two seconds)
5. Both LEDs light (about one second)

Fail conditions

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

If this is a 604 or 604e High Node:

1. Disconnect the node supervisor adapter cable from the node supervisor card assembly.
2. Locate LED 5. See Figure 3-1.

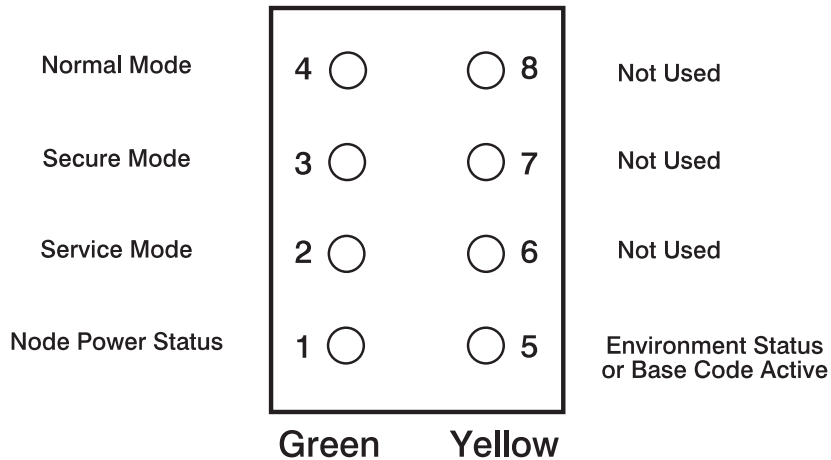


Figure 3-1. 604 and 604e High Node LEDs

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

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

Self-test Conditions

Pass sequence

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

Fail conditions

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

Base Code

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

If this is a 332 MHz SMP or POWER3 SMP Thin, Wide, or High Node:

1. Disconnect the node supervisor cable from the rear of the node.
2. Locate LED 5. See Figure 3-2.



Figure 3-2. 332 MHz SMP and POWER3 SMP Thin and Wide Node LEDs

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

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

Self-test Conditions

Pass sequence

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

Fail conditions

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

Base Code

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

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 3-29 before returning to the procedure that directed you here.

Checking network (LAN) status

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

Notes

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

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

```
lspp -ah ssp.basic
```

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

SSP code level 1.00 or 1.01

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

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

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

SSP code level 1.02 or higher

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

Selecting appropriate switch clocks

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

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

Selecting the switch clock source

1. Manual method for any SP system:

From an AIX window, enter:

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

2. **Topology** file method:

- a. From an AIX window, enter:

Eclock

(The display will tell you the current clock topology.)

- b. To select an alternate clock topology, enter:

Eclock -a filename

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

Determining the correct switch clock source

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

1. Determine the number of logical frames in the system.
2. Determine which clock choice to use for the system.
3. Locate the appropriate box in Table 3-5 on page 3-25, using the number of logical frames and the master clock choice.
4. Based on information in this box, set the switch clock source for each logical frame.
 - Lxx-** represents the logical frame number
 - Sxx-** represents a multi-switch frame

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

Table 3-5. Setting switch clock sources

Model	Number of Logical Frames	Master Clock Choice		
		1	2	3
30x	1-4	L01-S00 = i L02-S00 = 1 L03-S00 = 1 L04-S00 = 1	L01-S00 = 1 L02-S00 = i L03-S00 = 2 L04-S00 = 2	L01-S00 = 2 L02-S00 = 2 L03-S00 = i L04-S00 = 3
30x	5	L01-S00 = i L02-S00 = 1 L03-S00 = 1 L04-S00 = 1 L05-S00 = 2	L01-S00 = 1 L02-S00 = i L03-S00 = 3 L04-S00 = 2 L05-S00 = 2	L01-S00 = 2 L02-S00 = 3 L03-S00 = i L04-S00 = 3 L05-S00 = 3
40x	4-8	S01-S02=i All others = 1	S01-S06=i All others = 2	S01-S10=i All others = 3

Note: On an 8-port switch, the clock always equals 0. See samples in */etc/SP*.

Ethernet LAN isolation procedure

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

Ethernet coax LAN

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

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

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

Ethernet twisted pair LAN

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

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

Example of common topologies:

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

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

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

When the system monitor log is not working

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

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

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

Note: On older machines, the command can be:

```
/usr/lpp/sysmon/sp1mon
```

- b. From the Display Manager window, click on the "SP" option.
 - c. From the pulldown menu, click on the "Display Layouts" option.
2. Enter the frame number of the frame you are checking. Then:
 - **To check frame status:** Click on "Frame Diagnostic Panel" option, then click on "Display Frame Layout".
 - **To check a processor node's status:** Enter the number of the processor node you are checking, click on "Node Diagnostic Panel" option, then click on "Display Node Layout".
 - **To check a switch assembly's status:** Click on "Switch Diagnostic Panel" option, then click on "Display Frame Layout".
 3. Look for red or yellow indications on the "Diagnostic Panel".
 - **Red** status indicates a serious problem, such as a "shutdown" condition.
 - **Yellow** status normally indicates a warning condition.

Removing and restoring switch resources

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

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

Care should be taken to understand the consequences on any partitions that might be sharing switch resources. See “Viewing switch partitions” on page 3-28.

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

Removing a switch assembly from the active configuration

1. Identify the switch which is to be removed from the active configuration for an extended period of time. Display the clock selection for this switch assembly and record it for later use. See “Selecting appropriate switch clocks” on page 3-24.
2. **If the primary processor node (usually in Frame 1) is connected to the switch identified in step 1**, the customer must select an **available** processor node to be the new primary processor node. The primary node is set by the **Eprimary** command. Refer to *IBM RS/6000 SP: Administration Guide* for more information.
3. **If the master clock selected for the switch is from the switch assembly identified in Step 1**, the customer must reselect a new master clock. Refer to “Selecting appropriate switch clocks” on page 3-24.
4. Have customer stop all current parallel jobs and suspend all parallel jobs on the job queue.
5. Put circuit breaker at the front of switch assembly in the Off ('0') position.
6. The customer can re-initialize the switch using the **Estart** command. The frame and processor nodes which were removed in this procedure will appear in the **out.top** file with error messages; however, the remainder of the switch resources are now available for customer use.
7. If switch re-initialization was successful, the customer can start running parallel jobs again.
8. Return to MAPs to continue service action(s).

Restoring a switch assembly to the active configuration

1. Identify the switch assembly which is to be restored to the active configuration.
2. Have customer stop all current parallel jobs and suspend all parallel jobs on the job queue.
3. Make sure that the circuit breaker at the front of the switch assembly in the Off ('0') position.
4. Connect all cables to the switch assembly. Pay attention to the labels on the cables.
5. Put the circuit breaker at the front of the switch assembly in the On ('1') position.
6. Use switch front panel or the **Eclock** command to select the appropriate clock input for this switch assembly. For SSP code level 1.02 and higher, use the **Eclock -r** command.
7. If the primary processor node was changed during the isolation procedure, the customer can change the primary processor node back to the original selection; however, this is NOT required. The primary node is set by the **Eprimary** command. Refer to *IBM RS/6000 SP: Administration Guide*, for more information.

8. **If the master clock was changed during the isolation procedure**, the customer can reselect the clocks on all other switches; however, this is not suggested. (The previous clock selection for this switch assembly was recorded for possible use. See “Selecting appropriate switch clocks” on page 3-24.)
9. The customer can re-initialize the switch using the **Estart** command. Cables connected to the switch assembly and processor nodes which were restored in this procedure should appear in the **out.top** file without any error messages.
10. If switch re-initialization was successful, the customer can start running parallel jobs again.
11. Return to MAPs to continue service action(s).

Viewing switch partitions

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

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

Fencing nodes:

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

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

Unfencing nodes:

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

Efence of primary and primary backup nodes

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

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

Efence: 0028-147 Node number designates the Primary Node.

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

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

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: On POWER3 SMP High Nodes, the LED/LCD value stops at **E1F1** for an extended time and will appear to be hung. This is a normal stop. If necessary to monitor and verify activity, open a read-only TTY connection to that node.

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.

Working with an HACWS configuration

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

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

Making a particular control workstation active/inactive

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

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

1. Perform “Checking HACWS state of control workstations” to verify the HACWS state of both control workstations.
2. HACMP must be running on both workstations; perform “Starting HACMP and PSSP code on control workstations” on page 3-31 if necessary. Do not worry about which is the active or inactive workstation at this time.
3. To swap the state of the active/inactive control workstations: from the currently active workstation, perform “Stopping HACMP and PSSP code (with optional failover)” on page 3-31 with shutdown mode of “takeover”. Wait for completion of **clstop** command (about 2-10 minutes).
4. If maintenance is required on the inactive workstation, perform it here.
5. Perform “Starting HACMP and PSSP code on control workstations” on page 3-31 to start HACMP on the workstation that was shutdown.

Checking HACWS state of control workstations

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

- Check HACMP status (to make sure HACMP is running):
 1. On each workstation, enter:

```
smitty clshow
```
 2. Make sure subsystems “clstrmgr”, “clinfo”, and “clsmuxpd” all show “active” in the Status field. The “active” status indicates HACMP is active on this workstation.
 3. If status is “inoperative”, refer to “Starting HACMP and PSSP code on control workstations” on page 3-31.
- Check HACWS state of this workstation (primary/backup, active/inactive):
 1. On the workstation, enter:

```
lshacws -s
```
 2. Check the return for one of the following:

```
HACWS_PRIM_ACT_CWS
```

 This is an active primary control workstation.

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

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

- If desired, check the SDR for information concerning HACWS:
 1. On the workstation, enter the following:

```
sp1stdata -e |
pg
```

2. Check for information in fields such as:

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

Starting HACMP and PSSP code on control workstations

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

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

1. On the workstation, enter:

```
smitty clstart
```

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

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

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

Stopping HACMP and PSSP code (with optional failover)

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

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

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

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

1. On the workstation, enter:

```
smitty clstop
```

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

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

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

Monitoring activity/completion of clstart and clstop commands

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

1. On the workstation, enter:

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

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

Command (State)	Message
clstart (active)	SPCW_APPS COMPLETE at <i>timestamp</i>
clstart (inactive)	<i>timestamp</i> EVENT COMPLETED: node_up_complete <i>hostname</i>
clstop (active)	<i>timestamp</i> EVENT COMPLETED: node_down_complete <i>hostname</i>
clstop (inactive)	<i>timestamp</i> EVENT COMPLETED: node_down_complete <i>hostname</i>

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

Installing firmware updates on SP nodes

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

Follow the instructions in the README file within the package.

Installing adapter microcode packages

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

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

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

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

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

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

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

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

```
bffcreate -l -d /dev/fd0
```

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

e.

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

This will copy the data to the designated directory and update a table of contents file (`.toc`)

3. NFS Export that directory to the nodes:

```
exportfs -i /tmp/microcode
```

4. Either use the **dsh** command to control one or more nodes directly from the control workstation, or telnet to each individual node. (Commands in following steps would be 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.

Preventive maintenance

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

Removing and cleaning the air filter

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

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

1. Refer to "Removing the acoustic skirts" on page 4-23 to remove the front acoustic skirt.
2. Lift air filter from bottom and slide forward to remove completely.
3. Clean air filter screen with a soft brush to remove debris collected on the mesh.

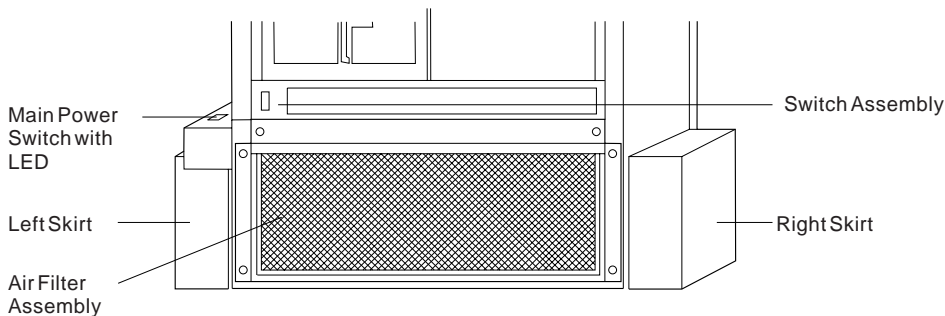


Figure 3-3. Air filter assembly

Replacing the air filter

Perform the following procedures to replace the air filter:

1. Replace the air filter by placing the air filter top first into the holding assembly. Push up on the bottom of the air filter and move the bottom back into holding bracket.
2. Refer to "Replacing the acoustic skirts" on page 4-24 to replace the front acoustic skirt.

SP-Attached Server service procedures

Decoupling and coupling code for SP-Attached Servers

1. Go to *IBM Parallel System Support Programs for AIX: Diagnosis Guide* and perform the problem determination procedure described in the chapter "Diagnosing SP-Attached Server Problems".
2. Before servicing the SP-Attached Server (RS/6000 7017 Models S70, S7A, and S80), perform the following procedures.

Decoupling the SP-Attached Server: Before removing the connection cables and powering off the SP-Attached Server, enter the following commands on the SP-Attached Server:

1. Stop hardmon:

```
stopsrc -s hardmon
```

2. Physically disconnect SAMI cable from RS/6000 7017 Models S70, S7A, or S80 operator panel.

3. Restart hardmon:

```
startsrc -s hardmon
```

When the SAMI daemon is stopped, you can unplug the SAMI cable from the RS/6000 7017 Models S70, S7A, and S80 operator panel and the serial cable from the S1 connector at the rear of the main I/O drawer. A keyboard and display must be attached to perform any action other than reading the operator panel codes.

RS/6000 7017 Models S70, S7A, and S80 service: Refer to the *RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide* to perform the required service action. One or both of the SP-Attached Server connection cables may need to be replaced to regain supervisor connectivity between the control workstation and the server.

Coupling the SP-Attached Server: Physically connect SAMI cable at the RS/6000 7017 Models S70, S7A, or S80 operator panel. Hardmon will detect the cable connection in approximately 5 seconds.

Chapter 4. FRU removals and replacements

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Procedures for the Power Distribution Unit (PDU)

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 xvii 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.

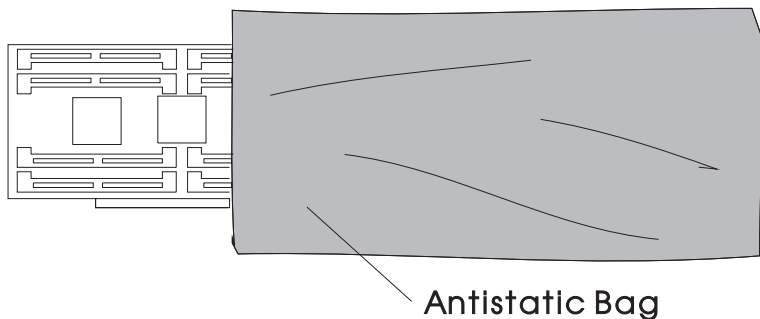


Figure 4-1. Handling an anti-static device

Procedures for the Power Distribution Unit (PDU)

Removing PDU components

Note: It may be necessary to remove the switch assembly and even the first processor node drawer to access some PDU parts and/or the PDU chassis.

CAUTION:

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

Perform these procedures to remove power distribution components:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the file system.

2. Toggle main power switch to Off ('0') position.
3. Open back cover and toggle circuit breaker to Off position.
4. Perform the Lockout/tagout procedure or the Bagout/lockout procedure ("Lockout safety procedures" on page 1-1), to remove power.
5. Perform "Removing the air filter assembly" on page 4-25 to remove the complete air filter assembly.
6. Refer to "Removing the acoustic skirts" on page 4-23 to access the PDU components.
7. Access the ac and dc sections of the power distribution as follows:
 - **ac Section:** Remove ac access panel screws to lift off access panel.
 - **dc Section:** Remove dc access panel screws to lift off access panel. If removing the dc access panel, first remove the cable at J9.
8. Return to the procedure that directed you here.

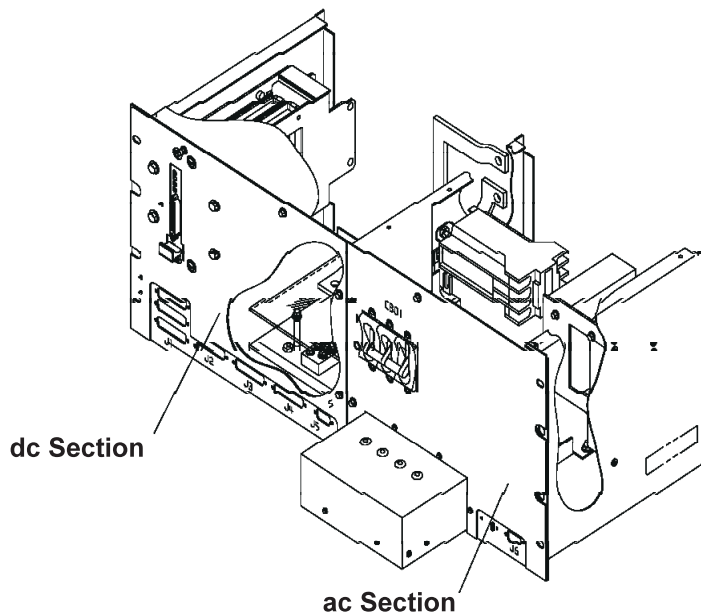


Figure 4-2. Removing PDU components

Replacing PDU components

Perform these procedures to replace power distribution components:

1. Reinstall ac access panel and tighten access panel screws.
2. Reinstall dc access panel and tighten access panel screws.
3. If previously removed, reinstall plug J9 at the dc section of the power distribution unit.
4. Refer to "Replacing the acoustic skirts" on page 4-24 to replace the acoustic skirts (except on 1.25 m frames).
5. Refer to "Replacing the air filter assembly" on page 4-25 to replace the air filter assembly.
6. Reapply ac voltage to ac line cord by plugging cable or toggling external circuit breaker feeding the line cord.
7. Toggle circuit breaker on the ac access panel of the Power Distribution Unit to On ('1') position.
8. Toggle main power switch to On ('1') position.
9. Return to the procedure that directed you here.

Procedures for the Power Distribution Unit (PDU)

Removing the PDU frame supervisor card

Note: The frame supervisor card can be removed and replaced concurrently.

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

1. Refer to “Removing PDU components” on page 4-2 to access the dc section of the Power Distribution Unit.
2. Disconnect J9 cable from the frame supervisor card.
3. Remove access panel screws on dc section, then remove panel.
4. Loosen captive screws in card faceplate.
5. Pull frame supervisor card out of the card cage using the plastic pull tab.

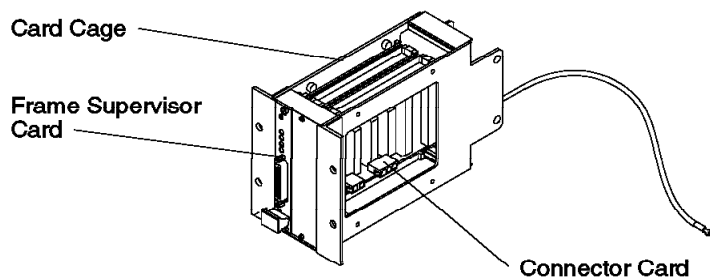


Figure 4-3. Removing the PDU frame supervisor card

Replacing the PDU frame supervisor card

Perform these procedures to replace the frame supervisor card:

1. Insert frame supervisor card into card cage, lining up card into card guide rails. Push card until card faceplate is even with faceplate of connector card.
2. Tighten two captive screws to hold supervisor card to cage.
3. Reinstall access panel and screws on dc section.
4. Reconnect J9 cable on the frame supervisor card.
5. Refer to “Replacing PDU components” on page 4-3 to reinstall dc access panel on Power Distribution Unit.
6. Perform “Verification test for supervisor bus” on page 3-17.

Removing the PDU supervisor connector card

Perform these procedures to remove the connector card:

1. Refer to “Removing PDU components” on page 4-2 to access the dc section of the Power Distribution Unit.
2. Loosen captive screws in card faceplate.
3. Disconnect six cables from the connector card.
4. Carefully pull connector card out of the card cage.

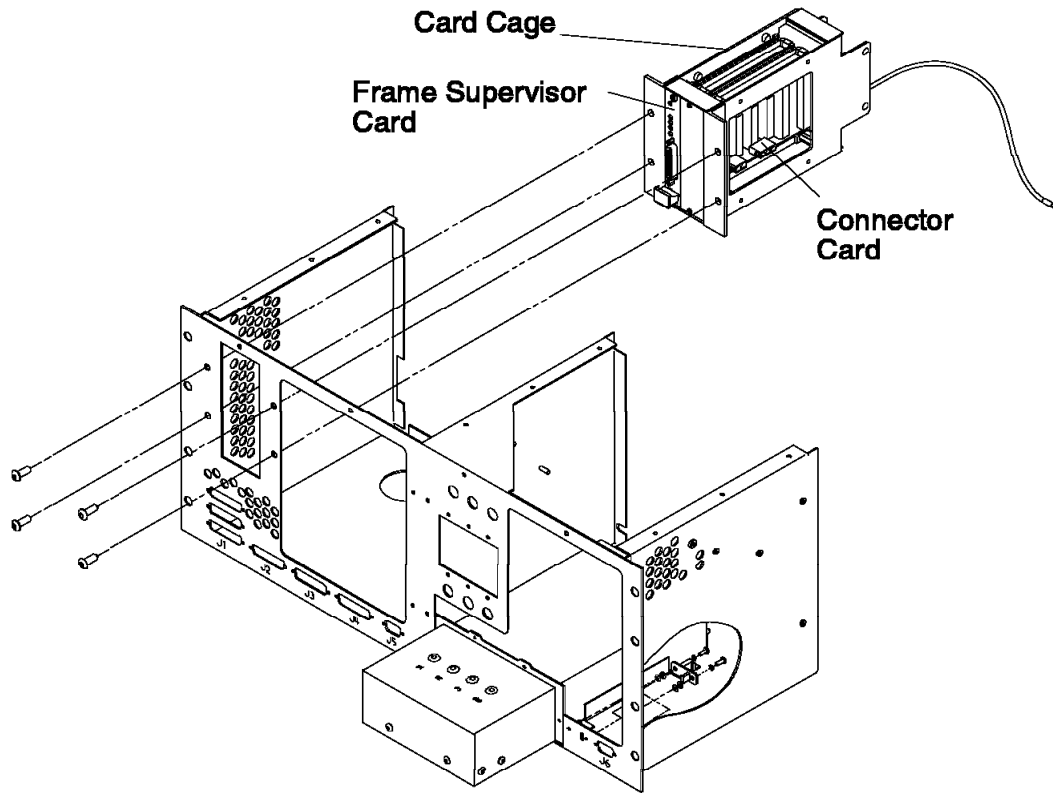


Figure 4-4. Removing supervisor connector card from card cage

Replacing the PDU supervisor connector card

Perform these procedures to replace the connector card:

1. Insert connector card into card cage, lining up card into card guide rails. Push card in until card is firmly seated.
2. Screw faceplate to card cage, using the two screws.
3. Reconnect cables on to connector card. Pay special attention to cable P403 and P404 connections.
4. Refer to “Removing PDU components” on page 4-2 to access the dc section of the Power Distribution Unit.

Removing the PDU supervisor backplane card

Perform these procedures to remove the backplane card:

1. Refer to “Removing PDU components” on page 4-2 to access the dc section of the Power Distribution Unit.
2. Disconnect cables from the connector card.
3. Loosen two captive screws on each supervisor and connector card.
4. Remove supervisor and connector cards from cage.
5. Remove four screws holding the plastic shield over the bus bars.
6. Remove ground strap from bus bar.
7. Remove four screws retaining card cage, then remove card cage from dc section.
8. Remove four screws holding backplane card to the cage. Make note of card alignment on back of cage.

Procedures for the Power Distribution Unit (PDU)

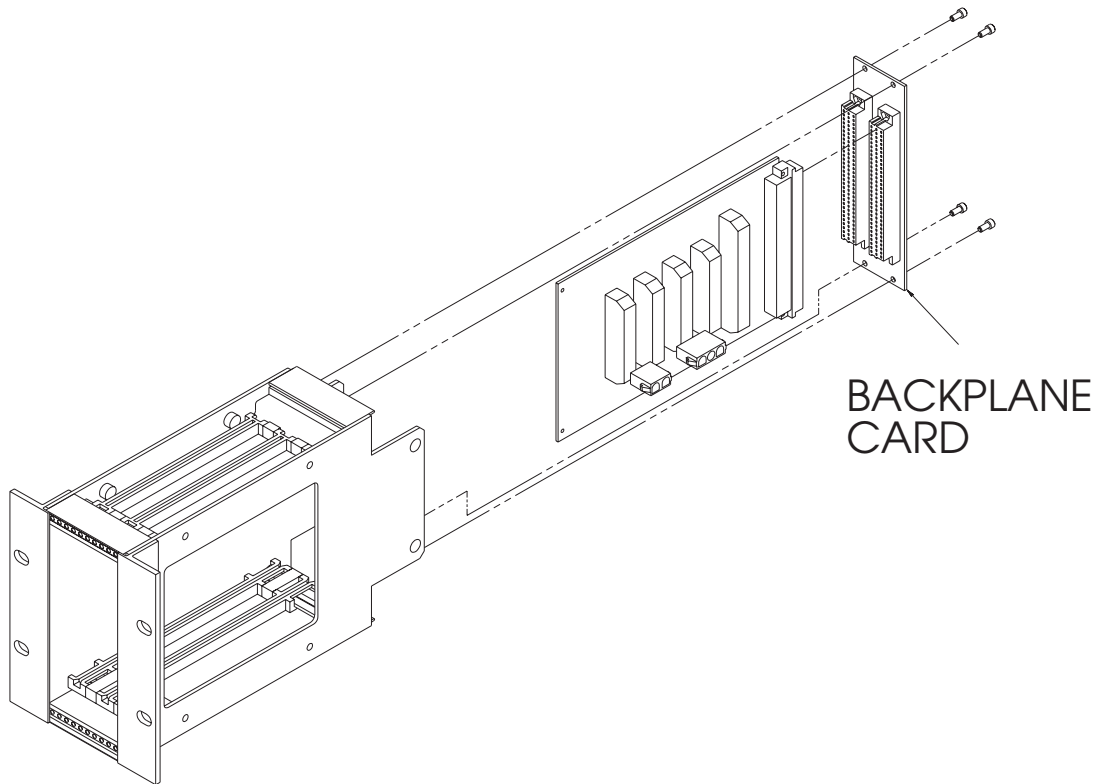


Figure 4-5. Removing supervisor backplane card from card cage

Replacing the PDU supervisor backplane card

Perform these procedures to replace the backplane card:

1. Reinstall backplane card to cage using four screws. Carefully align so that when the cards are reinstalled, they are seated correctly.
2. Reinstall supervisor and connector cards.
3. Tighten two captive screws on each supervisor and connector card.
4. Reinstall four screws to hold cage to frame.
5. Attach ground strap to bus bar.
6. Reinstall plastic shield over bus bars, using the four screws.
7. Reinstall cables to the connector card.
8. Refer to “Replacing PDU components” on page 4-3 to reinstall dc access panel on Power Distribution Unit.

Removing the PDU ac filter

Perform the following procedures to remove the ac filter:

1. Refer to “Removing PDU components” on page 4-2 to power down frame and access the ac compartment.
2. Refer to “Removing the PDU ac line cord” on page 4-15 and follow these procedures. Return to Step 3 when completed.
3. Remove the bleeder resistor from the ac filter. Make note of its location.
4. Remove the six mounting screws from circuit breaker 1 and carefully move the circuit breaker out of the ac compartment.
5. Remove the four nuts holding the ac filter to the frame.
6. Disconnect the ground wire on the rear of the ac filter from the frame.

7. Lift the ac filter straight up and out of the ac compartment.
8. Make note of the wire locations on the rear of the ac filter and remove the wires. Save the ground wire for replacement.
9. Loosen the four nuts holding the mounting plate to the ac filter and remove the plate.

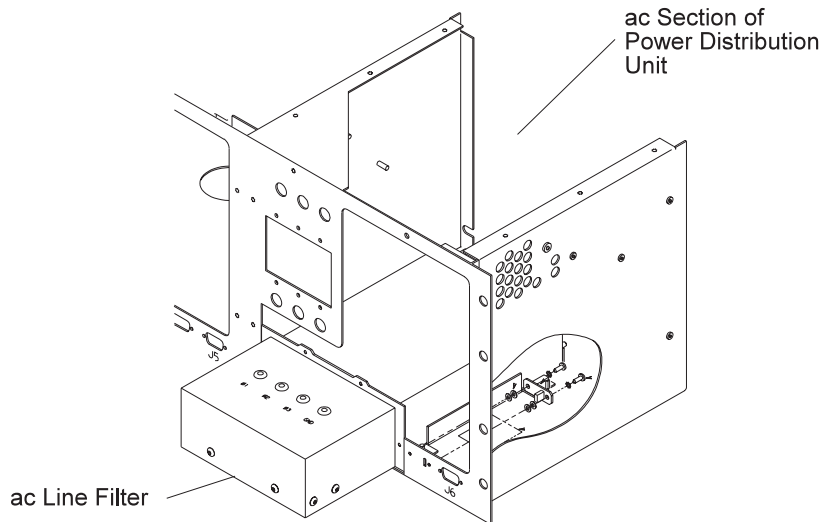


Figure 4-6. Removing the PDU ac filter

Replacing the PDU ac filter

Perform the following procedures to replace the ac filter:

1. Place the ac filter into mounting plate and tighten the four nuts.
2. Reinstall bleeder resistor on ac filter (on previously noted location).
3. Reinstall the wires on the back of the ac filters to their previously noted locations. Reinstall the ground wire you saved during the ac filter removal.
4. Carefully reinstall the ac filter on the four mounting studs.
5. Reinstall washers and nuts on the four mounting studs and secure filter to the frame.
6. Reinstall rear ground to the frame.
7. Carefully move circuit breaker 1 back into the ac compartment and reinstall the six mounting screws.
8. Refer to “Replacing the PDU ac line cord” on page 4-15.
9. Refer to “Replacing PDU components” on page 4-3 to reinstall ac access panel and power up frame.

Removing the PDU main contactor

Perform these procedures to remove the main contactor:

1. Refer to “Removing PDU components” on page 4-2 to power down frame and access the ac compartment.
2. Refer to “Removing the Power Distribution Unit (PDU)” on page 4-12 to remove the power distribution unit.
3. Remove the top plate of the power distribution unit for easier access.
4. Remove the main contactor by removing the two mounting nuts.
5. Make note of all wire positions and remove the wires from the main contactor. If the new contactor is available, install the wires directly on the new contactor as they are removed from the old contactor.

Procedures for the Power Distribution Unit (PDU)

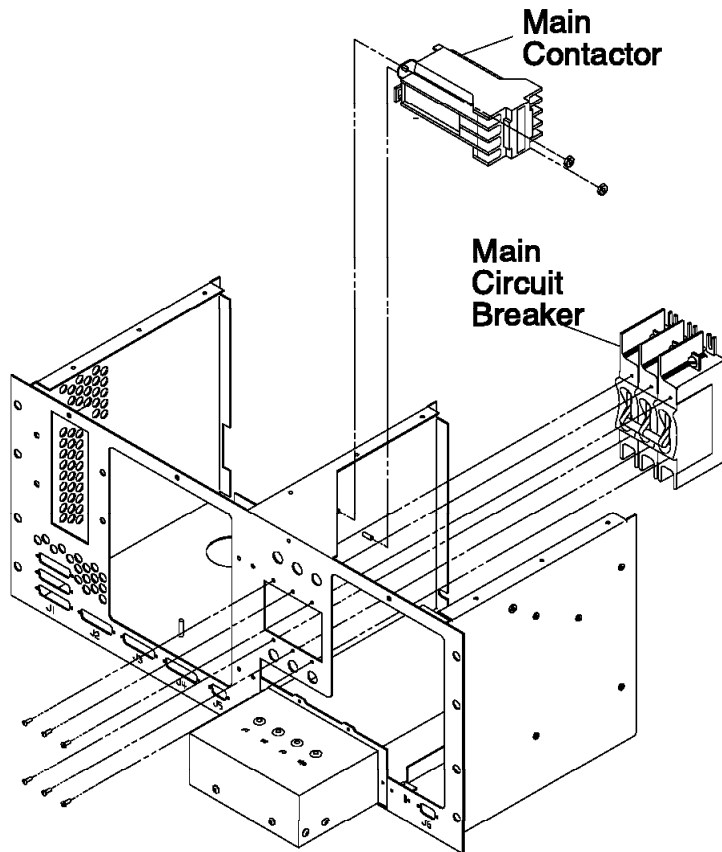


Figure 4-7. Removing the main contactor from the Power Distribution Unit

Replacing the PDU main contactor

Perform these procedures to replace the main contactor:

1. Reinstall wires on the new contactor to their previously noted positions.
2. Reinstall the contactor onto its mounting studs.
3. Reinstall the washers and nuts onto the mounting studs.
4. Reinstall top plate of the power distribution unit.
5. Refer to “Replacing the Power Distribution Unit (PDU)” on page 4-14 to reinstall the PDU.
6. Refer to “Replacing PDU components” on page 4-3 to reinstall ac access panel and power up frame.

Removing the PDU main circuit breaker

Perform the following procedures to remove the main circuit breaker:

1. Refer to “Removing PDU components” on page 4-2 to power down frame and access the ac compartment.
2. Refer to “Removing the Power Distribution Unit (PDU)” on page 4-12 to remove the power distribution unit.
3. Remove the top plate of the power distribution unit for easier access.
4. Remove six mounting screws from the face of circuit breaker 1.
5. Remove the circuit breaker from the ac box, being careful not to snag the wires on the back of the circuit breaker.
6. Make note of all wire locations and then remove the six wires from the circuit breaker.

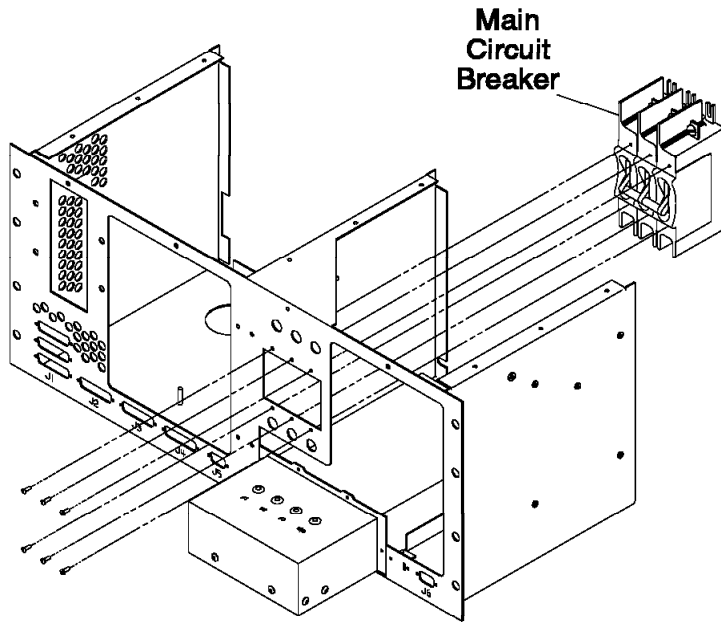


Figure 4-8. Removing the PDU main circuit breaker

Replacing the PDU main circuit breaker

Perform the following procedures to replace the main circuit breaker:

1. Reinstall six wires on circuit breaker 1 to the locations previously noted in the Main Circuit Breaker removal procedures.
2. Position circuit breaker 1 into the ac box.
3. Reinstall the six mounting screws in circuit breaker 1.
4. Reinstall the top plate of the power distribution unit.
5. Refer to "Replacing the Power Distribution Unit (PDU)" on page 4-14 to reinstall the PDU.
6. Refer to "Replacing PDU components" on page 4-3 to reinstall ac access panel and power up frame.

Removing the PDU supervisor power supply

Perform these procedures to remove the supervisor power supply:

1. Refer to "Removing PDU components" on page 4-2 to power down frame and access the ac compartment.
2. Remove the power supply ground wire mounted on the side of the power distribution unit.
3. Remove the three screws holding the power supply bracket to the ac compartment.
4. Remove the two screws holding the power supply (that is to be replaced) to the power supply bracket.
5. Remove the bottom input wires by loosening the three screws and pulling all wires out.
6. Make note of output wire locations on top of the supply and remove the four wires.
7. Remove two screws on the bottom of the power supply and four studs on top of the supply that are holding the supervisor power supply to the Plexiglass plate. Save this plate and the screws and studs for the new power supply.

Procedures for the Power Distribution Unit (PDU)

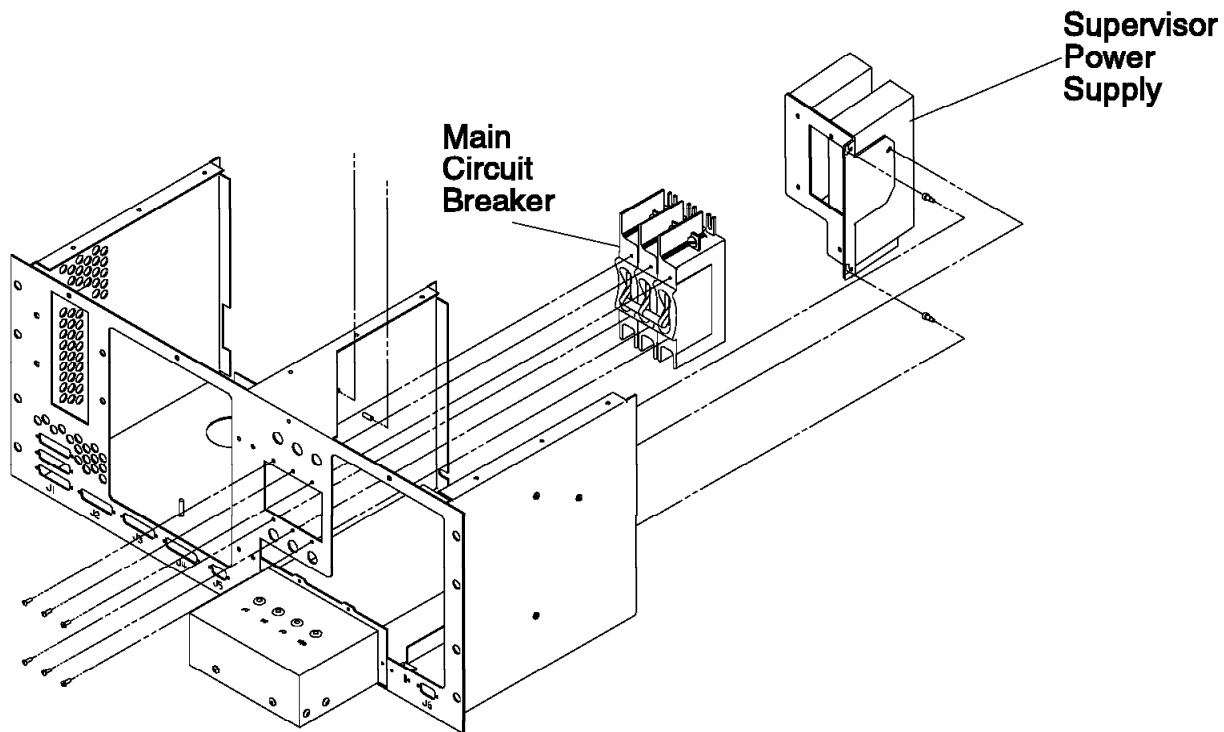


Figure 4-9. Removing the PDU supervisor power supply

Replacing the PDU supervisor power supply

1. Reinstall the two screws holding the power supply that was replaced to the power supply bracket.
2. Reinstall the three screws that hold the power supply bracket to the ac compartment.
3. Reinstall the input wires L1, L2, and ground wire to the bottom of the power supply.
4. Carefully move the power supply into place, aligning the slotted holes with the shoulder screws and slide down. The shoulder screws should end up in the narrow part of the slotted holes.
5. Reinstall the screw that holds the power supply to the frame.
6. Reinstall ground wire.
7. Reinstall the top plate of the power distribution unit.
8. Refer to "Replacing PDU components" on page 4-3 to reinstall ac access panel and power up frame.

Removing the PDU 48-volt power supply

Note: The 48-volt power subsystem consists of N+1 technology to allow for concurrent maintenance. Any one supply can be removed without powering down the system.

Perform the following procedures to remove the power book:

1. Perform "Removing the air filter assembly" on page 4-25 to remove the air filter assembly.
2. Remove power at supply by turning off the circuit breaker at the top of the power supply.
3. Remove the grounding screw at the front of supply, located left of the handle.
4. Locate the black handle at the bottom of the supply. Release the handle by pushing in the lever located on the left side of the handle, towards the right.
5. Pull the handle out all the way until the power supply starts to move forward. The handle should be at a right angle in comparison to the face of the power supply.
6. Pull the power supply out.

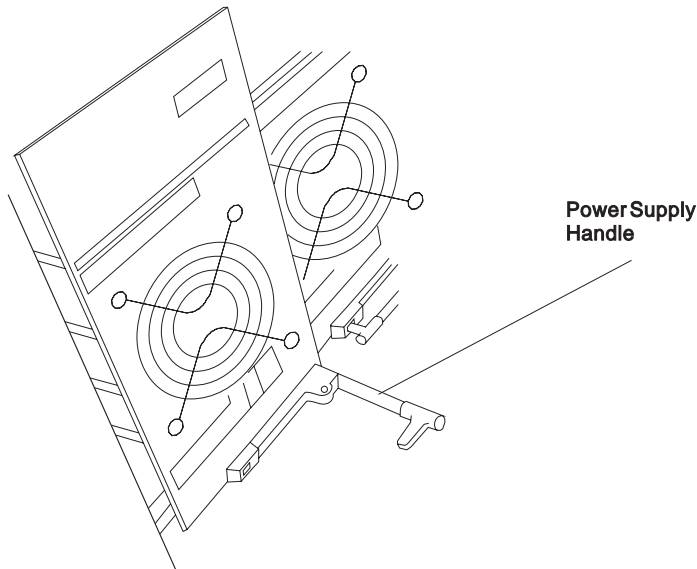


Figure 4-10. Removing the PDU 48-volt power supply from frame

Replacing the PDU 48-volt power supply

Perform the following procedures to replace the 48-volt power supply:

1. With the handle all the way out in the open position, slide the power supply back into position until the handle latches to the power supply frame, but do not close handle.
2. Close the handle all the way until the release lever catches.
3. Reinstall grounding screw at the front of the supply to left of the handle.
4. Power On the power supply with the circuit breaker.
5. Perform “Replacing the air filter assembly” on page 4-25 to replace the air filter assembly.

Removing the PDU 48-volt power chassis

CAUTION:

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

Perform the following procedures to remove the 48-volt power chassis:

1. Refer to “Removing PDU components” on page 4-2 to power down frame and access the ac and dc compartments.
2. Unplug J403 and J404 from the connector card in the dc power distribution unit.
3. Refer to “Replacing the air filter assembly” on page 4-25 to remove the air filter assembly.
4. Turn all power supply circuit breakers to the Off ('0') position.
5. Refer to “Removing the PDU 48-volt power supply” on page 4-10 to remove the power supplies.
6. Remove the eight bolts securing the 48-volt power chassis to the frame.
7. In the dc power distribution compartment, remove the two nuts and washers from the V1 bus bar straps.
8. Remove the power chassis ground wire from the bottom of the frame in the ac section of the power distribution unit compartment.
9. Carefully move the chassis forward making room to access TB1 on the back of the chassis. Make note of the wire positions and then remove the wires from TB1.
10. Move the chassis forward and out of the frame.
11. If the chassis is being replaced by a new chassis, make a note of the J1 and J2 cables. Remove the cables and ground wire and save these parts for reinstallation of the new chassis.

Procedures for the Power Distribution Unit (PDU)

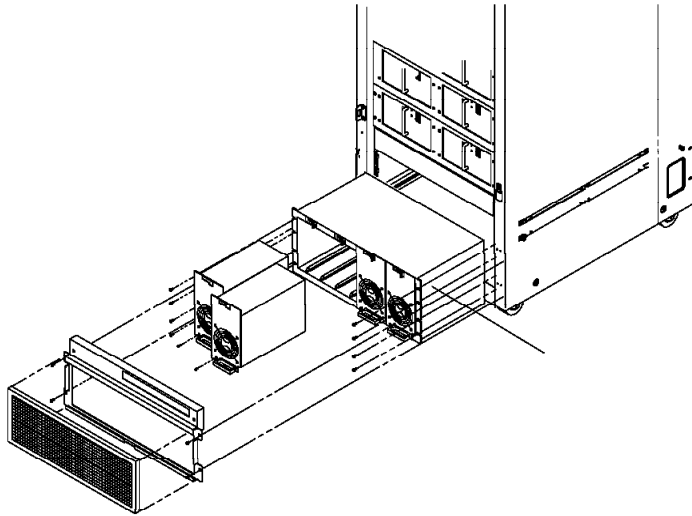


Figure 4-11. Removing the PDU 48-volt power chassis

Replacing the PDU 48-volt power chassis

Perform the following procedures to replace the 48-volt power chassis:

1. If the 48-volt power chassis is being replaced with a new part, then:
 - a. Reinstall the two cables saved from the removal into J1 and J2 locations of the replacement 48-volt power chassis.
 - b. Remove and set aside the three screws from TB1.
 - c. Reinstall the ground wire saved from the removal procedure to the back of the 48-volt power chassis.
2. Reinstall the chassis back into the frame, using care not to pinch the J1, J2 cables and the ground wire.
3. From the ac compartment, reinstall the wires on TB1 to the locations that you noted during the removal procedure.
4. Insert the chassis fully back into the frame, checking that the V1 bus bars line up with the studs on the back of the chassis.
5. Reinstall the eight bolts securing the chassis to the frame.
6. Reinstall V1 nuts and washers.
7. Reinstall the chassis ground wire to the frame ground on the bottom of the ac section, along with the other existing ground wires.
8. Refer to “Replacing the PDU 48-volt power supply” on page 4-11 to replace the power supplies.
9. Turn the power supply circuit breakers to the On (‘1’) position.
10. Refer to “Replacing the air filter assembly” on page 4-25 to replace the air filter assembly.
11. In the dc power distribution unit compartment, reinstall J403 and J404 into the connector card.
12. Refer to “Replacing PDU components” on page 4-3 to reinstall ac and dc access panels and power up frame.

Removing the Power Distribution Unit (PDU)

Perform these procedures to remove the power distribution unit:

1. Perform “Removing PDU components” on page 4-2 to power down the system and access ac and dc compartments.

Note: The switch, processor nodes 1, 2, 3, 4, and shelves must be removed to access inside the power distribution unit.

2. If necessary, remove the switch.

- Refer to the RS/6000 SP: SP Switch Service Guide.

3. If necessary, move processor nodes out of the way.

- Place the processor nodes on an ESD pad.
- Refer to the device specific service guide for the node.

4. Remove tie wraps from cables wire plate. Remove cables from shelf.

5. Remove cable from each adapter jack, if installed.

Note: Ensure cables are safely out of the way before removing shelves.

6. Remove the two screws and retainers from each side of the shelf.

Note: Two service personnel are needed to remove the shelf. One service person can stand in front holding the shelf, while the second person removes the screws and retainers from each side of the shelf bracket.

7. Push the shelf towards the back to release the studs from front bracket hole.

8. Angle shelf to remove from frame. Repeat these steps for the second shelf.

9. Remove cables J1 through J8 from the power distribution unit.

10. Refer to "Removing the PDU ac line cord" on page 4-15.

11. Remove the ground wires from the bottom of the frame inside the ac section of the power distribution unit.

12. Remove plastic shield over the bus bars in the dc section of the power distribution unit.

13. Remove bolt that holds ground bus bar to the frame.

14. Remove the plugs J403 and J404 from the connector card in the dc section.

15. Remove the nuts and washers from the V1 bus bar straps, located at the rear of the power distribution unit.

16. Remove the four screws holding the power distribution unit to the frame.

Note: The other end of the V1 bus bar straps may need to be loosened to free the power distribution unit.

At this point, the power distribution unit should be free of the frame.

17. Locate the three wires connected to the back of the power supply chassis. Slowly pull the power distribution unit out of the frame until there is enough room to access and remove the three wires from the terminal block. Make note of the wire positions on the terminal block and remove the wires.

18. The power distribution unit can now be removed from the frame.

Procedures for the Power Distribution Unit (PDU)

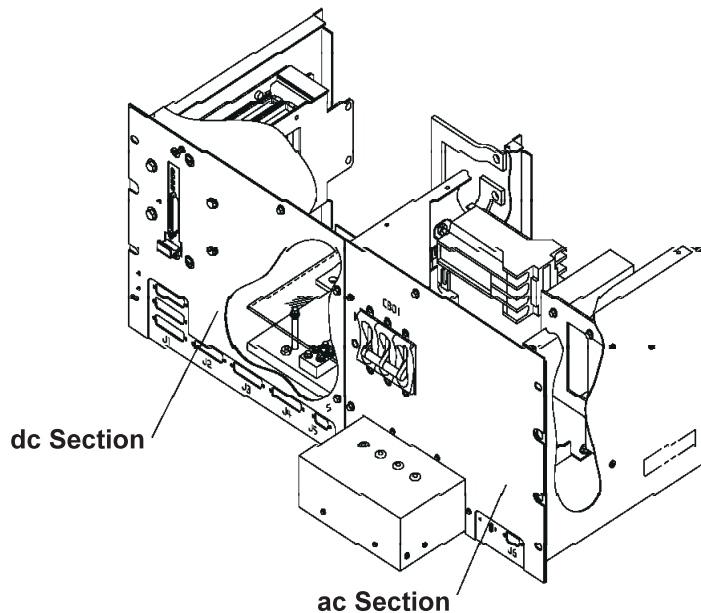


Figure 4-12. Removing the Power Distribution Unit

Replacing the Power Distribution Unit (PDU)

Perform these procedures to replace the power distribution unit:

1. Carefully slide the power distribution unit partially back into the frame. Leave enough room to replace the wires on the back of the power supply chassis terminal block.
2. Replace the three wires on the back of the power supply chassis to their previously noted positions.
3. Slide the power distribution unit back into the frame, ensuring that the V1 bus bar straps line up with the bolts, and slide into place.
4. Reinstall the ground wires to the frame in the ac section of the power distribution unit.
5. Reinstall bolt to hold the ground bus bar to the frame but do not tighten.
6. Reinstall the four screws securing the power distribution unit to the frame.
7. Reinstall the V1 bus bar strap nuts and washers. Tighten the other end of the V1 bus bar straps if they were loosened during removal.
8. Tighten bolt holding the ground bus bar to the frame.
9. Reinstall plastic shield over bus bars in dc section of the power distribution unit.
10. Reinstall plugs J403 and J404 onto the connector card.
11. Refer to "Replacing the PDU ac line cord" on page 4-15.
12. Reinstall J1 through J8 cables on the power distribution unit.
13. Angle shelf to replace into frame.
14. Replace the two screws and retainers on each side of the shelf.

Notes:

- a. Two service personnel are needed to replace the shelf. One service person can stand in front holding the shelf, while the second person replaces the screws and retainers on each side of the shelf bracket.
 - b. Ensure cables are safely out of the way before replacing shelves.
15. Reconnect cable from each adapter jack, if previously installed.
 16. Replace tie wraps to cables wire plate. Reconnect cables to shelf.
 17. If necessary, replaced any processor nodes that you moved out of the way.
 - Refer to the device specific service guide for the node.

18. If necessary, replace the switch.

- Refer to the RS/6000 SP: SP Switch Service Guide.

19. Refer to “Replacing PDU components” on page 4-3 to reinstall ac and dc access panels and power up frame.

Removing the PDU ac line cord

Perform the following procedures to remove the ac line cord:

1. Refer to “Removing PDU components” on page 4-2 to power down system and access the ac compartment.
2. Remove the six screws in the ac filter cover and remove the cover. Refer to “Removing the PDU ac filter” on page 4-6 for an additional view of this component.
3. Make note of the wire locations. Remove the nuts from A, B, C, and D, and remove the wires.
4. Remove the ground wire from the frame.
5. Remove the locking ring holding the ac line cord to the frame. Push the ac line cord through the hole and free it from the frame.

Replacing the PDU ac line cord

Perform the following procedures to replace the ac line cord:

1. Pull the ac line cord back through the hole in the frame and tighten the lock ring to secure the line cord in place.
2. Reinstall the line cord wires to the ac filter in their previously noted locations.
3. Using torque tool part number 2515283, tighten the nuts attaching the ac line cord to the ac filter to 16 - 24 inches/pounds (1.8 - 2.7 NM).
4. Reinstall the ac line cord ground to the frame.
5. Reinstall the ac filter cover with the six mounting screws.
6. Refer to “Replacing PDU components” on page 4-3 to reinstall ac access panel and power up frame.

Procedures for the Scalable Electrical Power Base Unit (SEPBU)

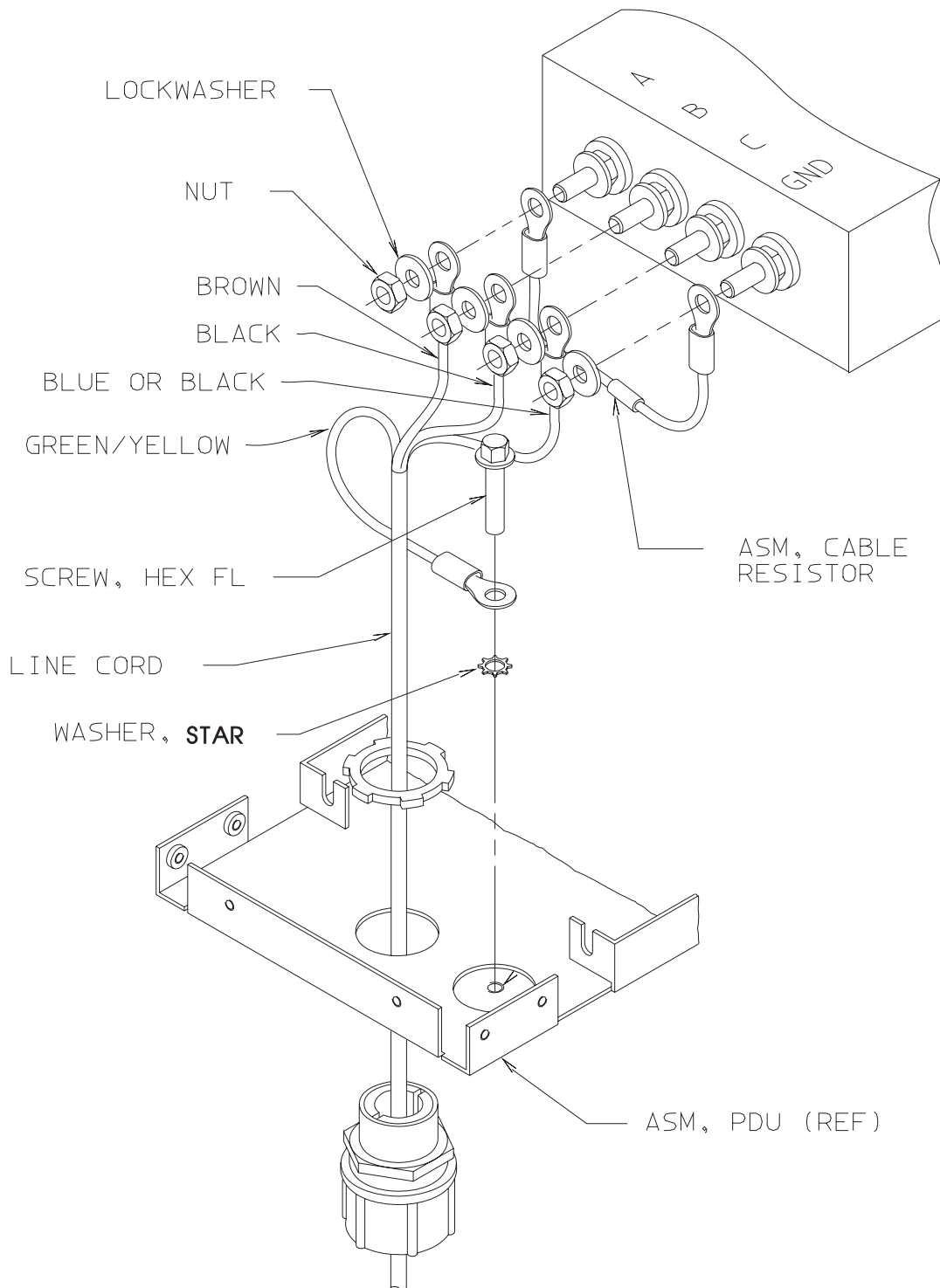


Figure 4-13. Removing the PDU ac line cord

Procedures for the Scalable Electrical Power Base Unit (SEPBU)

CAUTION:

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

Removing the SEPBU power chassis

Perform these procedures to remove the SEPBU power chassis:

1. Refer to “Removing the air filter assembly” on page 4-25 to remove the air filter assembly.
2. Put the circuit breaker at the front of each power module in the Off ('0') position.
3. Perform “SEPBU lockout procedures” on page 1-1 to remove power to the frame.
4. Disconnect all other cables at the front and rear of the SEPBU power chassis.
5. Perform “Removing the SEPBU frame supervisor card” on page 4-20.
6. Perform “Removing the SEPBU Power Control Interface (PCI) card” on page 4-19 to remove the PCI card.
7. Perform “Removing the SEPBU power module” on page 4-18 to remove **all** power modules. Make note of occupied positions.
8. Remove any existing covers over the blank power module spaces, making note of their locations.
9. At the front of the SEPBU power chassis, remove all mounting screws.
10. At the rear of the SEPBU power chassis, remove all mounting screws.
11. Slide the SEPBU power chassis out the front of the frame.
12. Return to the procedure that directed you here.

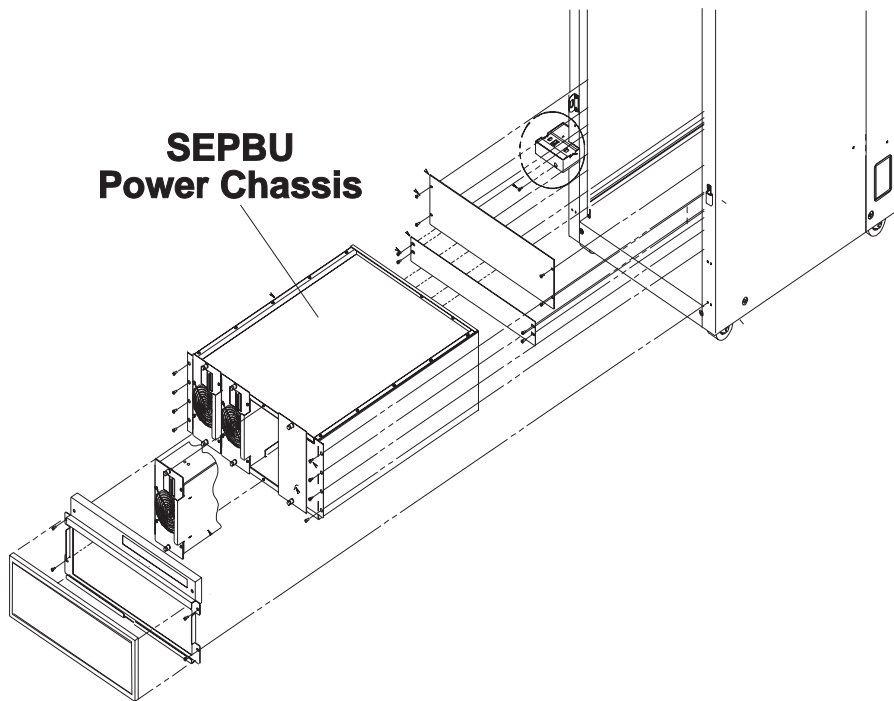


Figure 4-14. Removing the SEPBU power chassis

Replacing the SEPBU power chassis

Perform these procedures to replace the SEPBU power chassis:

1. Slide the SEPBU power chassis into the bottom front of the frame.
2. Reinstall the eight mounting screws at the front of the SEPBU power chassis.
3. Reinstall the eight mounting screws at the rear of the frame.
4. Replace any existing covers over the blank power module spaces that were noted in step 7 of “Removing the SEPBU power chassis.”
5. Perform “Replacing the SEPBU power module” on page 4-19 to reinstall the power modules to originally occupied positions.

Procedures for the Scalable Electrical Power Base Unit (SEPBU)

6. Perform “Replacing the SEPBU Power Control Interface (PCI) card” on page 4-20 to reinstall the PCI card.
7. Perform “Replacing the SEPBU frame supervisor card” on page 4-20.
8. Reconnect all cables at the rear of the SEPBU power chassis.
9. Remove lockout bag. Insert end of ac line cord into socket of SEPBU power chassis until it locks into place.
10. Put the circuit breaker on the front of each power module in the On (‘1’) position.
11. Refer to “Replacing the air filter assembly” on page 4-25 to replace the air filter assembly.
12. Refer to “Restoring a switch assembly to the active configuration” on page 3-27.
13. Return to the procedure that directed you here.

Removing the SEPBU power module

Note: The 48-volt power subsystem consists of N+1 technology to allow for concurrent maintenance. Any one supply can be removed without powering down the system.

Perform the following procedures to remove the power module:

1. Refer to “Removing the air filter assembly” on page 4-25 to remove the air filter assembly.
2. Verify the correct position of the power module to be replaced. Removal of the incorrect power module could result in a system disruption.
3. Remove power at the module by putting the circuit breaker at the front of the power module in the Off (‘0’) position.
4. Loosen the two retaining screws at the front of supply.
5. Pull the handle on the power module to remove the power module from the chassis.

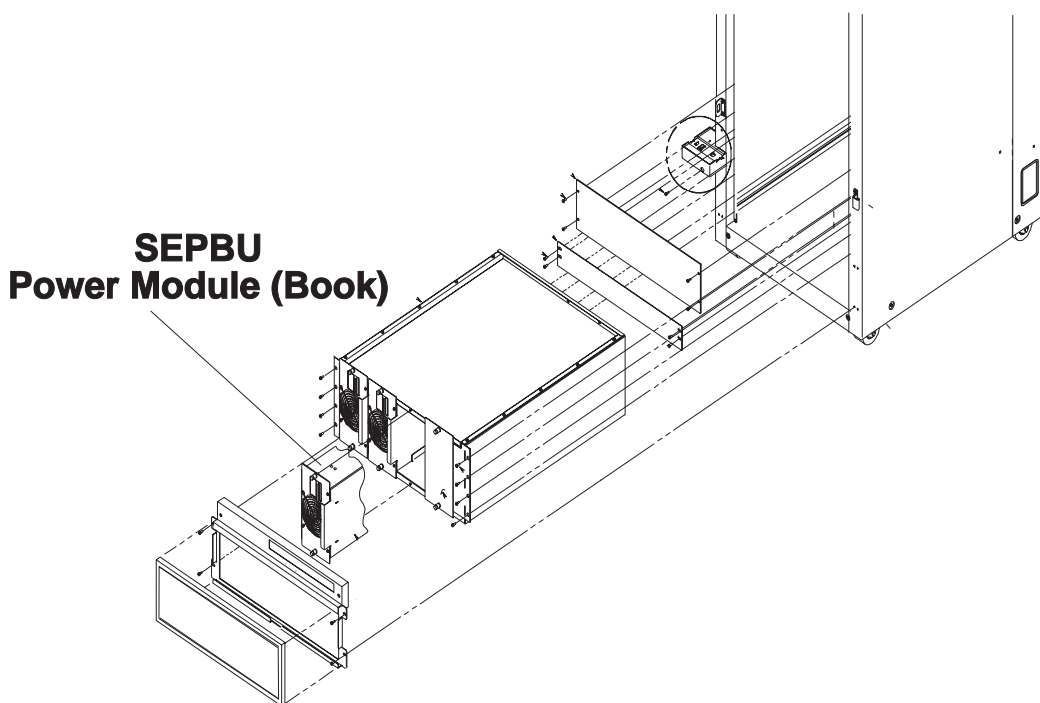


Figure 4-15. Removing the SEPBU power module

Replacing the SEPBU power module

Perform these procedures to replace the SEPBU power module:

1. Ensure that the circuit breaker on the power module is in the Off ('0') position.
2. Slide the power module gently into the SEPBU power chassis until the tabs are flush with the SEPBU frame.
3. Tighten the two retaining screws at the front of the module.
4. Put the circuit breaker at the front of the power module in the On ('1') position.
5. Refer to "Replacing the air filter assembly" on page 4-25 to replace the air filter assembly.

Removing the SEPBU Power Control Interface (PCI) card

Note: If PCI auxiliary function is used, the powering down of one frame may result in the powering down of all frames. Check for customer's remote power control cabling.

Refer to "Handling static-sensitive devices" on page 4-2, then perform these procedures to remove the power control interface card:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the file system.
2. Toggle main power switch to Off ('0') position.
3. Make note of any cables connected to the power control interface card. Also, note the position of the "AUX/LOC" switch.
4. Disconnect any cables from the power control interface card.
5. Loosen captive screws in card faceplate.
6. Pull power control interface card out of the chassis using the plastic pull tab.

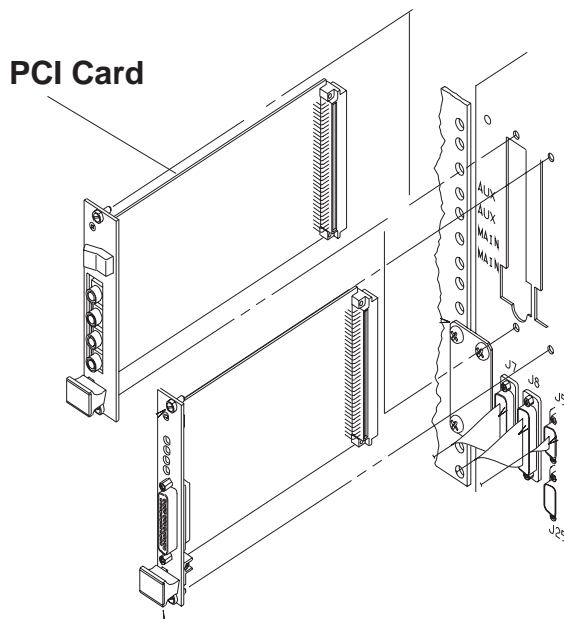


Figure 4-16. Removing the SEPBU Power Control Interface (PCI) card

Replacing the SEPBU Power Control Interface (PCI) card

Perform these procedures to replace the SEPBU power control interface card:

1. Insert power control interface card into chassis, lining up card into card guide rails. Push card until card faceplate is even with chassis.
2. Tighten two captive screws to hold supervisor card to cage.
3. Reconnect any cables to their original position on the power control interface card.
4. Set the "AUX/LOC" switch to the original position. (Normally, this is the "LOC" position.)
5. Toggle main power switch to On ('1') position.

Removing the SEPBU frame supervisor card

Note: The frame supervisor card can be removed and replaced concurrently.

Refer to "Handling static-sensitive devices" on page 4-2, then perform these procedures to remove the frame supervisor card:

1. Disconnect J9 cable from the frame supervisor card.
2. Loosen captive screws in card faceplate.
3. Pull frame supervisor card out of the chassis using the plastic pull tab.

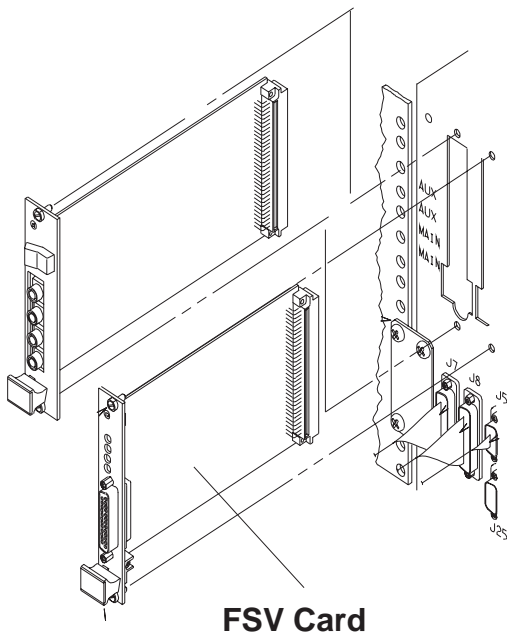


Figure 4-17. Removing the SEPBU frame supervisor card

Replacing the SEPBU frame supervisor card

Perform these procedures to replace the SEPBU frame supervisor card:

1. Insert frame supervisor card into chassis, lining up card into card guide rails. Push card until card faceplate is even with chassis.
2. Tighten two captive screws to hold supervisor card to cage.
3. Reconnect J9 cable on the frame supervisor card.
4. Perform "Verification test for supervisor bus" on page 3-17.

Removing the SEPBU ac line cord

Perform the following procedures to remove the SEPBU ac line cord:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the file system.
2. Toggle main power switch to Off ('0') position.
3. Perform "SEPBU lockout procedures" on page 1-1 to remove power to the frame.
4. If ac line cord is hardwired to customer power, have customer remove power and disconnect ac line cord from customer power feed.
5. Disconnect the ac line cord from customer's receptacle.
6. If the SEPBU cable connector does not fit through the hole in the frame, perform "Detaching the ac power connector" on page 4-22.
7. Push the ac line cord through the hole and free it from the frame.

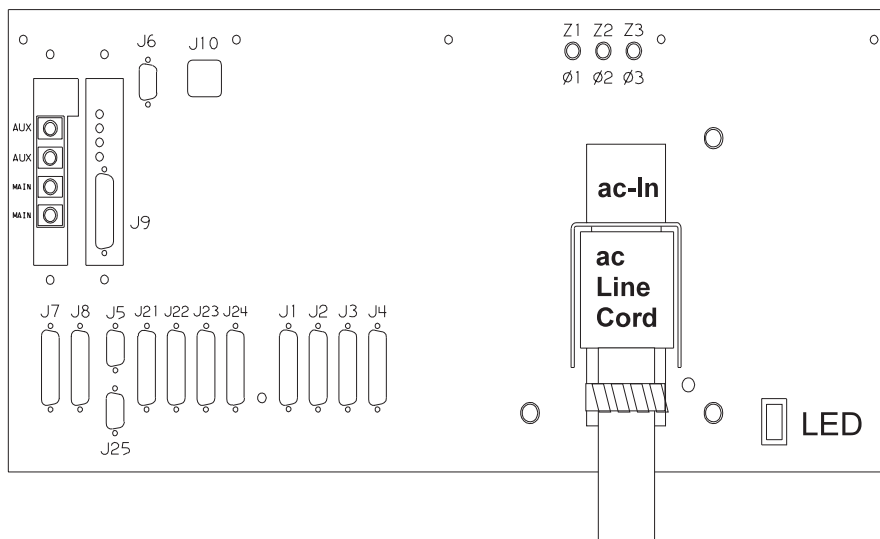


Figure 4-18. Removing the SEPBU ac line cord (3.5 kW)

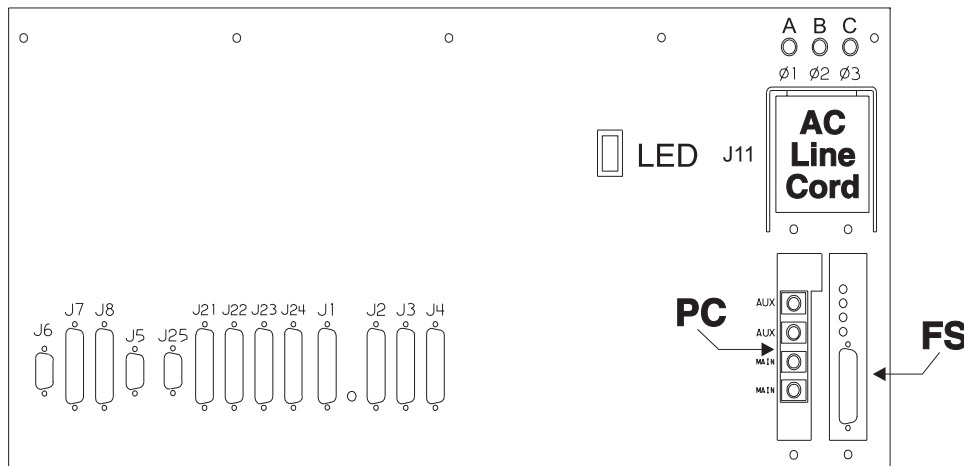


Figure 4-19. Removing the SEPBU ac line cord (5 kW)

Procedures for the Scalable Electrical Power Base Unit (SEPBU)

Detaching the ac power connector

If necessary, perform the following procedures to remove the ac power connector (at customer power end) from the ac line cord:

1. With the ac line cord disconnected at both ends, remove the two screws inside plug.
2. Remove the two screws from cable strain relief clamps to remove both clamps.
3. Remove the two screws in cap, then pull cap away from plug.
4. With a flathead screwdriver, pry rubber gasket out of plug. Pull it at least 10 cm (4 inches) away from plug.
5. Push line cord into plug until wires are exposed.
6. Loosen retention screws until wires are loose, then pull out wires.
7. Pull plug housing, rubber gasket, and cap off of cable.

Replacing the SEPBU ac line cord

Perform these procedures to replace the SEPBU ac line cord:

1. If necessary, perform "Reattaching the ac power connector."
2. Pull the ac line cord through the hole into the frame.
3. If the SEPBU cable connector does not fit through the hole in the frame, perform "Detaching the ac power connector."
4. Remove lockout bag. Insert end of ac line cord into socket of SEPBU power chassis until it locks into place.
5. Connect the ac line cord to customer's receptacle.
6. Remove the tagout.
7. Reapply ac voltage to ac line cord by reconnecting cable or toggling external circuit breaker feeding the line cord.
8. Toggle main power switch to On ('1') position.

Reattaching the ac power connector

Perform the following procedures to reattach the ac power connector on the ac line cord:

1. With the ac line cord disconnected at both ends, push cap, rubber gasket, and plug housing onto cable. Pay attention to orientation of parts.
2. Insert wires into pin assembly as indicated in Figure 4-20. Secure by tightening retention screws. Figure 4-21 on page 4-23 shows a typical pair of three-phase power connectors. Figure 4-22 on page 4-23 shows a typical pair of single-phase power connectors (used with the 1.25 m frame).

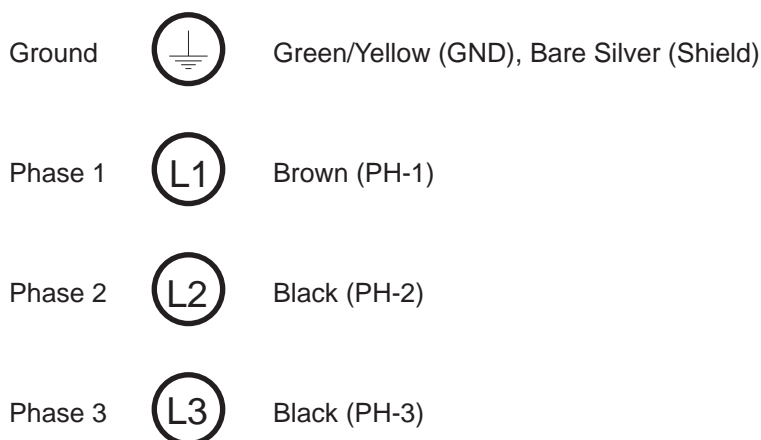


Figure 4-20. Wire positions in pin assembly

Note: Symbols appear near wire insertion holes.

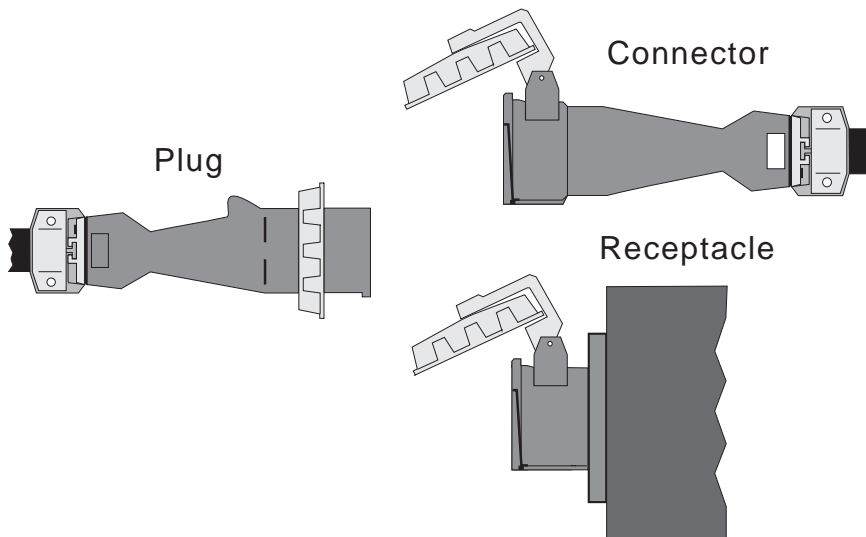


Figure 4-21. Three-phase power connectors (U.S.)

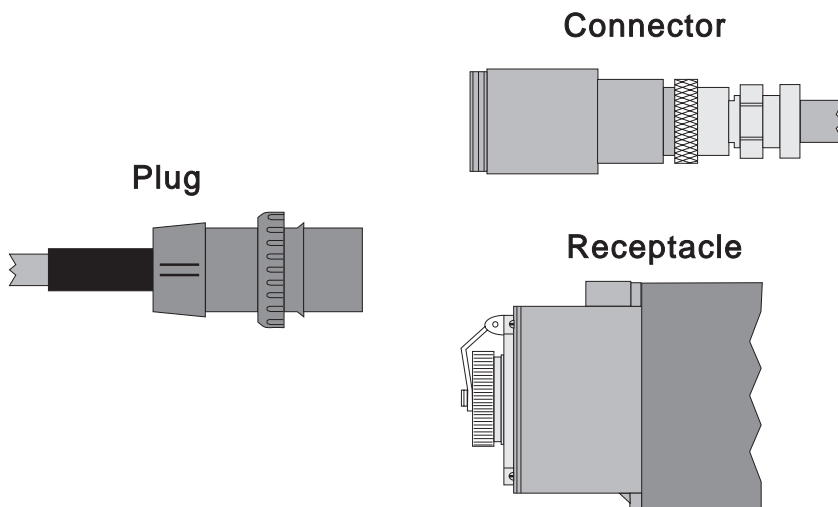


Figure 4-22. Single-phase power connectors (U.S.)

3. Rotate plug housing to line up orientation slot of pin assembly with plug housing, then pull plug housing over pin assembly.
4. Install the two screws to secure pin assembly to plug housing.
5. Push rubber gasket and cap into plug housing, then install the two screws to retain cap.
6. Install cable strain relief, then install and tighten the two screws.

Procedures for Skirts and Main Power Switch

Removing the acoustic skirts

Perform one of the following procedures to remove the acoustic skirts (depending on the frame type):

Procedures for Skirts and Main Power Switch

1.93 m frame

1. Loosen the front skirt from the filter bracket by loosening the two captive screws, on top of the front skirt, one quarter turn.
2. Remove the front skirt by pulling on the top and lifting the skirt free of the locating pins on the side skirts.
3. Remove the side skirts by moving the skirt to free the shoulder bolts from the keyhole in the skirt.
4. Lift the side skirt up and away from the frame.
5. Return to the procedure that directed you here.

2.01 m frame

1. Open the front door of the frame.
2. Remove the front skirt by loosening the two captive screws by turning them a half turn.
3. Open the rear door of the frame.
4. Remove the two screws that secure the side skirt. These are located at the lower rear inside the frame.
5. Remove the side skirt by lifting it up and away from the frame.
6. Return to the procedure that directed you here.

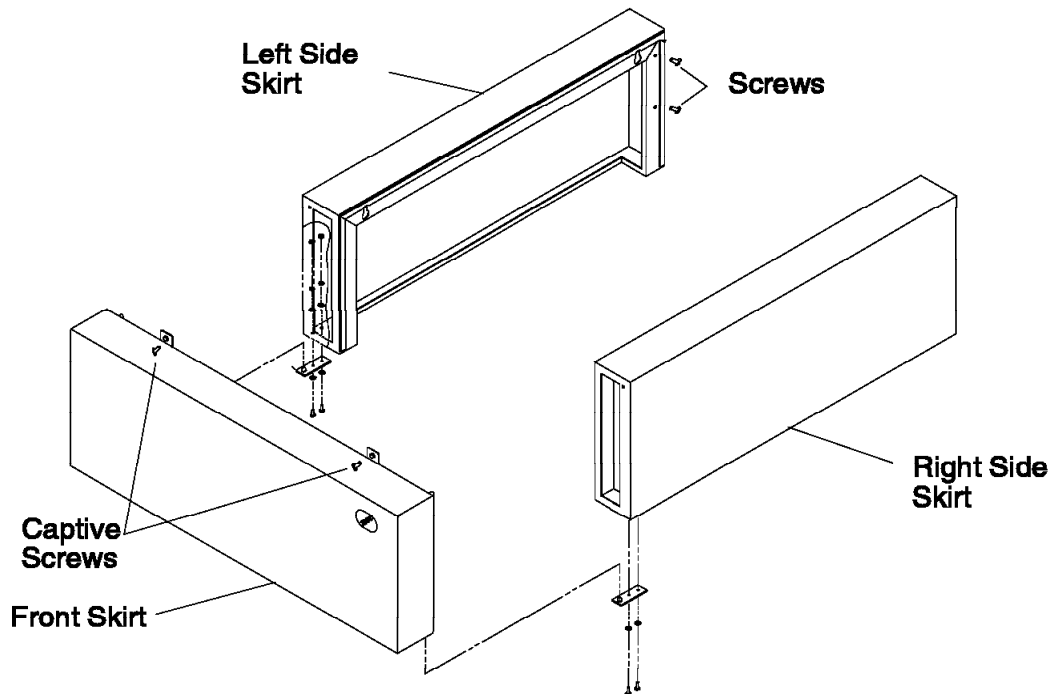


Figure 4-23. Removing the side skirt

Replacing the acoustic skirts

Perform one of the following procedures to replace the acoustic skirts (depending on the frame type):

1.93 m frame

1. Hang the side skirt on the shoulder bolts using the keyhole in the skirt.
2. Temporarily install the front skirt near the bottom of the frame using the bottom locating pins on the side skirts.

Note: Engage one end of the front skirt at a time by lifting from the bottom surface of the skirt at the end you are engaging.

3. Push the top of the skirt onto the upper locating pins.
4. Ensure the air filter is securely installed in the air filter bracket.
5. Tighten the 2 quarter-turn screws on the top of the front skirt, into the filter bracket.
6. Return to the procedure that directed you here.

2.01 m frame:

1. Position the side skirt onto the two shoulder screws on the side of the frame.
2. Reinstall the two mounting screws at the lower rear inside the frame. Do not tighten.
3. Replace the front skirt assembly. Position the side skirt lower aligning pins into the front skirt alignment pin holes. Once the front skirt is aligned with the side skirt, fasten the two captive screws by turning them a half turn.

Note: Engage one end of the front skirt at a time by lifting from the bottom surface of the skirt at the end you are engaging.

4. Tighten mounting screws at lower rear, inside the frame.
5. Close front and rear frame doors.
6. Return to the procedure that directed you here.

Removing the air filter assembly

Perform the following procedures to remove the air filter assembly:

Note: Schedule periodic cleaning of the air filter screen with a soft brush to remove debris collected on the mesh. See “Preventive maintenance” on page 3-34.

1. Refer to “Removing the acoustic skirts” on page 4-23 to remove the front acoustic skirt (except on 1.25 m frames).
2. Remove the four frame mounting screws and then remove the air filter assembly.

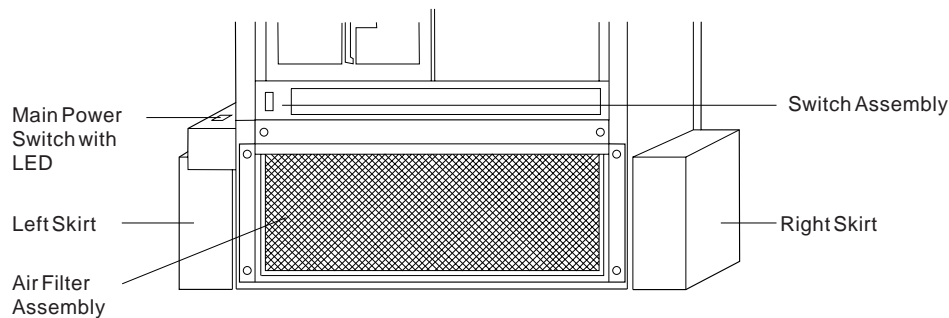


Figure 4-24. Removing the air filter assembly

Replacing the air filter assembly

Perform the following procedures to replace the air filter assembly:

1. Replace the air filter assembly by fastening it with frame mounting screws.
2. Refer to “Replacing the acoustic skirts” on page 4-24 to replace the front acoustic skirt (except on 1.25 m frames).

Removing the main power switch or LED

Perform the following procedures to remove the main power switch or LED:

1. Ask customer to stop all jobs running on the system. Unscheduled interruptions may corrupt files on the system.
2. Toggle main power switch to Off ('0') position.
3. Open back cover and unplug the PDU-BH-P6 cable from the rear of the frame.
4. Remove the small screw on the side of the main power switch cover, then remove the cover.
5. Remove the two screws holding the main power switch to the frame.
6. Remove the ground wire from the main power switch assembly.
7. Unplug the J1 connector in the main power switch assembly.
8. Unplug the LED connector in the main power switch assembly.
9. Remove the cables from the main power switch assembly.
10. **If removing the switch, remove the two screws holding the switch in place.**
11. **If removing the LED, remove the screws holding the LED assembly in place.**

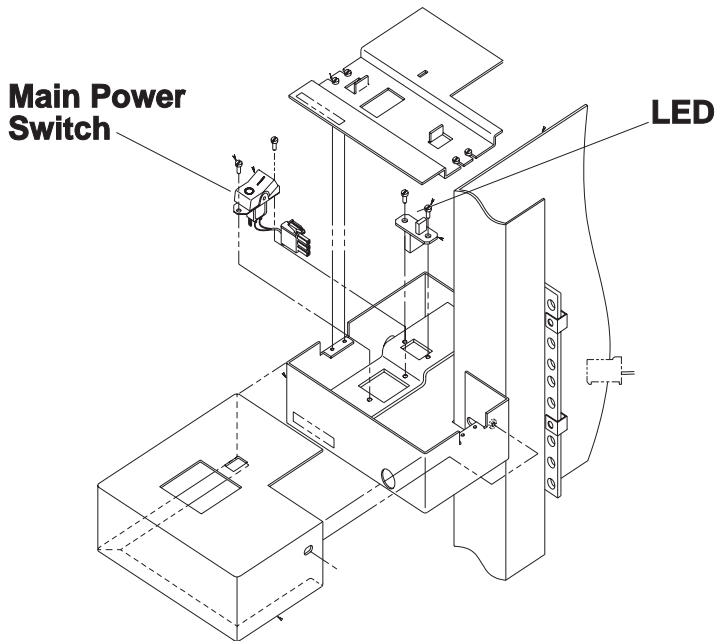


Figure 4-25. Removing the main power switch or LED

Replacing the main power switch or LED

Perform the following procedures to replace the main power switch or LED:

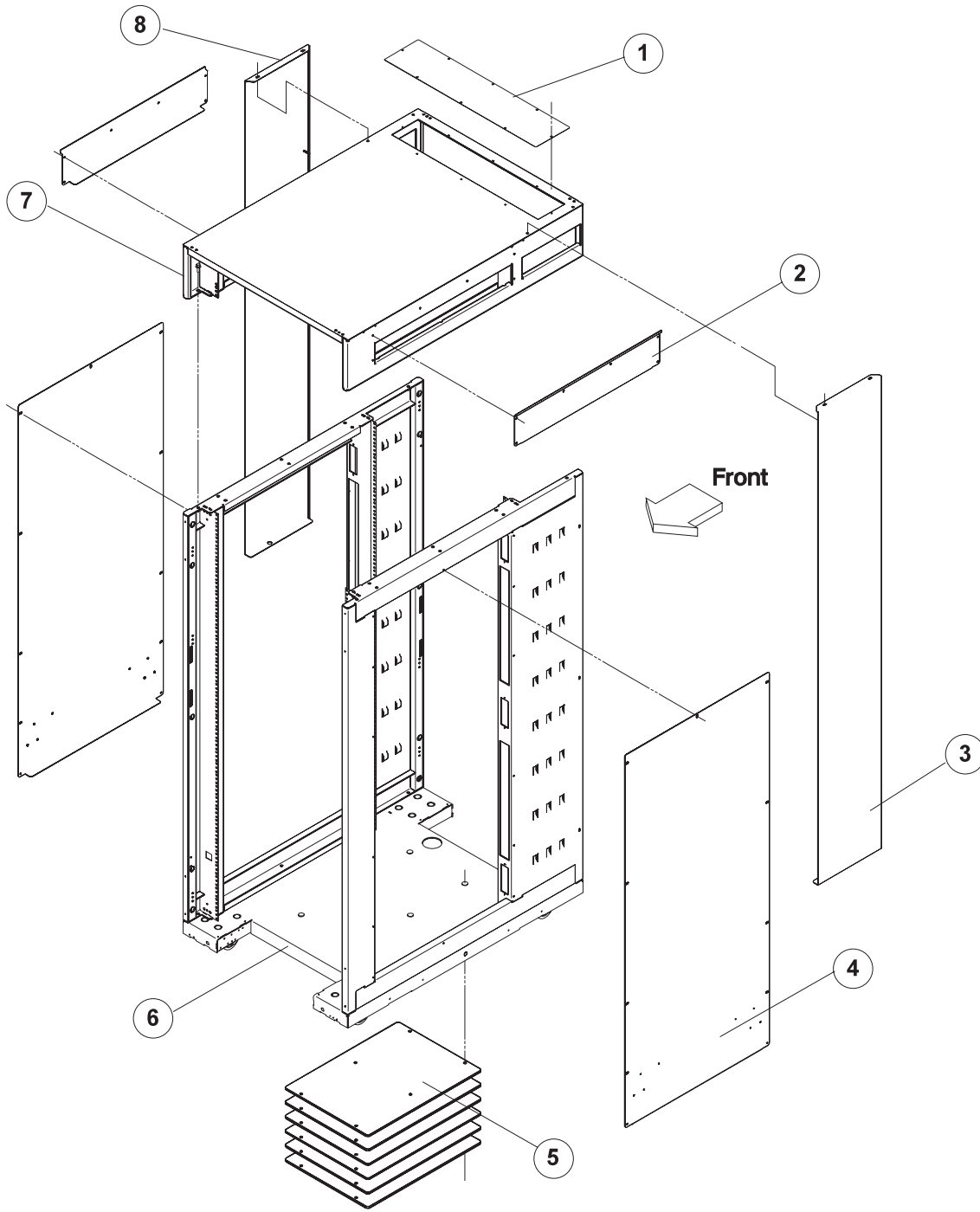
1. **If replacing the switch, reinstall the switch into the main power switch assembly. The switch should be oriented so the 1 is closest to the frame.**
2. **If replacing the LED, reinstall the LED assembly into the main power switch assembly.**
3. Reinstall power switch cable into the main power switch assembly.
4. Reinstall ground wire into the main power switch assembly.
5. Plug J1 connector into the main power switch assembly.
6. Plug LED indicator wire into the main power switch assembly.
7. Reinstall the two screws that hold the assembly to the frame (in the bottom two holes in the frame, making sure that the cable is not pinched).
8. Reinstall cover over the assembly and reinstall the screw in the side of the cover.
9. Plug the PDU-BH-P6 cable into the rear of the frame, and close the back cover.
10. Turn the main power switch to On ('1') position.

Chapter 5. Parts catalog

This chapter presents the Parts Catalog, listing RS/6000 SP parts and FRUs, with corresponding figures containing indexed descriptions.

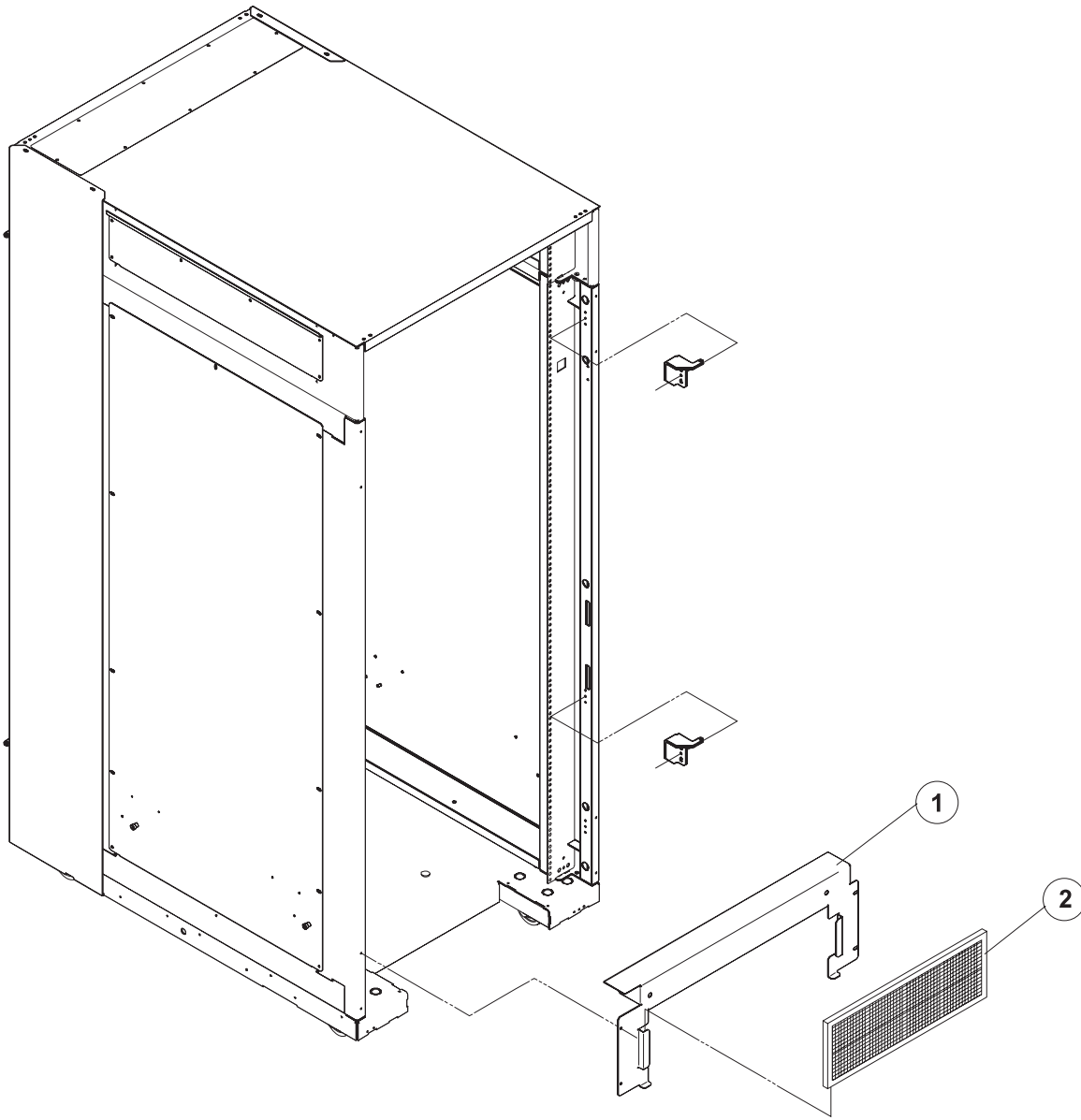
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Assembly 1: 1.93 m Frame assembly (view 1)



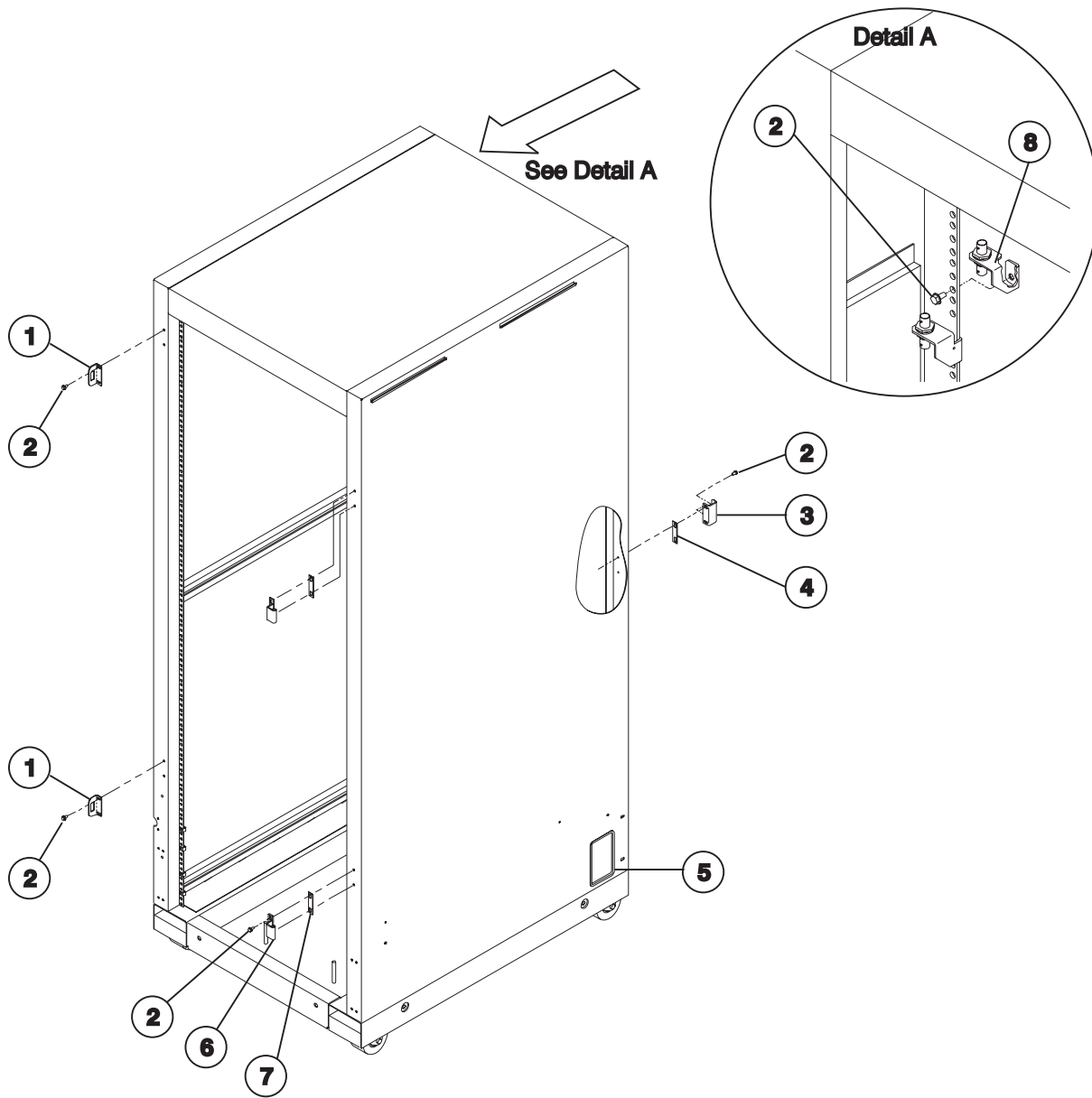
Asm- Index	Part Number	Units	Description
1-6	21L2377		Frame Asm, 1.93 m
-1		1	• Cover
-	2665528	8	• • Screw
-2		2	• Side Plate, Top
-	1623740	12	• • Screw
-3		1	• Side Panel, Decorative
-	2665528	2	• • Screw
-4		2	• Side Plate, Bottom
-	1623740	18	• • Screw
-5		6	• Weight Plate
-	19F1586	6	• • Nut
-7		1	• Top, Frame
-	1624803	16	• • Screw
-8		1	• Side Panel, Decorative
-	2665528	2	• • Screw

Assembly 2: 1.93 m Frame assembly (view 2)



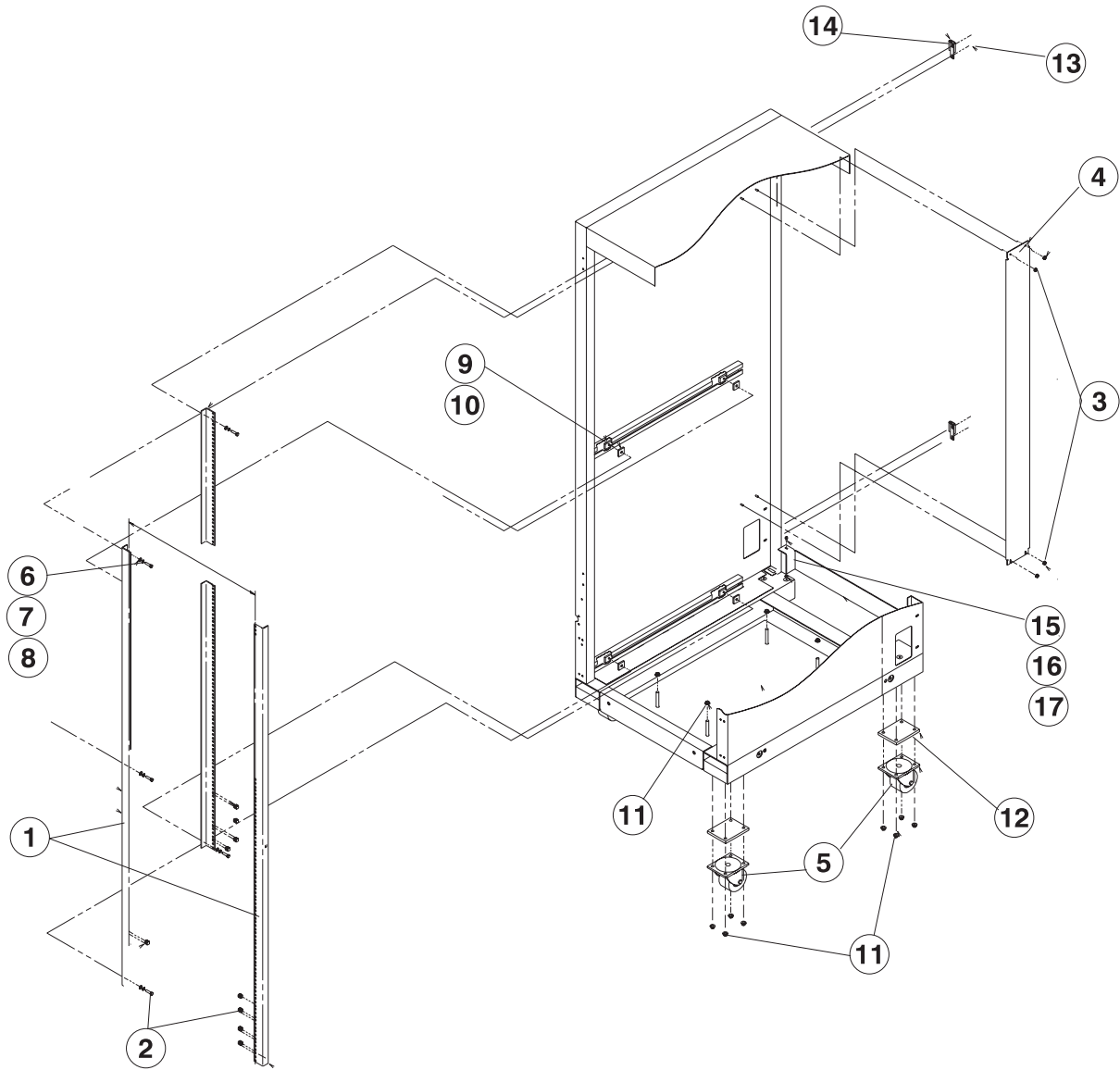
Asm- Index	Part Number	Units	Description
2-			Frame Asm, 1.93 m (reference only)
-1	31L8523	1	• Bracket, Air Filter
-	2665528	4	• • Screw, Self Tapping
-2	46G6970	1	• Air Filter

Assembly 3: Frame assembly, 2.01 m (view 1)



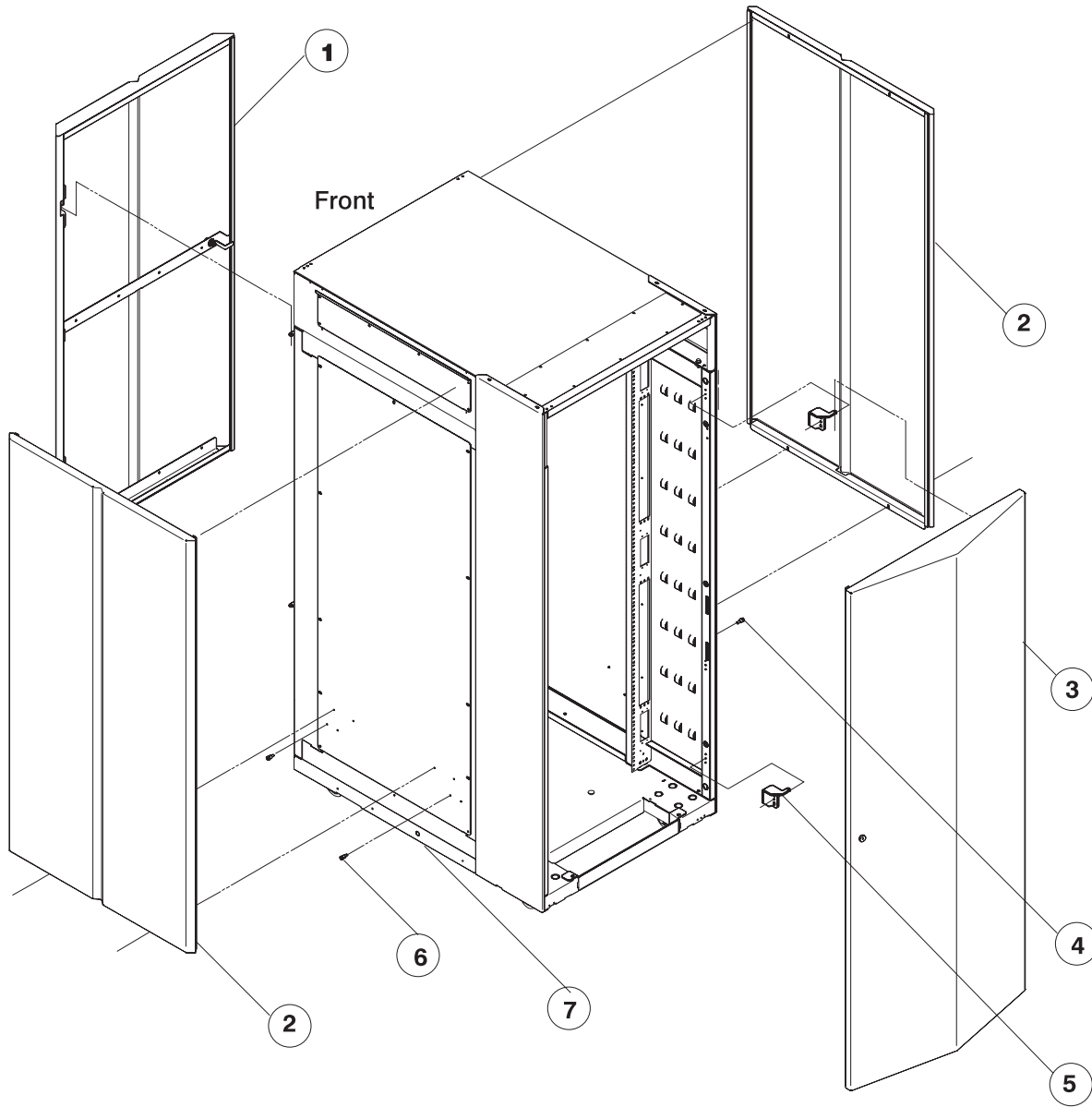
Asm- Index	Part Number	Units	Description
3-			Frame Asm, 2.01 m (reference only)
-1	46G6972	2	• Keeper, Front Door Latch
-2	54G2882	14	• Screw, M5 X 10 Black
-3	46G6961	1	• Keeper, Rear Door Latch
-4	26H7246	1	• Shim
-5	84X5896	2	• Seal, 355.6 (14.00) Long
-6	31G9267	2	• Hinge, Front Cover
-7	26H7245	2	• Shim
-8	21L2362	4	• RF Shunt Asm.

Assembly 4: Frame assembly, 2.01 m (view 2)



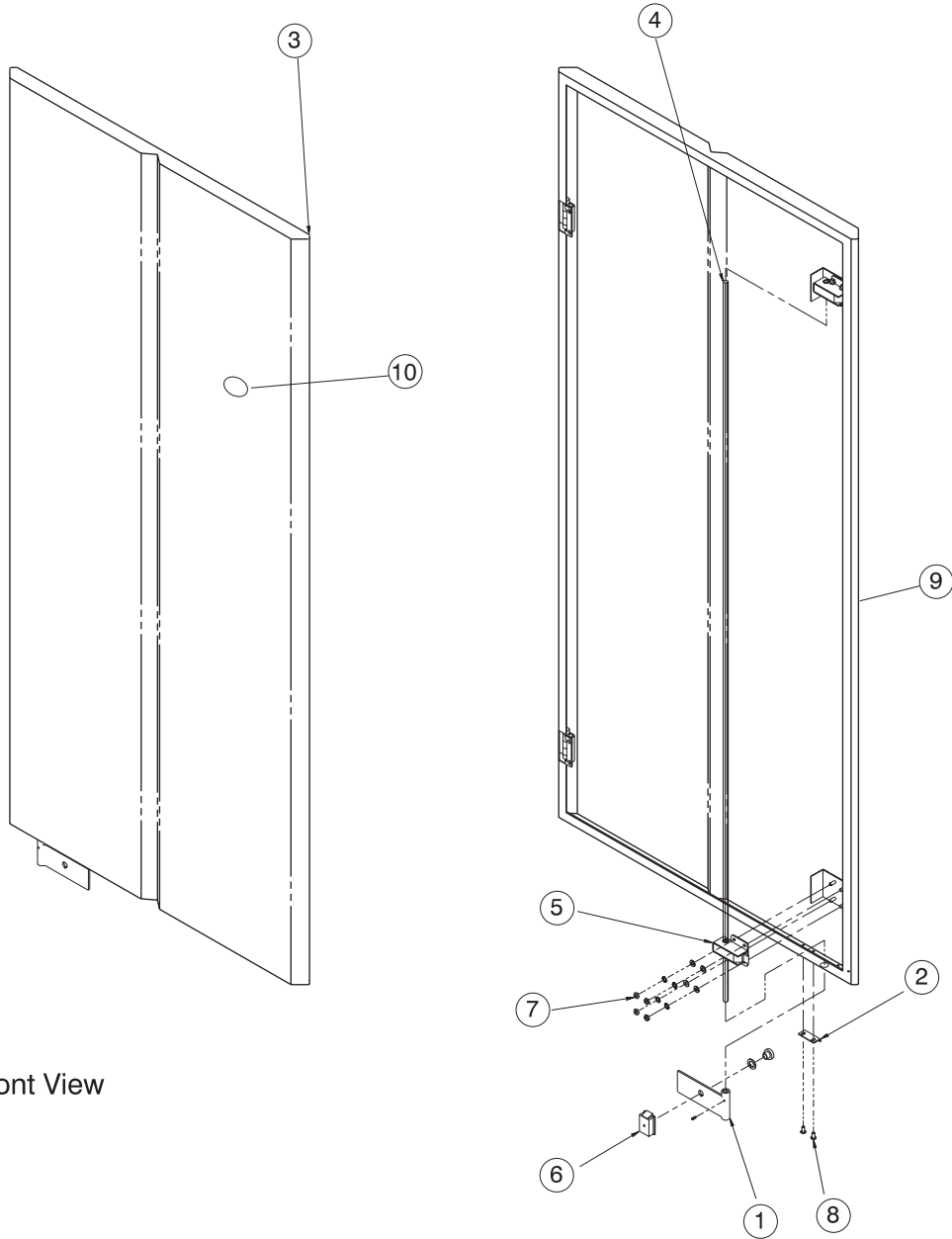
Asm- Index	Part Number	Units	Description
4-			Frame Asm, 2.01 m (reference only)
-1	46G6952	4	• Angles, Mounting
-2	0375867	46	• Clip, Self Retaining
-3	84X4841	8	• Nut, Hex Flange M4
-4	46H9737	2	• Bracket, Velcro
-5	5453958	4	• Caster
-6	0333769	12	• Washer, Flat 6.35 (.025)
-7	0076574	12	• Washer, Star 6.35 (.025)
-8	0059647	12	• Screw, Hex Hd .25-20 X 1.0
-9	54G2881	12	• Pad, Neoprene Unistrut
-10	9488029	12	• Nut, Unistrut .25-20
-11	1622420	20	• Nut, Hex FI M8
-12	4442739	4	• Pad
-13	54G2882	6	• Screw, Hex FI Hd M5 X 10
-14	31G9264	2	• Hinge, Rear Cover
-15	26H7215	2	• Screw, Slotted Hd FL M4 X 8
-16	46H9144	1	• Bracket, Cable Access
-17	1622346	2	• Washer, Lock External Tooth M4

Assembly 5: Cover assemblies, 1.93 m frame



Asm- Index	Part Number	Units	Description
5-1	31L7724	1	Cover, Front
-2	11J5228	2	Cover, Side
-	2665528	4	• Screw, Self Tapping
-3	31L7725	1	Cover, Rear
-4	11J6168	2	Screw, Shoulder
-5	11J5235	4	Hinge, Cover
-	2665528	12	• Screw, Self Tapping
-6	11J6168	2	Screw, Shoulder
-7			Frame Asm, 1.93 m (reference only)

Assembly 6: Front cover assembly (2.01 m frame)

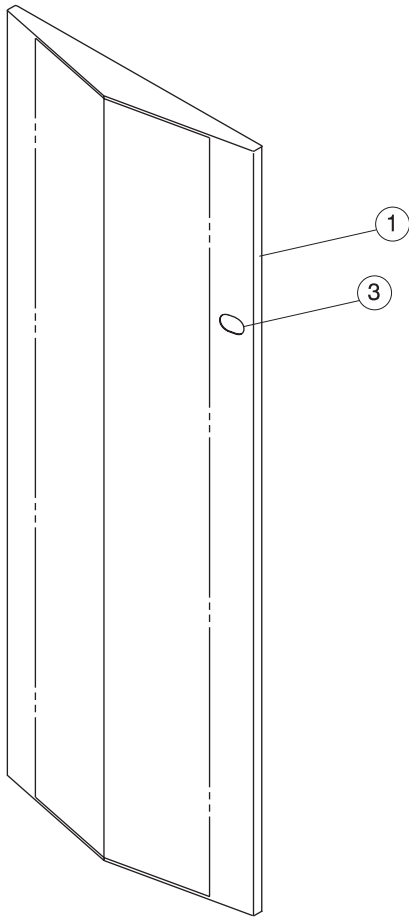


Front View

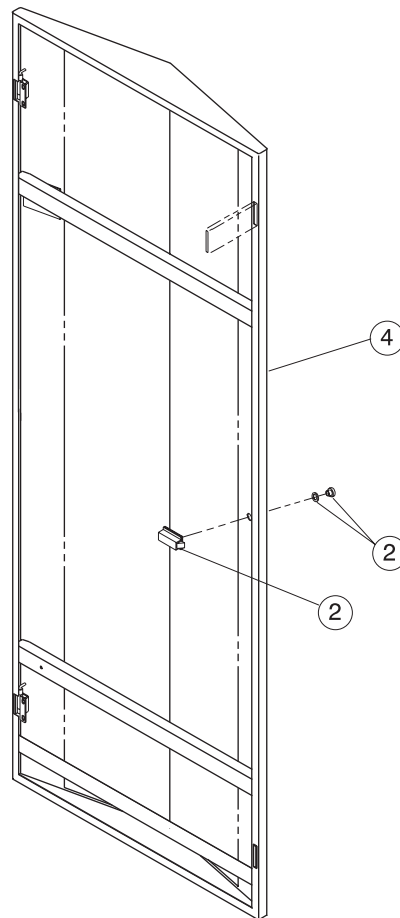
Rear View

Asm- Index	Part Number	Units	Description
6-	08J6106		Cover Asm, Front, 2.01 m frame
-5	89F4158	2	• Latch Assembly
-6	46G6976	1	• Latch Slam
-7	84X4842	8	• Nut, Hex Flange M5
-8	26H7213	2	• Screw, Hex Fl Hd M5 X 16
-9	46G5616	1	• Gasket
-10	46H9139	1	• Plate, Logo IBM

Assembly 7: Rear cover assembly (2.01 m frame)



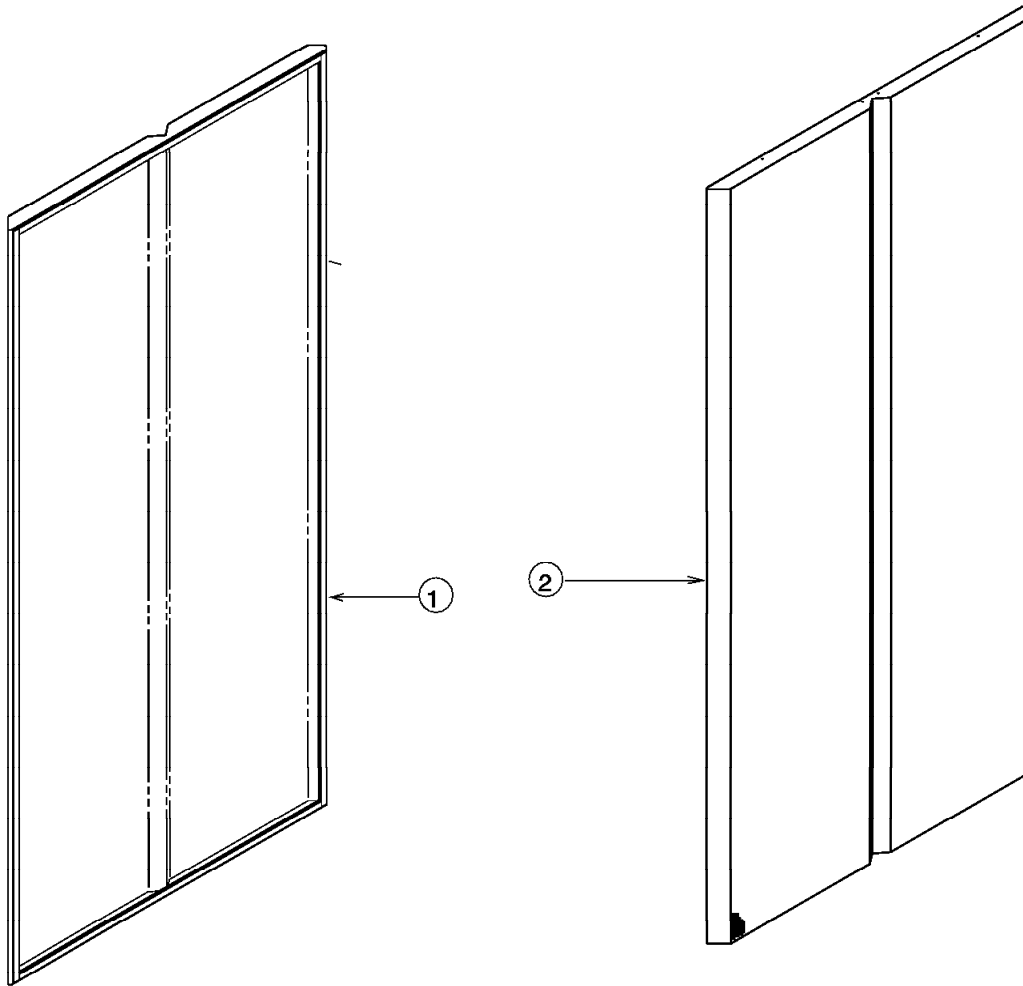
Front View



Rear View

Asm- Index	Part Number	Units	Description
7-	08J6102		Cover Asm, Rear, 2.01 m frame
-1	31G9293	1	• Cover, Rear (Cover Only, No Hdw)
-2	46G6975	1	• Latch, Slam Assembly
-3	46H9139	1	• Plate, Logo IBM
-4	46G5616	1	• Gasket

Assembly 8: Side cover assembly (2.01 m frame)

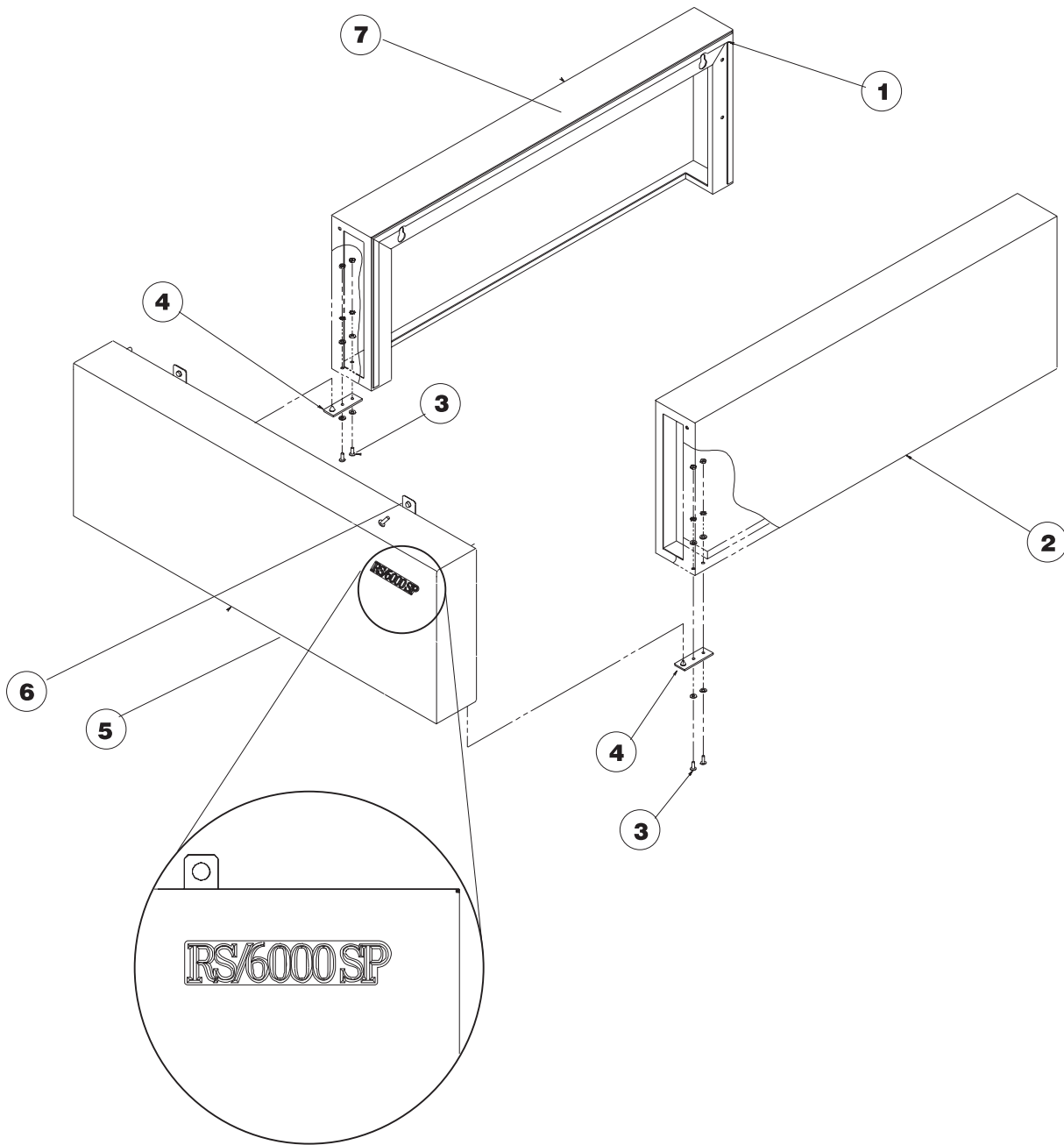


Left Cover

Right Cover

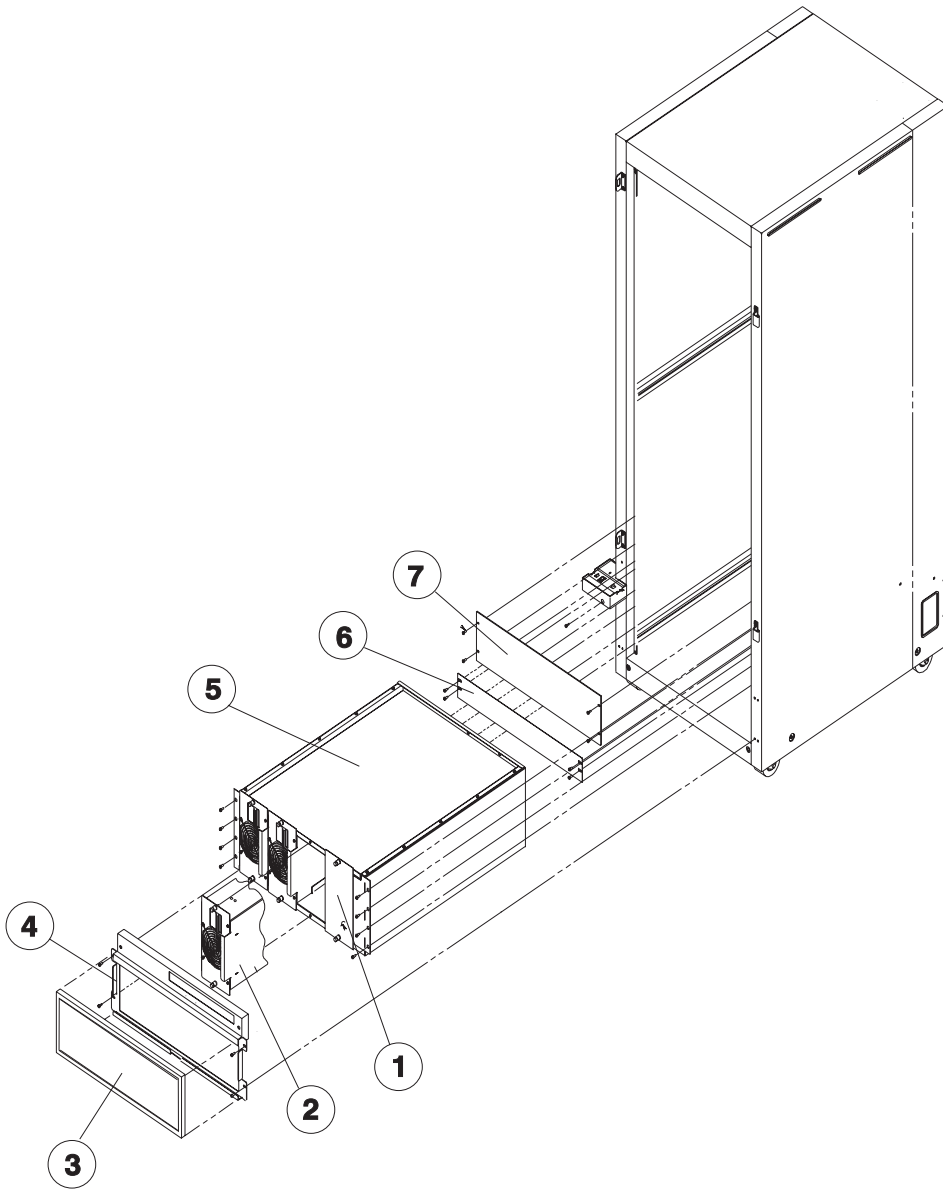
Asm- Index	Part Number	Units	Description
8-			Cover Asm, Side, 2.01 m frame
-1	54G2884	1	• Cover, Left
-2	54G2885	1	• Cover, Right

Assembly 9: Acoustic skirt assembly



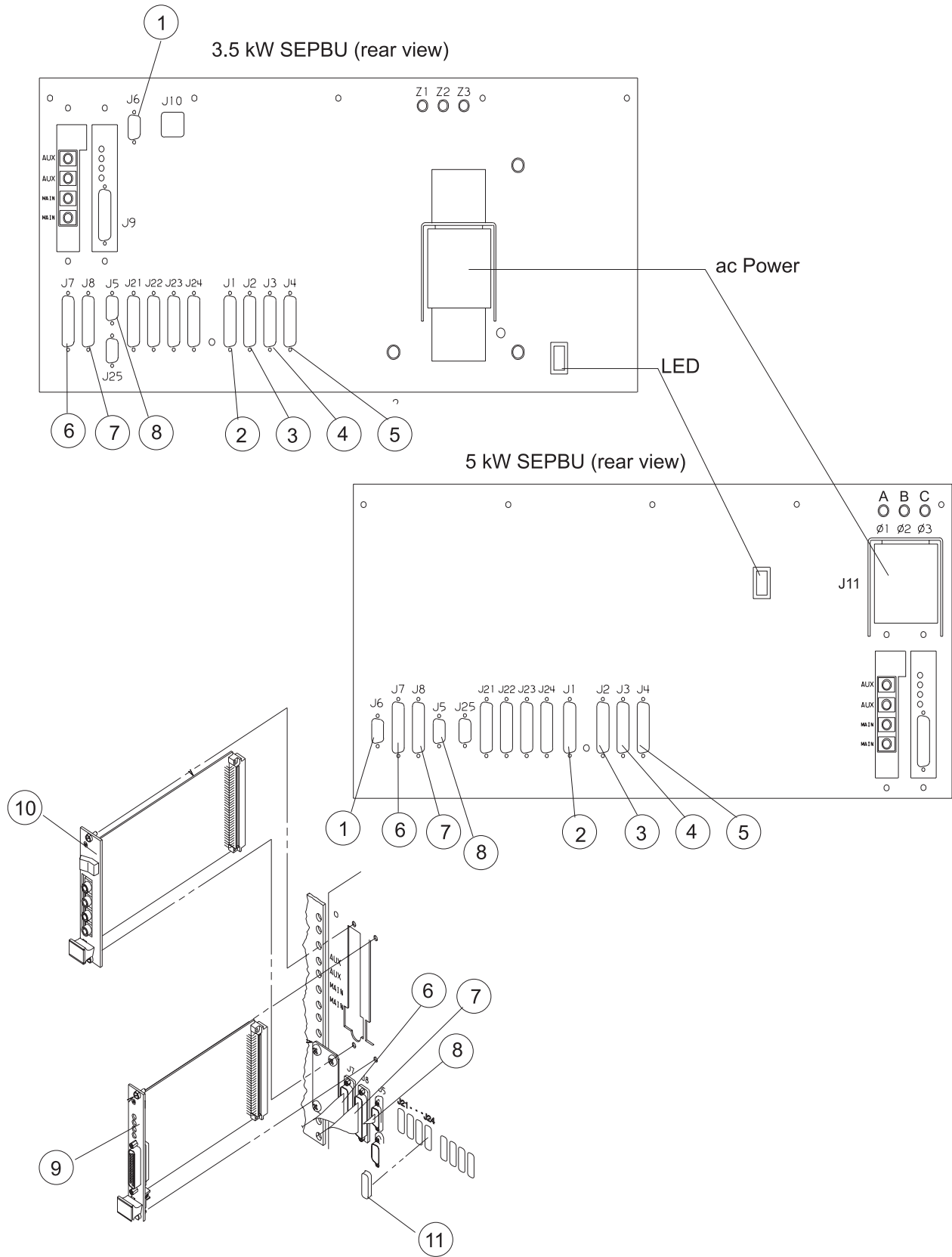
Asm- Index	Part Number	Units	Description
9-			Cover, Acoustic Skirt
-1	46G7009	1	• Gasket
-4	31G9288	2	• Skirt, Locator Bracket
-6	46G6967	2	• Tab Fastener, Skirt
-	46G6980	2	• Fastener, Pin (not shown)
-			•
-			•
-			• 1.93 m Frame Parts
-2	11J5230	1	• Cover, Right Skirt (1.93 m Frame)
-7	11J5231	1	• Cover, Left Skirt (1.93 m Frame)
-5	11J5232	1	• Cover, Front Skirt (1.93 m Frame)
-3	54G2882	4	• Screw (1.93 m Frame)
-			•
-			•
-			• 2.01 m Frame Parts
-5	46G6964	1	• Cover, Front Skirt (2.01 m Frame)
-7	46G6965	1	• Cover, Left Skirt (2.01 m Frame)
-2	46G6966	1	• Cover, Right Skirt (2.01 m Frame)
-3	1624775	4	• Screw, Hex Fl Hd M5 X 6 (2.01 m Frame)

Assembly 10: Scalable Electrical Power Base Unit (SEPBU) (view 1)



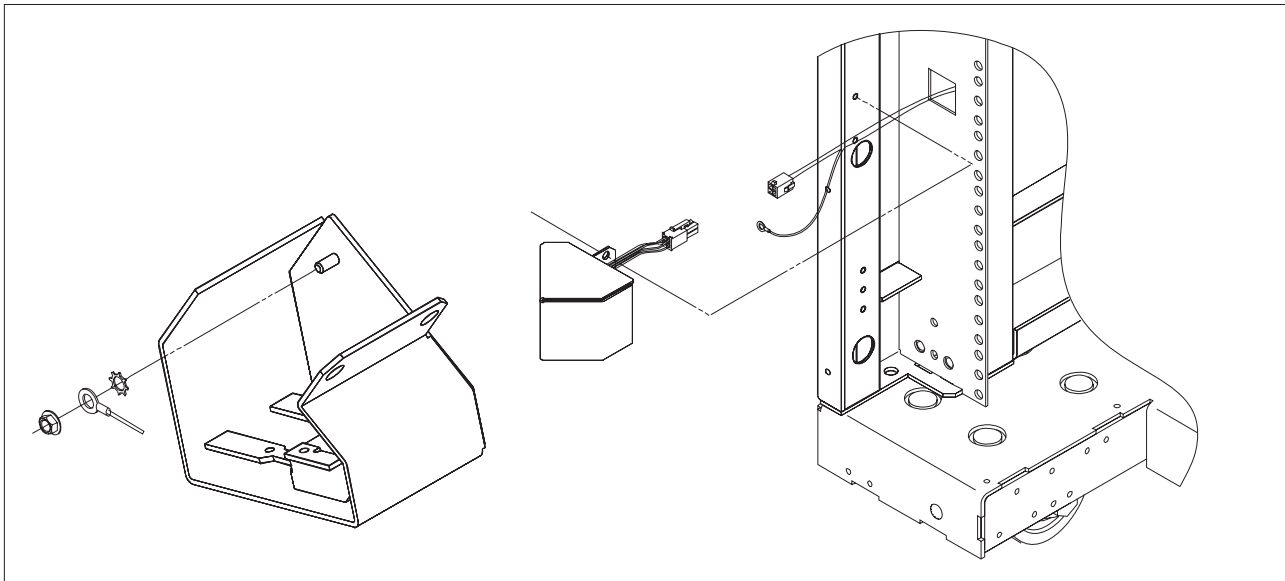
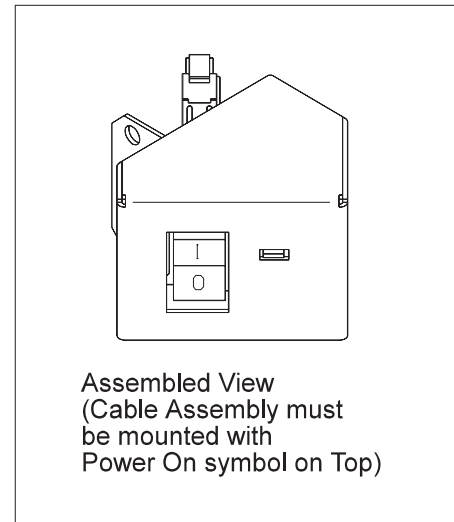
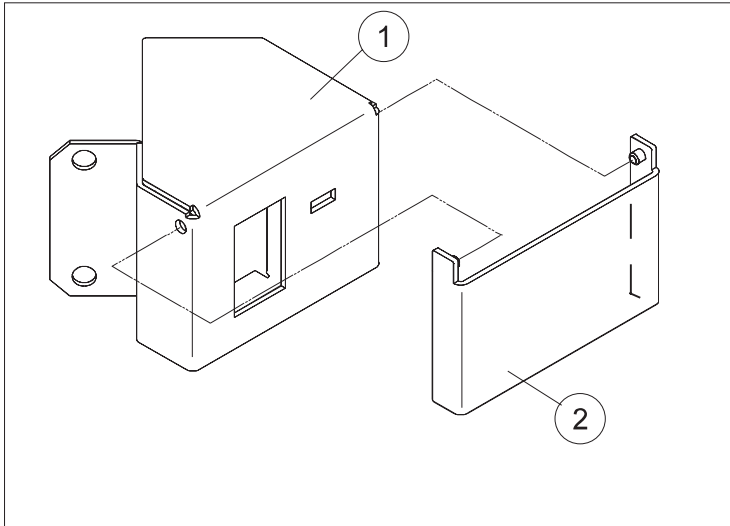
Asm-Index	Part Number	Units	Description
10-			SEPBU Assembly (reference only)
-1	77G0939	1	• Panel, Power Sup Chassis Blank, 3.5 kW
-1	11J5242	1	• Panel, Power Sup Chassis Blank, 5 kW
-2	21L2906	3	• Power Supply, 3.5 kW
-2	21L3138	3	• Power Supply, 5 kW
-3	46G6970	1	• Filter, Air
-4	54G2901	1	• Bracket, Air Filter (2.01 m Frame)
-4	31L8523	1	• Bracket, Air Filter (1.93 m Frame)
-5	77G0909	1	• Power Supply Chassis Assembly, 3.5 kW
-5	11J5258	1	• Power Supply Chassis Assembly, 5 kW
-6	54G2877	1	• Panel, Switch Management Blank (2.01 m Frame)
-6	11J5155	1	• Panel, Switch Management Blank (1.93 m Frame)
-7	54G2947	1	• Panel, Blank (2.01 m Frame)
-7	11J4774	1	• Panel, Blank (1.93 m Frame)
-	21L3180	AR	Linecord, 3-phase, (US), 14 ft, 3.5 kW
-	21L3181	AR	Linecord, 3-phase, (US), 6 ft, 3.5 kW
-	21L3182	AR	Linecord, 3-phase, (EMEA), 14 ft, 3.5 kW
-	21L3183	AR	Linecord, 3-phase, (APG), 14 ft, 3.5 kW
-	54G2745	AR	Linecord, Hi Volt (UL/CSA)
-	54G2749	AR	Linecord, Hi Volt (HAR)
-	77G0940	AR	Linecord, 3-phase, 7 kW, (US), 14 ft (SEPBU)
-	77G0947	AR	Linecord, 3-phase, 7 kW, (US), 6 ft (SEPBU)
-	77G0948	AR	Linecord, 3-phase, 7 or 10.5 kW, (APG, WT, UL/CSA Pigtail) (SEPBU)
-	77G0950	AR	Linecord, 3-phase, 7 or 10.5 kW, (EMEA, WT, HAR Pigtail) (SEPBU)
-	77G0941	AR	Linecord, 3-phase, 10.5 kW, (US), 14 ft
-	77G0949	AR	Linecord, 3-phase, 10.5 kW, (US), 6 ft
-	77G0942	AR	Linecord, single phase, 3.5 kW, (US), 14 ft
-	77G0945	AR	Linecord, single phase, 3.5 kW, (US), 6 ft
-	77G0944	AR	Linecord, single phase, 3.5 kW, (HAR, EMEA), 14 ft
-	77G0943	AR	Linecord, single phase, 3.5 kW, (APG), 14 ft
-	11J4782	AR	Linecord, single phase, 5 kW, (US), 14 ft
-	11J4783	AR	Linecord, single phase, 5 kW, (US), 6 ft
-	11J4784	AR	Linecord, single phase, 5 kW, (HAR, EMEA), 14 ft
-	11J4785	AR	Linecord, single phase, 5 kW, (APG), 14 ft

Assembly 11: Scalable Electrical Power Base Unit (SEPBU) (view 2)



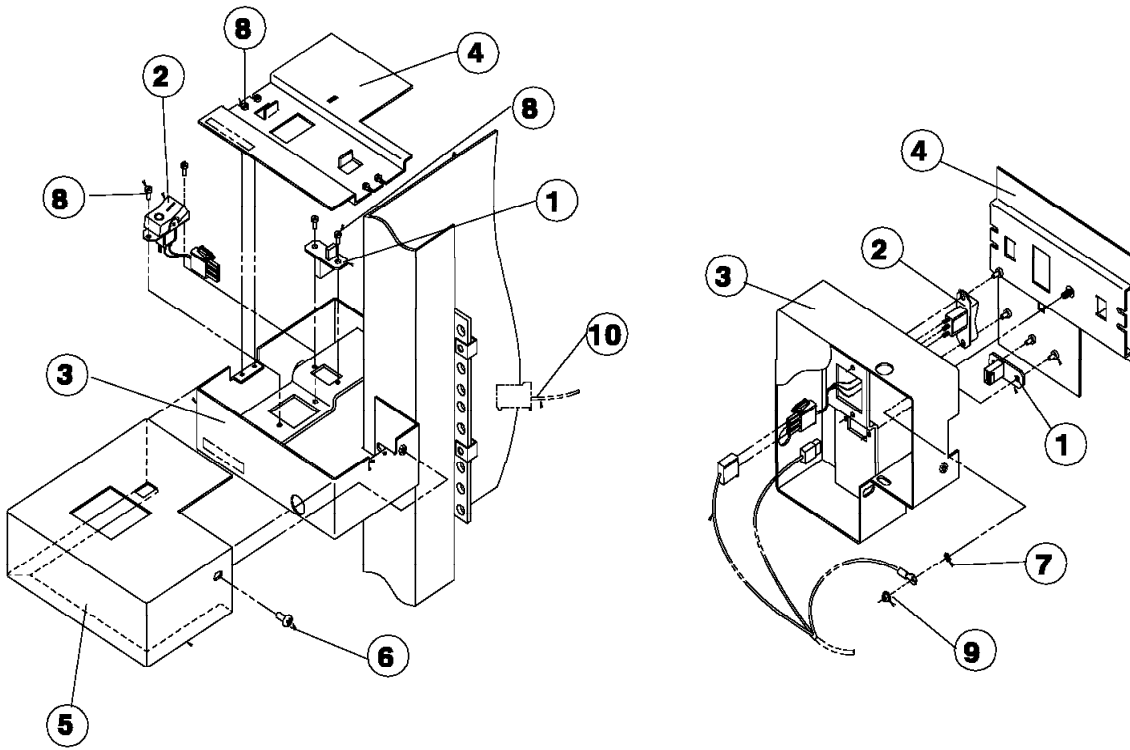
Asm- Index	Part Number	Units	Description
11-			SEPBU Assembly (reference only)
-1	77G0917	1	• Cable, Main Power Switch (not shown)
-2	54G3039	1	• Cable, +48 V dc Node Grp "A" (not shown) Thin Nodes 1, 2, 3, 4 - Wide Nodes 1, 3
-3	54G3040	1	• Cable, +48 V dc Node Grp "B" (not shown) Thin Nodes 5, 6, 7, 8 - Wide Nodes 5, 7
-4	54G3041	1	• Cable, +48 V dc Node Grp "C" (not shown) Thin Nodes 9, 10, 11, 12 - Wide Nodes 9, 11
-5	54G3042	1	• Cable, +48 V dc Node Grp "D" (not shown) Thin Nodes 13, 14, 15, 16 - Wide Nodes 13, 15
-	11J5189	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5190	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5191	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5192	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5193	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5194	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5195	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-	11J5196	1	• Cable, +48 V dc, (Model 550 Frame) (not shown)
-6	21L3916	1	• Cable, Harness Super Bus "A"
-7	21L3917	1	• Cable, Harness Super Bus "B"
-8	46G5686	1	• Cable, +48 V dc Power Dist-Sw
-9	04H9466	1	• Card, Frame Supervisor (SEPBU)
-	05N5775	1	• Card, Twin-Tail Frame Supervisor
-	26H7359	1	• • Cable, RS232 "Y" (HACWS) (not shown)
-	48G3055	AR	• Cover, Cable Cap Plug (not shown)
-10	77G0919	1	• Card, PCI (Power Control)
-11	46H9856	4	• Cap, Protective Plastic
-	31L7265	AR	• Cable, 48 volt power, with switch

Assembly 12: Main power switch asm, 1.93 m frame



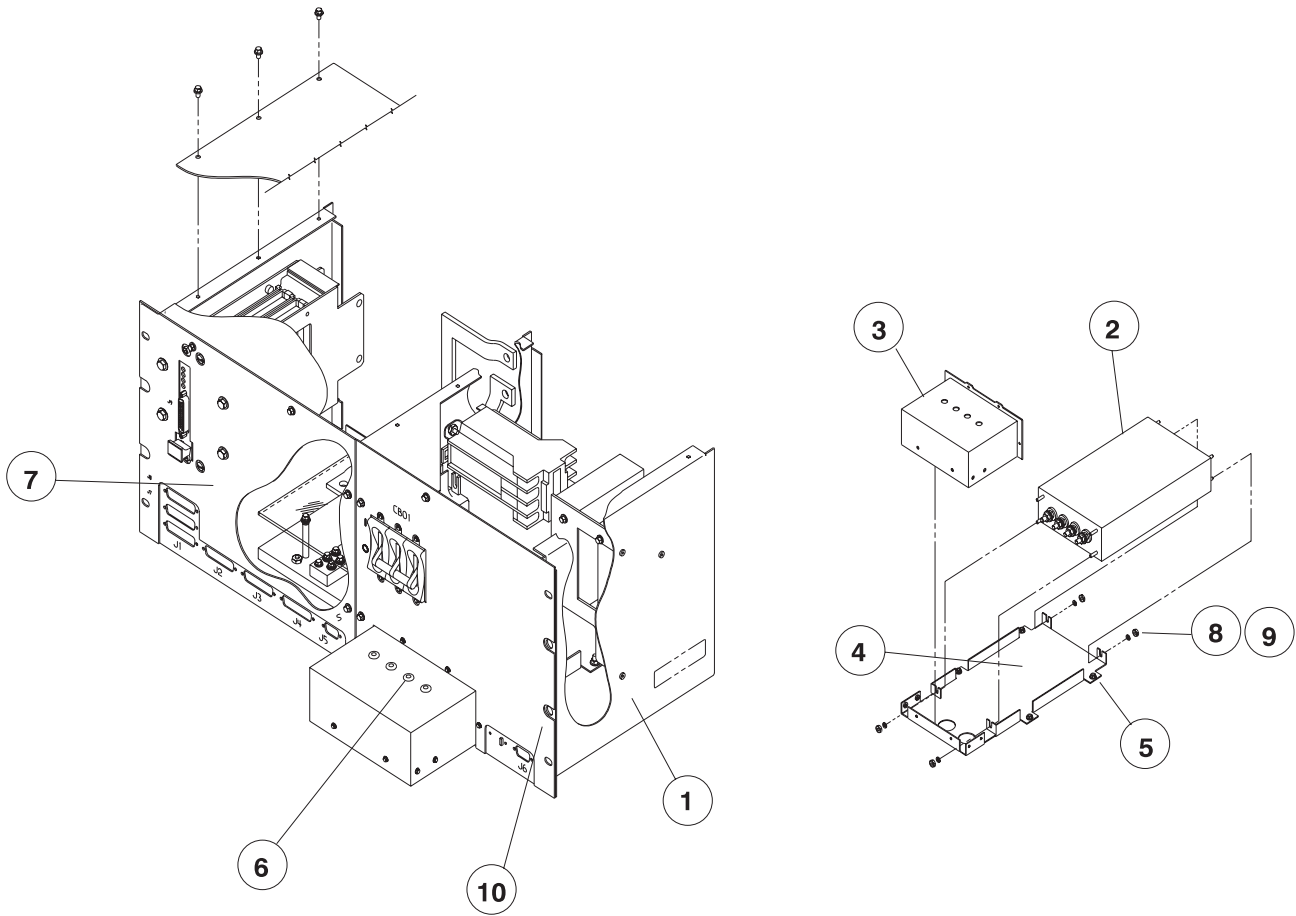
Asm- Index	Part Number	Units	Description
12-5 -2	31L7121 31L7157	1 1	Power Switch Assembly, Main (1.93 m Frame) (reference only) Kit, Plastic Dust Cover

Assembly 13: Main power switch asm (2.01 m frame)



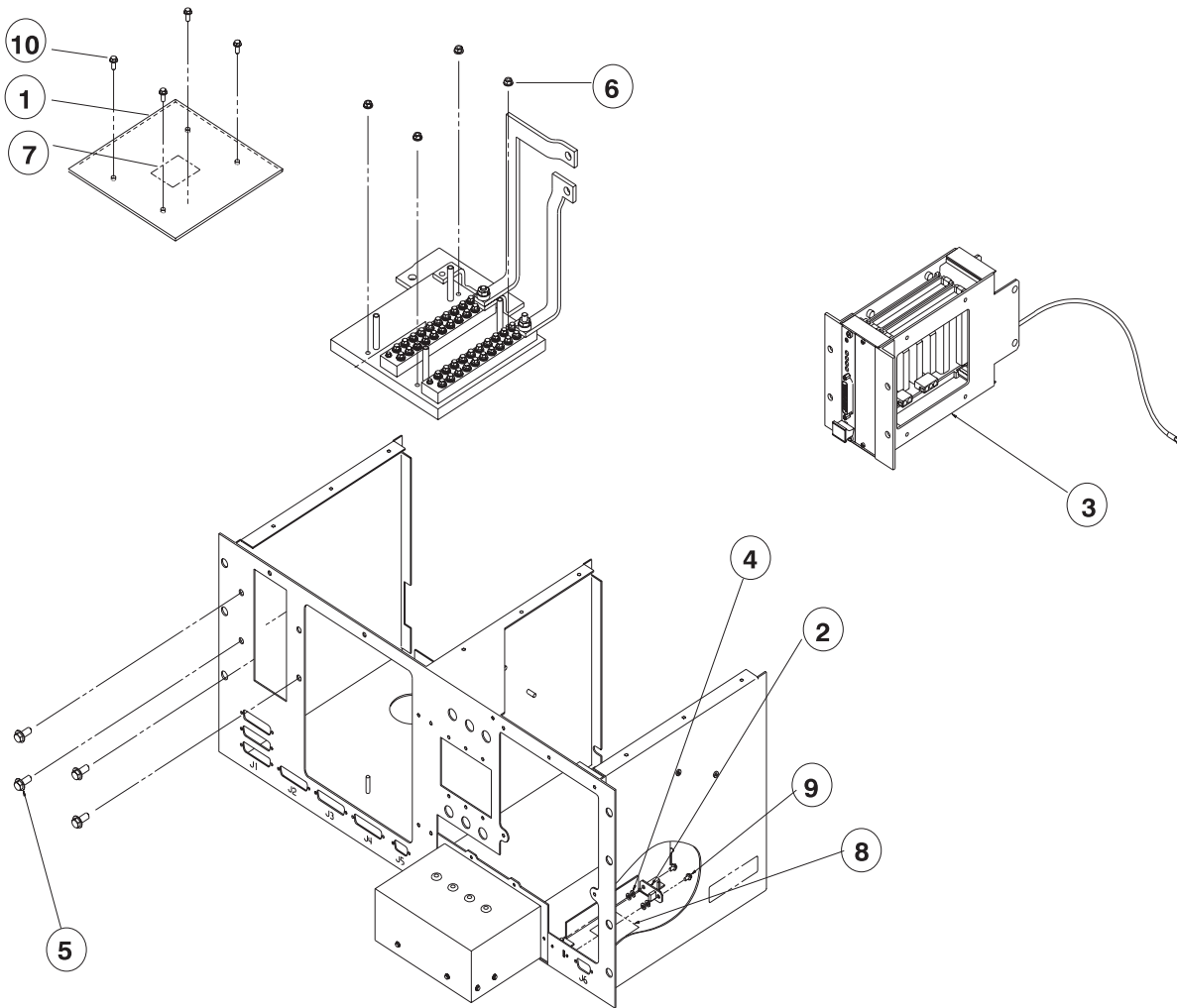
Asm- Index	Part Number	Units	Description
13-			Power Switch Assembly, Main (2.01 m Frame) (reference only)
-1	67G4987	1	• Power LED Card Asm (PDU) (not shown)
-1	77G0921	1	• Power LED Card (SEPBU)
-2	54G2995	1	• Switch/Cable, Main Power Assembly (PDU) (not shown)
-2	77G0918	1	• Switch/Cable, Main Power Assembly (SEPBU)
-3	54G2929	1	• Housing
-4	54G2930	1	• Top Plate
-5	54G2933	1	• Cover
-6	54G3274	1	• Screw, Pan Hd M4 x 6
-7	1622346	1	• Washer, Star
-8	1621020	8	• Screw, CHS M3 X 6
-9	84X4881	1	• Nut, Hex Flange
-10	46G5704	1	• Cable, Main Power Switch (PDU) (not shown)
-10	77G0917	1	• Cable, Main Power Switch (SEPBU)
-12	54G2882	2	• Screw
-	54G2931	1	• Shield, Plastic (not shown)
-	54G2932	1	• Slide (not shown)

Assembly 14: Power distribution unit asm (view 1)



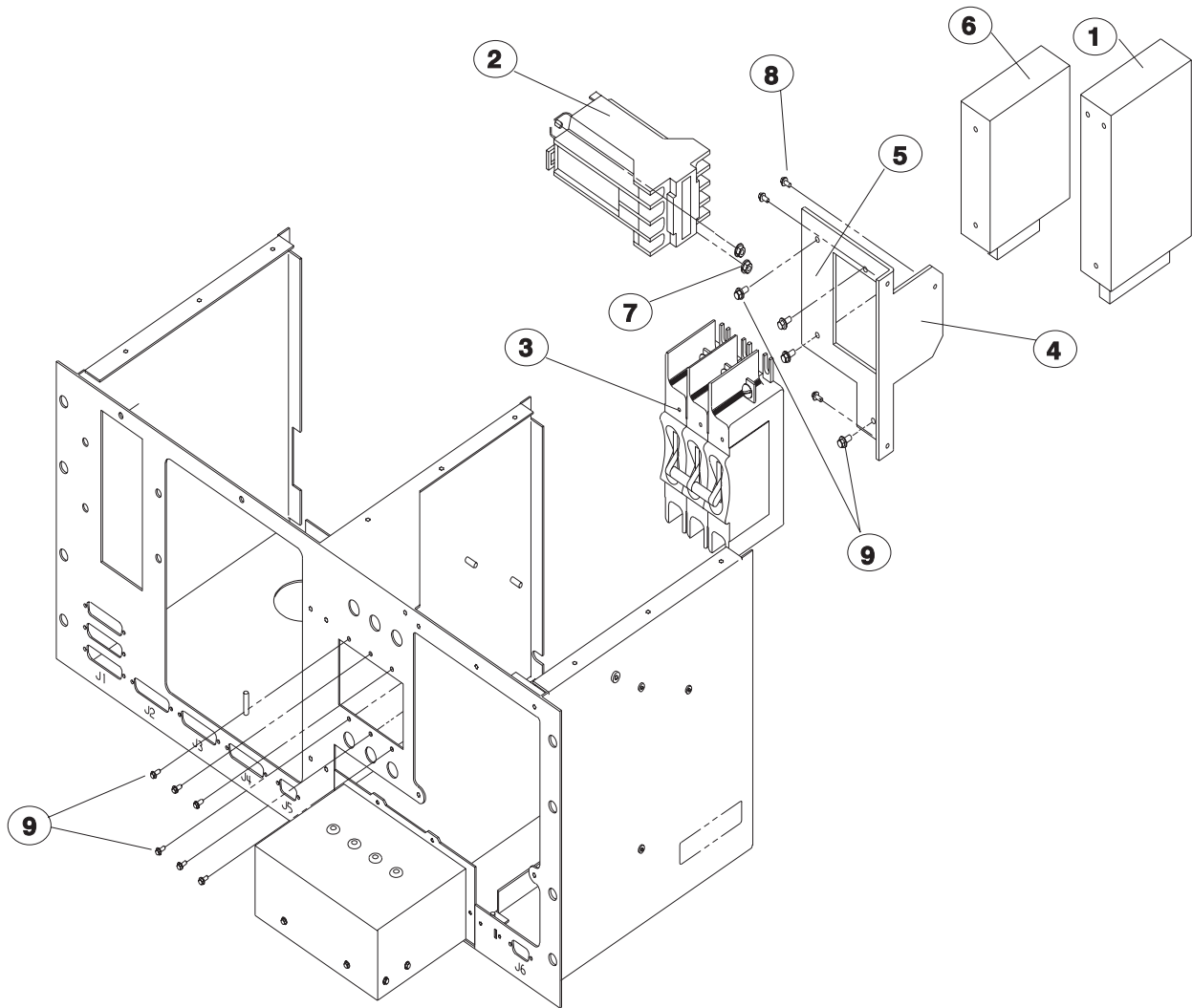
Asm- Index	Part Number	Units	Description
14-			Power Distribution Unit Assembly (reference only)
-1	54G3260	1	• Chassis, PDU
-2	46G6999	1	• Line Filter 30 AMP
-3	31G9239	1	• ac Filter Cover
-4	31G9238	1	• Frame, Filter
-5	84X4841	6	• Nut, Hex Flange M4
-6	93G1140	4	• Grommet
-7	31G9232	1	• Cover PDU, Left
-8	0418787	4	• Washer, Flat #8
-9	0002899	4	• Nut, Hex 8-32
-10	54G3263	2	• Cover PDU, Right
-	54G2745	AR	Linecord, Hi Volt (UL/CSA)
-	54G2749	AR	Linecord, Hi Volt (HAR)
-	64G6023	AR	Linecord, US 14 ft (PDU)
-	64G6024	AR	Linecord, US 6 ft (PDU)
-	64G6025	AR	Linecord, WT (UL/CSA Pigtail) (PDU)
-	64G6026	AR	Linecord, WT (HAR Pigtail) (PDU)

Assembly 15: Power distribution unit asm (view 2)



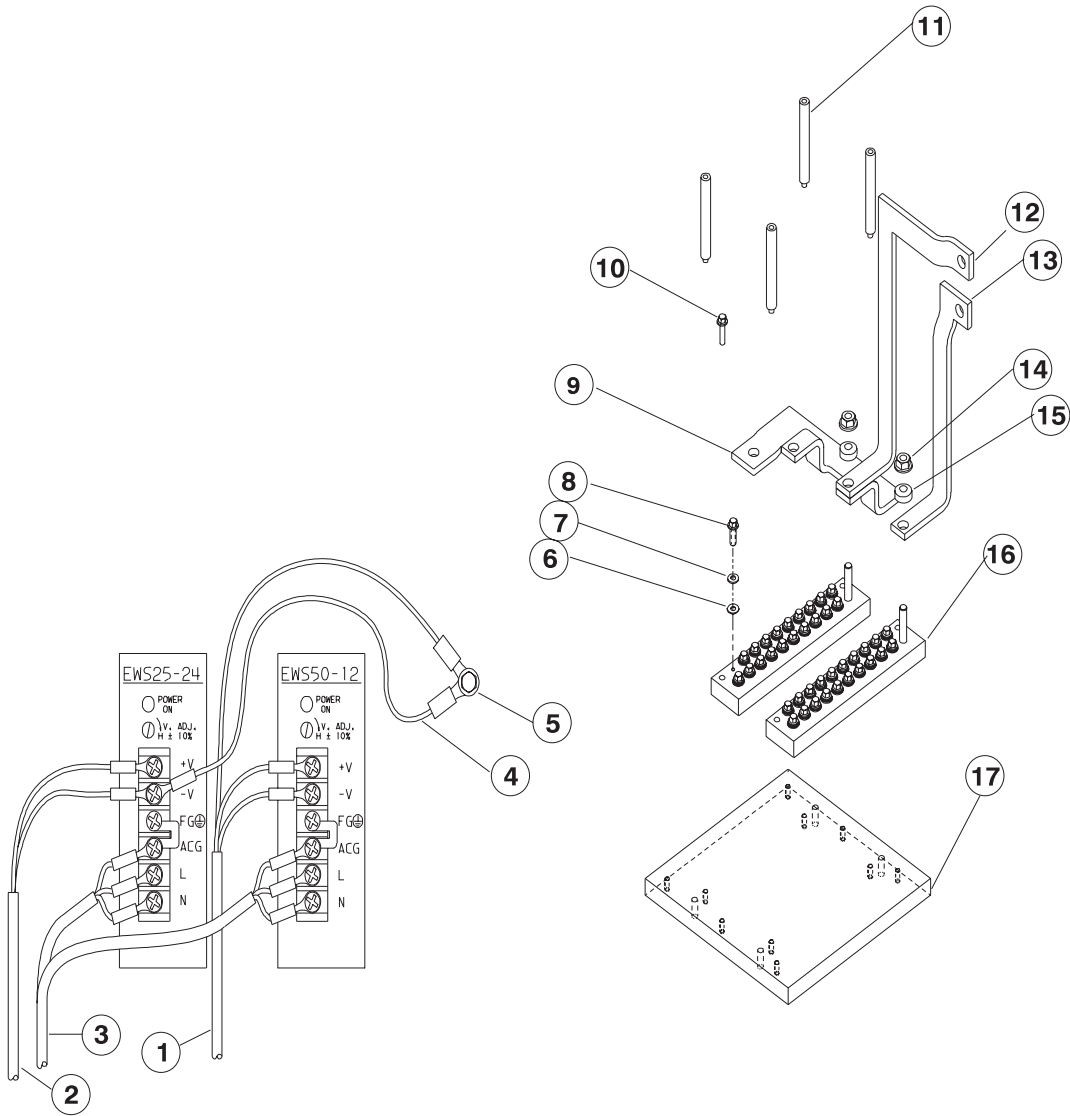
Asm- Index	Part Number	Units	Description
15-			Power Distribution Unit Assembly (reference only)
-1	31G9237	1	• Shield, Bus Bar Assembly
-2	67G4987	1	• Power LED Card
-3		1	• Frame Supervisor Assembly (See "Assembly 20: Supervisor gate asm (PDU only)" on page 5-40.)
-4	1622302	4	• Washer, Flat M3
-5	54G2882	4	• Screw, Hex FI Hd M5 X 10, Black
-6	84X4841	4	• Nut, Hex Flange M4
-7	54G3197	1	• Label, Safety 200-240 VA
-8	54G3198	1	• Label, Safety 200-240 V
-9	1624743	2	• Screw, Hex FI Hd M3 X 6
-10	1624766	4	• Screw, Hex FI Hd M4 X 10

Assembly 16: Power distribution unit asm (view 3)



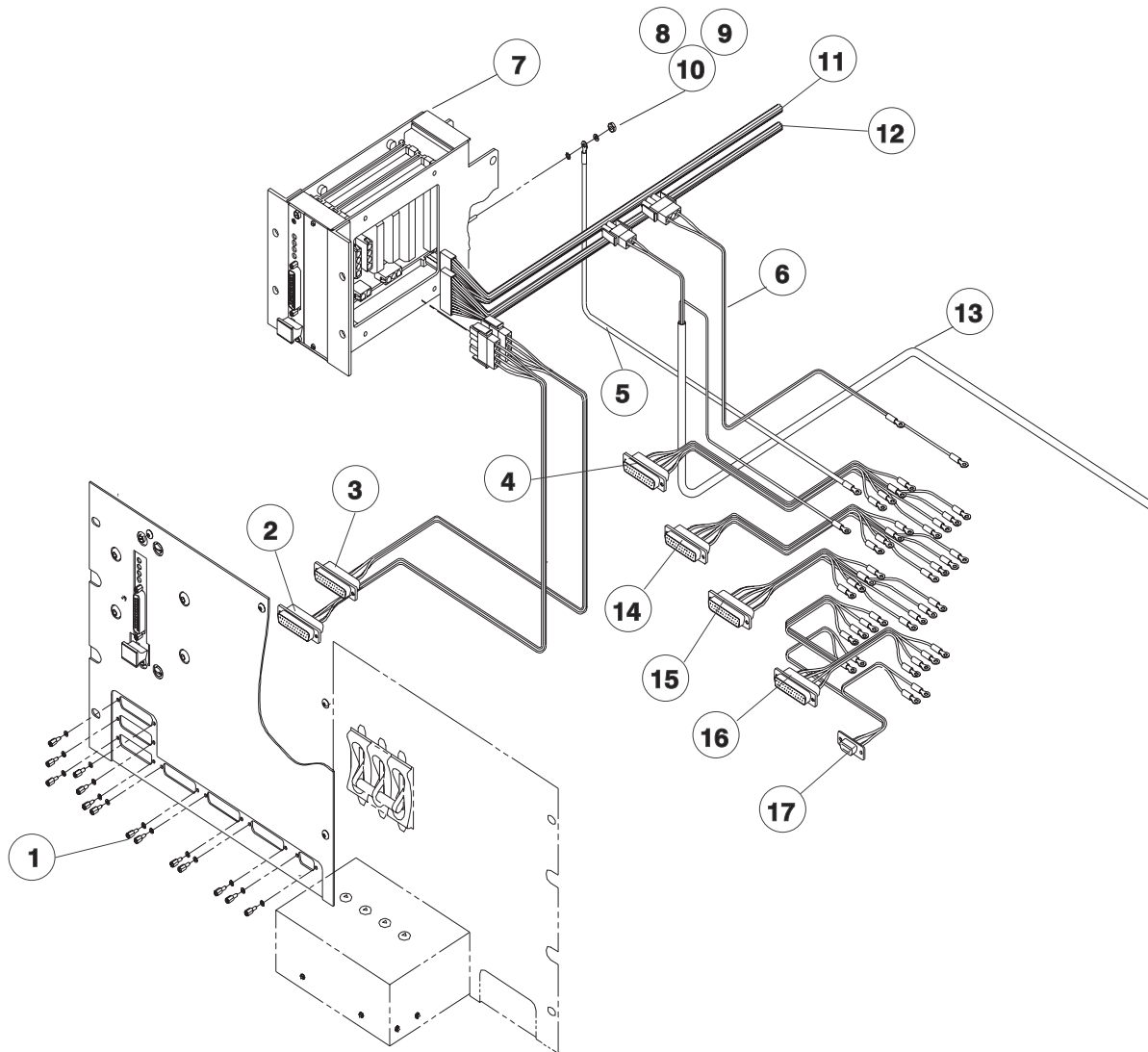
Asm- Index	Part Number	Units	Description
16-			Power Distribution Unit Assembly (reference only)
-1	54G3356	1	• Power Supply (12 V dc)
-1	64G5594	1	• Power Supply (48 V dc)
-2	84X6119	1	• Contactor, (24 volt coil)
-3	54G2904	1	• Circuit Breaker (30 AMPS)
-4	93G1057	1	• Power Supply Bracket (Right)
-5	46G7034	1	• Power Supply Bracket (Left)
-6	54G3357	1	• Power Supply (24 V dc)
-7	84X4841	6	• Nut, Hex Flange M4
-8	1624743	1	• Screw, Hex Fl Hd M3 X 6
-9	1624744	8	• Screw, Hex Fl Hd M3 X 8

Assembly 17: Power distribution unit asm (view 4)



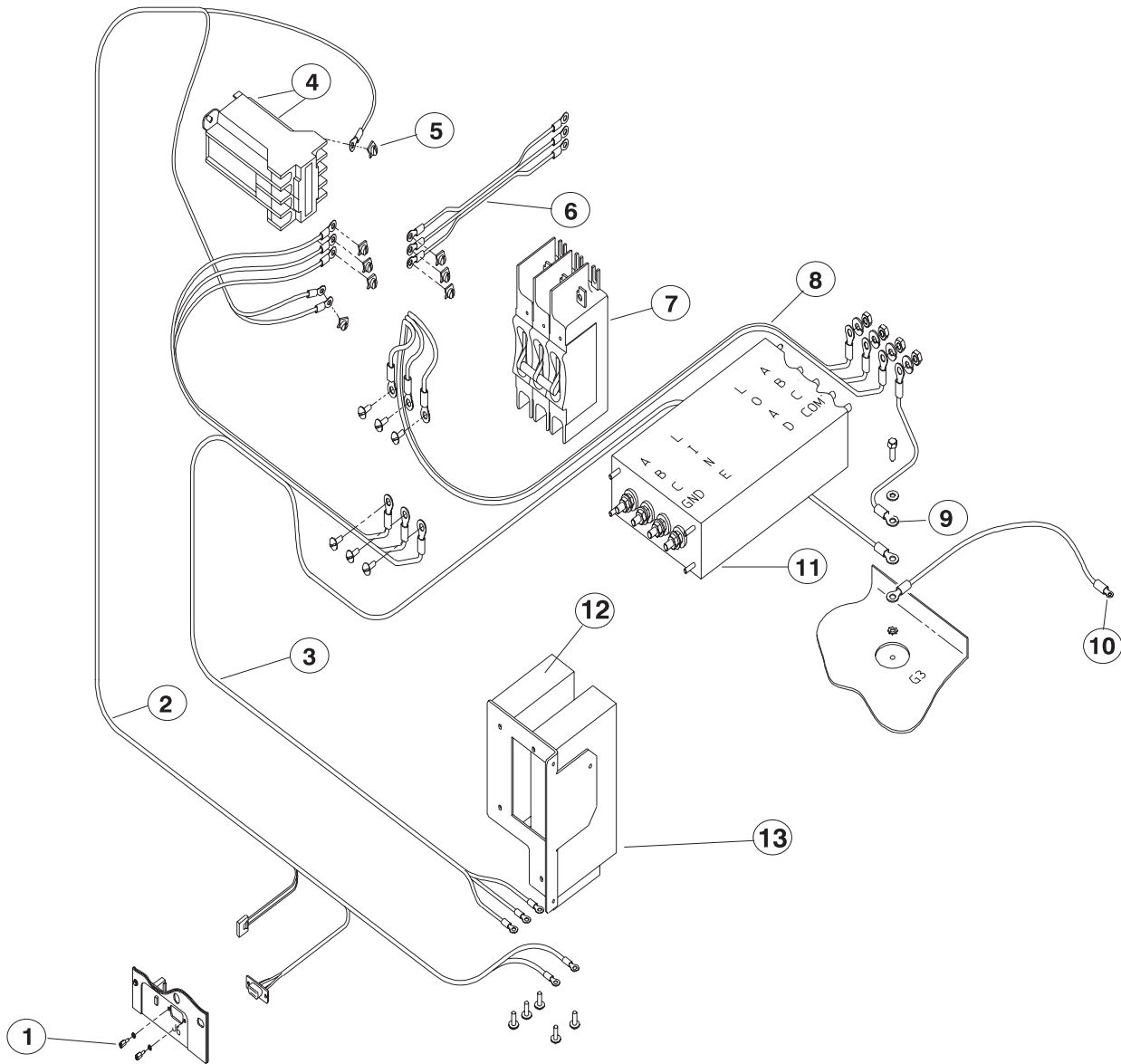
Asm- Index	Part Number	Units	Description
17-			Power Distribution Unit Assembly (reference only)
-1	54G2913	1	• Cable, 12 volt Frame Supply
-3	46G7013	1	• Cable, CB1 to K01
-2	46G5969	1	• Cable, Main Contactor Harness
-4	46G5944	1	• Cable, 24 volt Ground
-5	1624764	1	• Screw, Hex Fl Hd M4 X 6
-7	2665747	40	• Washer, Belleville M4
-6	2566646	40	• Washer, Flat M4
-8	1624766	40	• Screw, Hex Fl Hd M4 X 10
-9	31G9234	1	• Bus Strap, Jumper Ground
-10	1624770	4	• Screw, Hex Fl Hd M4 X 20
-11	8653386	4	• Standoff, M4X4
-12	46G5637	1	• Bus Strap, Grnd Return
-13	31G9233	1	• Bus Strap, Jumper +48 V
-14	84X4843	2	• Nut, Hex Flange M6
-15	2665752	2	• Washer, Belleville M6
-16	46G5635	2	• Bus Bar Assembly
-17	46G5633	1	• Bus Bar Insulator Assembly

Assembly 18: Power distribution unit asm (view 5)



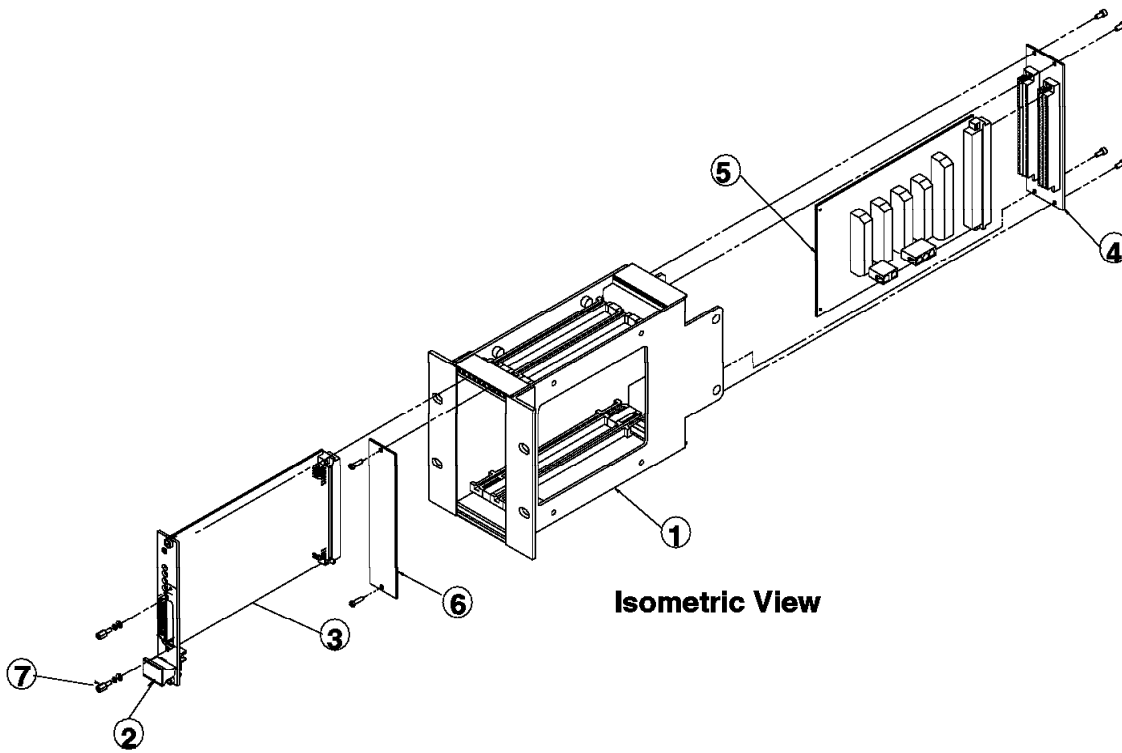
Asm- Index	Part Number	Units	Description
18-			Power Distribution Unit Assembly (reference only)
-1	31G9308	16	• Screw, Lockset
-2	46G5703	1	• Cable, Frame Supply
-3	46G5697	1	• Cable, Bulkhead to Supervisor
-4	64G5573	1	• Cable, Group "A" to Bulk
-5	54G3011	1	• Cable, Frame Supervisor Ground
-6	46G5706	1	• Cable, 48 volt Frame Supply
-7		1	• Frame Supervisor Assembly (See "Assembly 20: Supervisor gate asm (PDU only)" on page 5-40.)
-8	1622401	1	• Nut, Hex M3
-9	2179909	5	• Washer, Star M3
-10	1622302	9	• Washer, Flat M3
-11	54G3305	1	• Cable, Power Supply Chassis Power Control, "A"
-12	54G3306	1	• Cable, Power Supply Chassis Power Control, "B"
-13	54G2913	1	• Cable, 12 volt Frame Supply
-14	64G5574	1	• Cable, Group "B" to Bulk
-15	64G5575	1	• Cable, Group "C" to Bulk
-16	64G5576	1	• Cable, Group "D" to Bulk
-17	54G3009	1	• Cable, Switch to PDU

Assembly 19: Power distribution unit asm (view 6)



Asm- Index	Part Number	Units	Description
19-			Power Distribution Unit Assembly (reference only)
-1	31G9308	16	• Screw, Lockset
-2	46G5969	1	• Cable, Main Contactor Harness
-3	46G7013	1	• Cable, CB1 to K01
-4	84X6119	1	• Contactor, (24 volt coil)
-5	84X4841	6	• Nut, Hex Flange M4
-6	46G7012	1	• Cable, K01 to PS02
-7	54G2904	1	• Circuit Breaker (30 AMPS)
-8	46G7011	1	• Cable, FL1 to CB1
-9	46G7017	1	• Cable, G3 to LFCOM
-10	46G7018	1	• Cable, Power Supply Chassis to PS Ground
-11	46G6999	1	• Line Filter 30 AMP
-12	54G3357	4	• Power Supply (24 V dc)
-13	54G3356	1	• Power Supply (12 V dc)

Assembly 20: Supervisor gate asm (PDU only)



Asm- Index	Part Number	Units	Description
20-			Supervisor, Gate Assembly (reference only)
-1	46G5476	1	• VME Card Cage
-2	31G9248	1	• Eurocard Card Cover (LED)
-3	17H5419	1	• Frame Supervisor Card
-4	67G4991	1	• Backplane Card
-5	67G4995	1	• Connector Card
-6	46G5480	1	• Eurocard Cover (Blank)
-7	31G9308	2	• Screw, Lock

Assembly 21: SP-Attached Server (RS/6000 7017 Models S70, S7A, and S80)

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Asm- Index	Part Number	Units	Description
21-	31L7196	1	Cable Assembly (SAMI)
-	31L7197	1	Cable Assembly (S1 Port)
-	54G3301	1	Cable, Coax
-	08J6118	1	Cable, Ground, 10-meter
-	08L0398	1	Adapter, RS/6000 SP System
-			
			<p>For a complete list of SP-Attached Server parts, see <i>RS/6000 Enterprise Servers S70, S7A, and S80 Installation and Service Guide, SA38-0548.</i></p>

Assembly 22: Features, Micro Channel Adapters

Asm-Index	Part Number	Units	Description
22-	00G3368	AR	Ethernet MCA Card (F/C 2980)
-	04H9464	AR	• Adapter, BNC TEE (White)
-	89G2333	AR	• Adapter, HiPS Type 1 (MCA)
-	17H5426	AR	• Adapter, HiPS Type 2 (MCA)
-	26H7241	AR	• Adapter, SPS (MCA)
-	54G3298	AR	• Cable, Assembly, 1 Core Ethernet
-	54G2993	AR	• Cable, Assembly, No Core Ethernet
-	46G7005	AR	• Terminator, 50 OHM
-	00G1276	AR	• Ethernet T/P Riser Card
-	02G7431	AR	• Ethernet T/P Xceivr Box
-	02G7434	AR	• Ethernet T/P Xceivr Cable
-	00G2380	AR	• Ethernet T/P Wrap Plug
-	93H4036	AR	Ethernet FullDuplex 10Base2 (F/C 2993)
-	93H4020	AR	Ethernet FullDuplex 10Base5 (F/C 2992)
-	93H1505	AR	Ethernet Card (F/C 2964)
-	93H8022	AR	Ethernet Card (F/C 2994)
-	07L6601	AR	Ethernet 10/100 UTP MCA Card (F/C 2994)
-	52G3380	AR	SCSI-2 DE Turbo MCA Card (F/C 2412)
-	11H2447	AR	SCSI-2 DE Fast MCA Card (F/C 2420)
-	11H7660	AR	SCSI-2 DE Fast/Wide MCA Card (F/C 2416)
-	52G7348	AR	• SCSI-2 DE Y-Cable
-	52G7350	AR	• SCSI-2 DE Connector
-	52G7349	AR	• SCSI-2 DE S-2 Cable
-	52G4349	AR	• SCSI-2 DE Adapter Cable
-	59F2977	AR	• SCSI-2 DE Terminator
-	52G4291	AR	• SCSI-2 DE F/W S-2-S Cable
-	52G4234	AR	• SCSI-2 DE F/W Y-Cable
-	61G8324	AR	• SCSI-2 DE F/W Connector
-	40F9969	AR	• Spacer, I/O Card
-	11H4779	AR	SCSI-SE Adapter (F/C 2410)
-	52G4259	AR	• Terminator SCSI
-	00G0972	AR	• Connector 50 Pos.
-	93H8814	AR	SCSI-2 SE F/W Adapter (F/C 2415)
-	26H7249	AR	• Internal 4-Port Cable
-	92F2565	AR	• Interposer to Fast Device
-	92F0322	AR	• Terminator
-	65G1879	AR	FDDI Single MCA Card (F/C 2724)
-	43G0856	AR	FDDI Dual MCA Card (F/C 2723)
-	40F9969	AR	• Spacer, I/O Card
-	65G1878	AR	FDDI STP Single Ring (F/C 2725)
-	43G0876	AR	FDDI STP Dual Ring (F/C 2726)
-	02G7425	AR	Block Multiplexer Channel Adapter (F/C 2755)
-	71F1184	AR	• Plug, Diagnostic Wrap
-	8575337	AR	• Plug, Bus Wrap
-	8575338	AR	• Plug, Tag Wrap
-	6473048	AR	• Terminator, Bus/Tag
-	54G3361	AR	• Cable, "Y" Frame Exit (One longer)
-	68F7211	AR	• Cable, "Y" Bus and Tag Conversion
-	54G3360	AR	• Cable, "Y" Daisy Chain (Two Shorter)

-	73H1589	AR	Token Ring Auto 32 MCA (F/C 2972)
-	00G2652	AR	Token Ring MCA Card (F/C 2970)
-	53F3930	AR	• Token ring 20 ft Cable
-	40F9969	AR	• Spacer, I/O Card
-	56G0294	AR	ESCON A MCA Card (Channel/Ctrl Unit) (F/C 2754,2756)
-	56G0295	AR	ESCON B MCA Card (Channel/Ctrl Unit) (F/C 2754,2756)
-	5605670	AR	• Wrap Plug
-	65G1828	AR	S/370 Chan. Emulator Card (F/C 2759)
-	68F7209	AR	• Cable (2 meters)
-	2282675	AR	• Terminator (BUS)
-	2282676	AR	• Terminator (TAG)
-	5479141	AR	• Wrap Plug (BUS)
-	5479139	AR	• Wrap Plug (TAG)
-	51G9994	AR	HIPPI MCA Card (Wide Node Only) (F/C 2735)
-	11H2504	AR	HIPPI MCA Card (Wide Node Only) (F/C 2735)
-	51G9996	AR	HIPPI MCA Card (Wide Node Only) (F/C 2735)
-	59F2977	AR	• Cable, Partition 8/16 Port Cbl
-	51G9226	AR	• Connector, Cross-over
-	72G0448	AR	• Cable, Wrap
-	67G3284	AR	9333 Hi-P MCA Card (F/C 6212)
-	73G9819	AR	ATM MCA Card (F/C 2984)
-	72H3043	AR	ATM OC3C, MCA Card (F/C 2989)
-	73G9817	AR	• Documentation Group
-	40H2648	AR	FCS (256Mb) MCA Card (F/C 1906)
-	73H2503	AR	FCS (1 GB) MCA Card (F/C 1902)
-	65G5292	AR	• Optic Card
-	11H8607	AR	RS-232 8 Port MCA Card (F/C 2930)
-	22F9694	AR	• Adapter Wrap Plug
-	40F9969	AR	• Cable Spacer
-	52G4757	AR	RS-422 8 Port MCA Card (F/C 2940)
-	22F9694	AR	• Adapter Wrap Plug
-	40F9969	AR	• Cable Spacer
-	52G4894	AR	ASYNCH 128 Port MCA Card (F/C 8128)
-	43G0928	AR	• Adapter Wrap Plug
-	43G0938	AR	• Adapter Wrap Plug
-	88G3841	AR	RAN Concentrator (F/C 8130)
-	40H2589	AR	RAN 128P Rack Mountable
-	40H3611	AR	• Power Supply
-	93H7091	AR	• Power Supply
-	43G0937	AR	• Cable
-	11H3614	AR	SSA MCA Card (F/C 6214)
-	40H5707	AR	SSA MCA Card 8-Way (F/C 6216)
-	89H5617	AR	SSA RAID MCA Base Card (F/C 6217)
-	73G3233	AR	SSA RAID SIMM's (F/C 6217)
-	84H9706	AR	SSA Multi Initiator/RAID EL Adapter, Micro Channel (F/C 6219)
-	89H5651	AR	• DRAM, 16 MB
-	89H5650	AR	SSA FAST-Write Cache (F/C 6222)
-	51G9060	AR	RS-232 (X.25) MCA Card (F/C 2960)
-	16F1884	AR	• Wrap Plug
-	40F9969	AR	• Spacer, Card
-	53F3926	AR	• Cable X.21
-	16F1890	AR	• Wrap Plug X.21
-	53F3927	AR	• Cable V.24
-	16F1891	AR	• Wrap Plug V.24

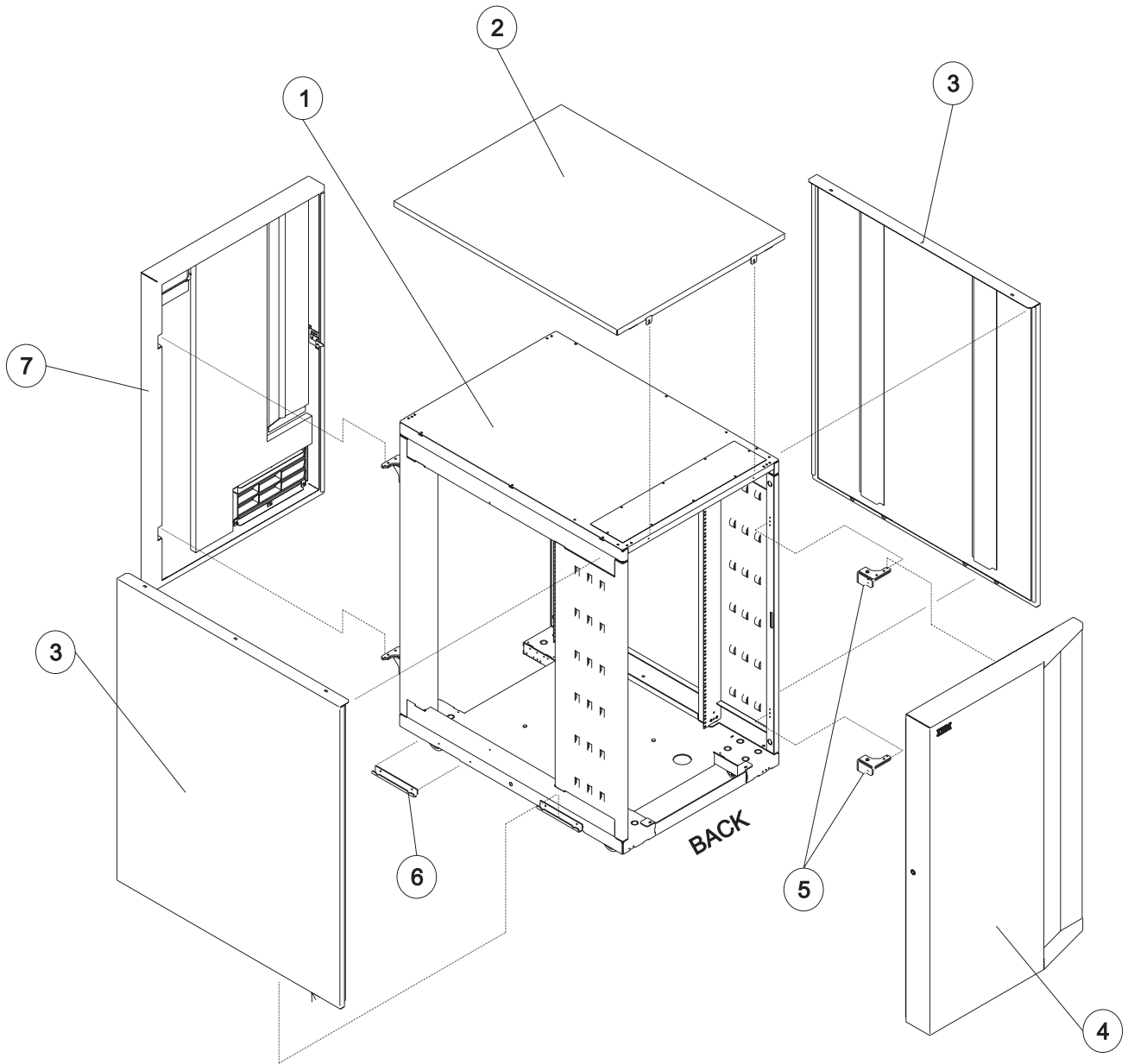
–	53F3927	AR	• Cable V.35
–	16F1861	AR	• Wrap Plug V.35
–	53F2660	AR	Port Master 1 MB, MCA Card (F/C 7006)
–	40F9969	AR	• Spacer, Card
–	53F2664	AR	Port Master 2 MB MCA Card (F/C 7008)
–	40F9969	AR	• Spacer, Card
–	53F2612	AR	Port Master 8-Prt RS232, MCA Card (F/C 7042)
–	68F7208	AR	• Wrap Plug
–	33F8985	AR	• Wrap Plug, Cable
–	53F2615	AR	Port Master 8-Prt RS422, MCA Card (F/C 7044)
–	68F7208	AR	• Wrap Plug
–	33F8964	AR	• Wrap Plug Cable
–	72F0164	AR	Port Master 6-Prt V.35, MCA Card (F/C 7046)
–	72F0168	AR	• Wrap Plug
–	04G5500	AR	Port Master 6-Prt X.21, MCA Card (F/C 7048)
–	85F0205	AR	• Wrap Plug
–	72F1966	AR	Cable, V.35 6-Prt
–	72F0167	AR	• Wrap Plug
–	53F2621	AR	Cable, PM 8-Prt
–	04G5501	AR	Cable, X.21 6-Prt
–	85F0206	AR	• Wrap Plug
–	6323741	AR	Cable, RS232D/V.24
–	71F0165	AR	Cable, RS232D/V.24 Asyn
–	43G3317	AR	Digital Trunk Dual, MCA Card (F/C 6305)
–	43G3318	AR	• Cable
–	11H5676	AR	Multiprotocol A, MCA Card (F/C 2700)
–	41F0464	AR	• Fan-out Box
–	71F0162	AR	• Cable, V.35
–	71F0163	AR	• Wrap Plug
–	71F0164	AR	• Cable, V.21
–	71F0165	AR	• Cable, V.24
–	51G8538	AR	Network Accl. 256 Term, MCA Card (F/C 2402)
–	51G8539	AR	Network Accl. 2048 Term, MCA Card (F/C 2403)
–	71F1167	AR	• Wrap Plug, Card
–	02G7434	AR	• Cable, Transceiver
–	43G0278	AR	• Transceiver
–	00G2380	AR	• Wrap Plug, Transceiver
–	38H6496	AR	• Documentation AIX 4.1
–	38H6405	AR	• Documentation AIX 3.2.5
–	88G3711	AR	Ultimedia Video MCA (F/C 2404)
–	88G3717	AR	Ultimedia JPEG MCA (F/C 2405)
–	39H8179	AR	Ultimedia Audio MCA (F/C 6202)

Assembly 23: Features, PCI adapters

Asm-Index	Part Number	Units	Description
23-	73H3405	AR	SAS SK-NET FDDI (F/C 2741)
-	73H3401	AR	DAS SK-NET FDDI(F/C 2742)
-	73H3413	AR	U-SAS SK-NET FDDI (F/C 2743)
-	51H8700	AR	ESCON channel (F/C 2751)
-	94H1038	AR	Token Ring auto LAN stream (F/C 2920)
-	93H6541	AR	WAN RS232 8-port (F/C 2943)
-	07L9822	AR	• Cable, Fan-out (F/C 2943)
-	6298964	AR	• Wrap Plug (F/C 2943)
-	93H6545	AR	WAN RS232 128P (F/C 2944)
-	43G0926	AR	• Terminator Plug (F/C 2944)
-	87H3427	AR	Artic960Hx 4-Port Selectable (F/C 2947)
-	87H3413	AR	Artic960Hx 4-Port Selectable (F/C 2947)
-	87H3518	AR	• Artic960Hx 4-Port T1 RJ45 Cable (F/C 2709)
-	87H3588	AR	• Wrap Plug (F/C 2709)
-	87H3515	AR	• Artic960Hx 4-Port E1 RJ45 Cable (F/C 2710)
-	87H3588	AR	• Wrap Plug (F/C 2710)
-	87H3405	AR	• Artic960Hx 4-Port EIA-232 Cable (F/C 2861)
-	87H3439	AR	• Wrap Plug (F/C 2861)
-	87H3396	AR	• Artic960Hx 4-Port RS449 Cable (F/C 2862)
-	87H3440	AR	• Wrap Plug (F/C 2862)
-	87H3408	AR	• Artic960Hx 4-Port X.21 Cable (F/C 2863)
-	53G0638	AR	• Wrap Plug (F/C 2863)
-	87H3399	AR	• Artic960Hx 4-Port V.35 (DTE) Cable (F/C 2864)
-	87H3442	AR	• Wrap Plug (F/C 2864)
-	87H3402	AR	• Artic960Hx 4-Port EIA-530 Cable (F/C 2865)
-	87H3439	AR	• Wrap Plug (F/C 2865)
-	93H5263	AR	V.24 Cable (F/C 2951)
-	33F8985	AR	• Wrap Plug (F/C 2951)
-	93H5264	AR	V.35 Cable (F/C 2952)
-	52G3379	AR	• Wrap Plug (F/C 2952)
-	93H5265	AR	V.36 Cable (F/C 2953)
-	73H2508	AR	• Wrap Plug (F/C 2953)
-	93H5267	AR	X.21 Cable (F/C 2954)
-	40F9904	AR	• Wrap Plug (F/C 2954)
-	93G6086	AR	2-Port Multipro (F/C 2962)
-	93H5270	AR	• Wrap Plug (F/C 2962)
-	21H7977	AR	ATM 155 UTP (F/C 2963)
-	94H0823	AR	10/100 Ethernet (F/C 2968)
-	07L8916	AR	Gigabit Ethernet-SX (F/C 2969)
-	93H6594	AR	Token Ring (F/C 2979, 2920)
-	93H1902	AR	Ethernet BNC (F/C 2985)
-	93H7766	AR	Ethernet AUI (F/C 2987)
-	21H3890	AR	ATM EL 155 MMF (F/C 2988)
-	93H3899	AR	Ultra SCSI SE (F/C 6206)
-	40H6595	AR	Ultra SCSI DE (F/C 6207)
-	93H8406	AR	SCSI-2 single-ended (F/C 6208)
-	93H8407	AR	SCSI-2 differential (F/C 6209)
-	09L2061	AR	SSA RAID (F/C 6215)
-	89H5651	AR	• 16MB DRAMM (F/C 6215)

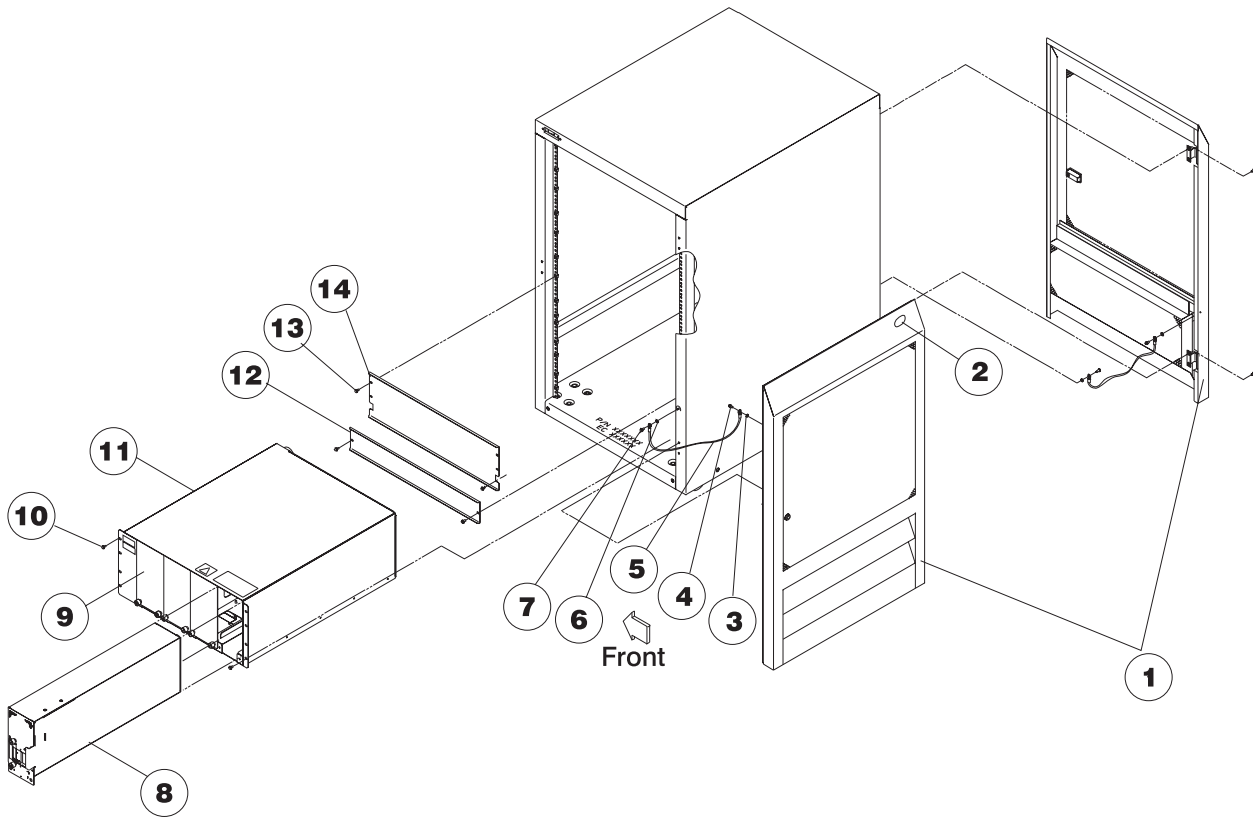
–	89H5650	AR	Fast/Write Cache (F/C 6222)
–	87H3734	AR	Artic960RxD Quad Digital Trunk (F/C 6310)
–	09J8829	AR	Artic960RxD Quad Digital Trunk (F/C 6310)
–	87H3793	AR	• Artic960RxD Quad DTA, T1, 100 Ohm, 3 m, 4-port cable (F/C 2871)
–	34F0876	AR	• Wrap Plug (F/C 2871)
–	54F0740	AR	• Artic960RxD Quad DTA, T1, 100 Ohm, 15 m, 4-port cable (F/C 2872)
–	87H3791	AR	• Artic960RxD Quad DTA, E1, 120 Ohm balanced, 3 m, 4-port cable (F/C 2873)
–	34F0876	AR	• Wrap Plug (F/C 2873)
–	05F2045	AR	• Artic960RxD Quad DTA, E1, 120 Ohm balanced, 7.5 m extension cable (F/C 2874)
–	87H3521	AR	• Artic960RxD Quad DTA, E1, 75 Ohm unbalanced-grounded 1.8 m, 4-port cable (F/C 2875)
–	87H3629	AR	• Artic960RxD Quad DTA, E1, 75 Ohm unbalanced-ungrounded, 18. m, 4-port cable (F/C 2876)
–	08L1215	AR	• Artic960RxD Quad DTA, H.100, 4-drop cable (F/C 2877)
–	51H8700	AR	ESCON
–	11K0089	AR	Short Wave Serial HIPPI (F/C 2732)
–	03N2492	AR	• Wrap Plug
–	11K0095	AR	Long Wave Serial HIPPI (F/C 2733)
–	03N2492	AR	• Wrap Plug
–	03N3554	AR	High Speed Token Ring (F/C 4959)
–	03N3606	AR	Dual Channel Ultra2 SCSI (F/C 6205)
–	09L5693	AR	Advanced Serial RAID (F/C 6225)
–	21H8979		• Fast/Write Cache Option (F/C 6225)
–	09L5695	AR	Advanced Serial RAID Plus (F/C 6230)
–	08J0663		• 128 MB DIMM Option Card (F/C 6231)

Assembly 24: 1.36 m Frame Assembly



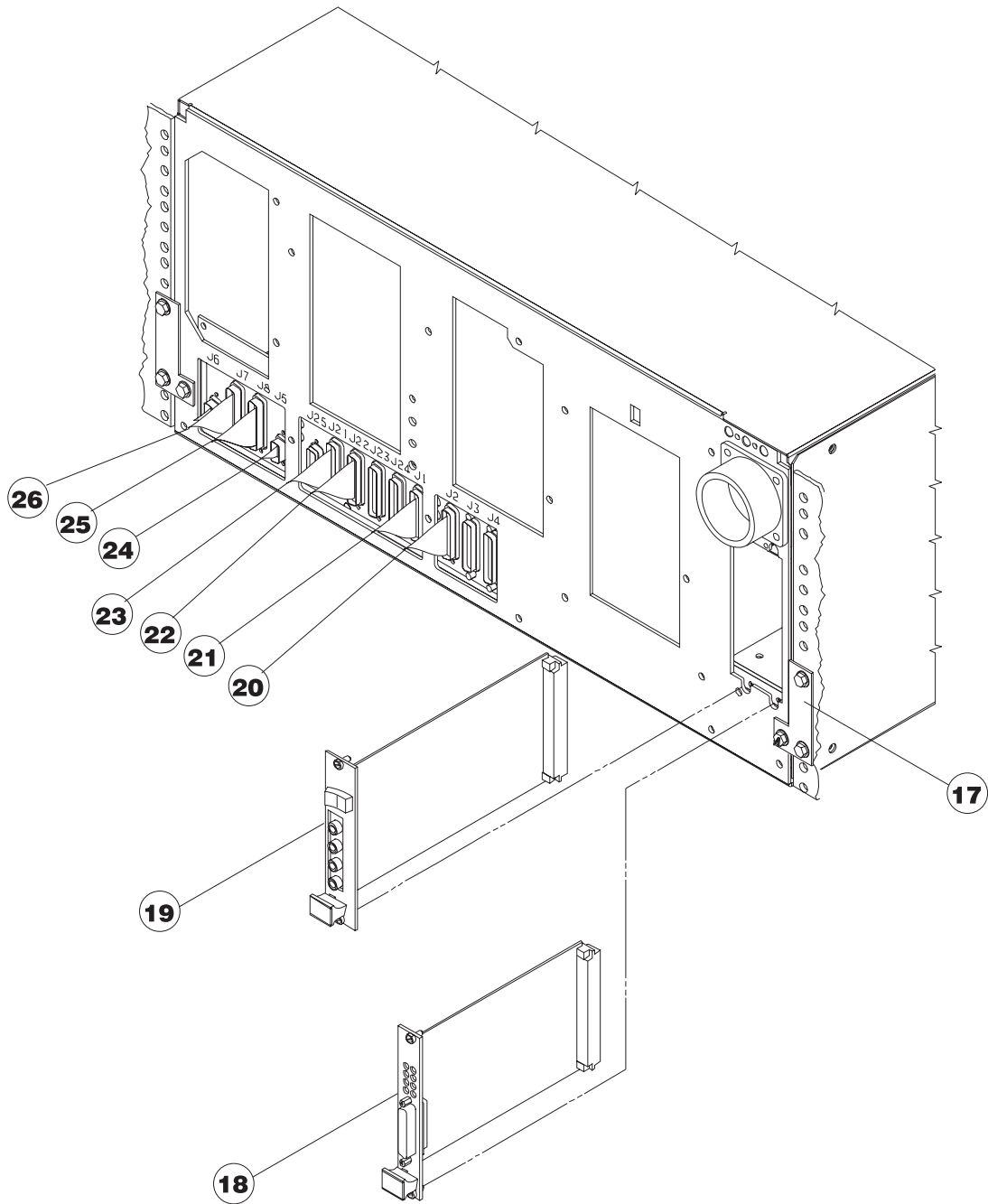
Asm- Index	Part Number	Units	Description
24-1		1	Frame Assembly, 1.36 m
-2	12K0429	1	Top Hat
-3	12K0428	2	Cover, Side
-4	12K0425	1	Cover, Rear
-5	12K0423	2	Hinge, Cover
-6	99F0606	4	Bracket, Cover Support
-7	12K0423	1	Cover, Front

Assembly 25: 1.25 m Frame



Asm- Index	Part Number	Units	Description
25-			1.25 m Base Frame Asm – 3.5 kW
-			1.25 m Base Frame Asm – 5 kW (Model 500 only)
-1	46H9151	2	• Cover, Front or Rear
-2	46H9139	1	• Plate, Logo IBM
-3	1622346	2	• Washer, Star M4
-4	1624766	2	• Screw, Hex FI M4 x 10
-5	54G3355	2	• Cable, Door Gnd.
-6	1622347	2	• Washer, Star M5
-7	54G3281	2	• Screw, Pan Head M5 x 12
-8	21L2906	AR	• Power Supply - SEPBU – 3.5 kW
-8	21L3138	AR	• Power Supply – 5 kW (Model 500 only)
-9	77G0939	3	• Panel, Blank, 3.5 kW
-9	11J5242	3	• Panel, Blank, 5 kW (Model 500 only)
-10	54G3281	8	• Screw, Pan Hd M5 x 12
-11	77G0909	1	• Power Supply Chassis – 3.5 kW
-11	11J5258	1	• Power Supply Chassis – 5 kW (Model 500 only)
-12	54G2877	1	• Panel, Switch
-12	11J5155	AR	• Panel, Switch – 5 kW (Model 500 only)
-13	54G3281	16	• Screw, Pan Hd M5 x 12
-13	54G2882	16	• Screw, Pan Hd M5 x 12, 5 kW (Model 500 only)
-14	54G2947	AR	• Panel, Blank 7-inch – 3.5 kW
-14	11J4774	AR	• Panel, Blank 7-inch – 5 kW (Model 500 only)
-	5547285	24	• Core (not shown)
-	5605690	12	• Cashin, Core (not shown)
-	0524519	1	• Tie Wrap (not shown)

Assembly 26: SEPBU Detail View (1.25 m and 1.36 m Frames)



Asm- Index	Part Number	Units	Description
26-			SEPBU Assembly for 1.25 m Frames (Model 500) and 1.36 m Frames (reference only)
-17	11J5253	2	• Bracket Retainer (Power Unit)
-	0375867	4	• • Clip, Self Retaining
-	54G2882	6	• • Screw
-18	05N5775	1	• Card, Supervisor
-19	77G0919	1	• Card, PCI
-20	11J5192	1	• Cable, 48 Vdc Power Distribution #4 (cable not shown)
-21	11J5190	1	• Cable, 48 Vdc Power Distribution #2 (1.25 m frames only) (cable not shown)
-21	11J5208	1	• Cable, 48 Vdc Power Distribution #2 (1.36 m frames only) (cable not shown)
-22	11J5191	1	• Cable, 48 Vdc Power Distribution #3 (cable not shown)
-23	11J5189	1	• Cable, 48 Vdc Power Distribution #1 (cable not shown)
-24	46G5686	1	• Cable Asm, 48 V Power Distribution Switch (cable not shown)
-25	21L3917	1	• Harness, Super Bus "B" (cable not shown)
-26	21L3916	1	• Harness, Super Bus "A" (cable not shown)

Assembly 27: Ship group items

Asm-Index	Part Number	Units	Description
27-	03N3983	1	<i>Diagnostic Information for Micro Channel Bus Systems (SA38-0532)</i>
-	03N3982	1	<i>Adapters, Devices and Cable Information for Micro Channel Bus Systems (SA38-0533)</i>
-	03N4032	1	<i>Diagnostic Information for Multiple Bus Systems (SA38-0509)</i>
-	03N4033	1	<i>Adapters, Devices and Cable Information for Multiple Bus Systems (SA38-0516)</i>
-	12K0231	1	<i>RS/6000 SP: Installation and Relocation (GA22-7441)</i>
-	12K0233	1	<i>RS/6000 SP: System Service Guide (GA22-7442)</i>
-	12K0233	1	<i>RS/6000 SP: SP Switch Service Guide (GA22-7443)</i>
-	12K0235	1	<i>RS/6000 SP: Uniprocessor Node Service Guide (GA22-7445)</i>
-	12K0236	1	<i>RS/6000 SP: 604 and 604e SMP High Node Service Guide (GA22-7446)</i>
-	12K0237	1	<i>RS/6000 SP: SMP Thin and Wide Node Service Guide (GA22-7447)</i>
-	12K0238	1	<i>RS/6000 SP: POWER3 SMP High Node Service Guide (GA22-7448)</i>
-	12K0230	1	<i>RS/6000 SP: Planning, Volume 1, Hardware and Physical Environment (GA22-7280)</i>
-	11J5158	1	<i>Service Director for 9076 RISC System/6000 SP CE Information Guide (ZA38-0383)</i>
-	2222222	1	Binder
-	04H9464	1	Adapter, BNC Y
-	54G3014	1	Cable Supervisor, Diagnostic
-	54G3300	1	Cable, RS-232 15 m long
-	54G3301	1	Cable, COAX 15 m
-	46G5695	1	Cable, Frame Jumper/Ground
-	54G2931	1	Cover, Main Power Switch
-	54G2933	1	Cover, Main Power Switch
-	11J3903	1	Cover, Node Power Switch
-	48G3055	2	Cover, Cable Cap Plug
-	40H6328	1	Cable, DB9-DB25 Converter
-	46H9145	1	Diag. Tape, 8 mm
-	04H9474	1	Installation Aid Tape, 8 mm- (WT)
-	1643894	2	Key, Cover
-	54G3277	1	Label, Data Cable
-	46G5947	1	Ladder (Included if wide node is installed in shelf position 5 or above)
-	54G2932	2	Rail, Main Power Switch Cover
-	46H9688	1	SPS Wrap Plug (F)
-	77G0818	1	SPS Wrap Plug (M)
-	46G5958	1	Stiffener, Wide Node
-	93G1058	4	Standoff, Stiffener
-	46H9197	1	Stability Foot, 2.01 m Frame
-	11J6108	1	Stability Foot, 1.93 m Frame
-	11J6108	1	Stability Foot, 1.36 m Frame
-	17H5032	1	Stability Foot, 1.25 m Frame
-	93G1147	1	Step Stool
-	2495448	1	Tape, Mylar
-	46G7005	1	Terminator 50 OHM
-	17H5078	1	Thumbscrew Tool

-	11J3280	2	Tool, Card Extraction (604e)
-	11H2697	1	Tool, Card Extraction, Dual Piece (604)
-	17H5005	1	VPD Disks, Mailer
-	08J5557	4	Wheel Chocks
-	54G3013	1	Wrap Plug, RS-232
-	46G5619	1	Wrap Plug, Male
-	46G5620	1	Wrap Plug, Female
-	6298964	1	Wrap Plug, RS232
-	6298965	1	Wrap Plug, RS232-9
-	74F0690	1	Wrap Plug, Parallel
-	47L3072	2	Card, PCI Insert

Assembly 28: Cable details

Asm-Index	Part Number	Units	Description
28-	04H9441	AR	Cable, CPU J37
-	04H9532	AR	Cable, HiPS Data External 20 m
-	31G9271	AR	Cable, Supervisor
-	31G9272	AR	Cable, Planar Serial
-	31G9274	AR	Cable, Diagnostic Display
-	31G9276	AR	Cable, DASD Power (Y-style)
-	31G9278	AR	Cable, Node Control Harness
-	43G0936	AR	Hd 15TOHD15 9-inch
-	43G0935	AR	RJ45/DB25 4-pack
-	21L3916	AR	Cable, Harness Super Bus "A"
-	46G5479	AR	Cable, Harness Super Bus "B"
-	46G5583	AR	Cable, Supervisor Bus
-	46G5584	AR	Cable, Clock (CLK-SW)
-	46G5686	AR	Cable, +48 V dc Power Switch
-	46G5686	AR	Cable, High Performance Switch Power
-	46G5697	AR	Cable, Bulkhead to Supervisor
-	46G5703	AR	Cable, Frame Supply Bulk
-	46G5706	AR	Cable, 48 volt Frame Supply
-	46G5944	AR	Cable, 24 volt Ground
-	46G5960	AR	Cable, Resistor Assembly
-	46G5969	AR	Cable, Main Contactor Harness
-	46G7011	AR	Cable, FL1 to CB1
-	46G7012	AR	Cable, K01 to PS02
-	46G7013	AR	Cable, CB1 to K01
-	46G7017	AR	Cable, PDU-LF1 (load)
-	46G7018	AR	Cable, Power Supply Chassis to PS Ground
-	53F3930	AR	Cable, Token Ring 20 ft
-	54G2745	AR	Linecord, Hi Volt (UL/CSA), PDU and SEPBU
-	54G2749	AR	Linecord, Hi Volt (HAR), PDU and SEPBU
-	64G6023	AR	Linecord, US 14 ft (PDU)
-	64G6024	AR	Linecord, US 6 ft (PDU)
-	64G6025	AR	Linecord, WT (UL/CSA Pigtail) (PDU)
-	64G6026	AR	Linecord, WT (HAR Pigtail) (PDU)
-	77G0940	AR	Linecord, 3-phase, 7 kW, US 14 ft (SEPBU)
-	77G0947	AR	Linecord, 3-phase, 7 kW, US 6 ft (SEPBU)
-	77G0948	AR	Linecord, 3-phase, 7 or 10.5 kW, (APG) WT (UL/CSA Pigtail) (SEPBU)
-	77G0950	AR	Linecord, 3-phase, 7 or 10.5 kW, (EMEA) WT (HAR Pigtail) (SEPBU)
-	77G0941	AR	Linecord, 3-phase, 10.5 kW, (US), 14 ft
-	77G0949	AR	Linecord, 3-phase, 10.5 kW, (US), 6 ft
-	77G0942	AR	Linecord, single phase, 3.5 kW, (US), 14 ft
-	77G0945	AR	Linecord, single phase, 3.5 kW, (US), 6 ft
-	77G0944	AR	Linecord, single phase, 3.5 kW, (HAR, EMEA), 14 ft
-	77G0943	AR	Linecord, single phase, 3.5 kW, (APG), 14 ft
-	11J4782	AR	Linecord, single phase, 5 kW, (US), 14 ft
-	11J4783	AR	Linecord, single phase, 5 kW, (US), 6 ft
-	11J4784	AR	Linecord, single phase, 5 kW, (HAR, EMEA), 14 ft
-	11J4785	AR	Linecord, single phase, 5 kW, (APG), 14 ft

-	21L3180	AR	Linecord, 3-phase, 3.5 kW, (US), 14 ft
-	21L3181	AR	Linecord, 3-phase, 3.5 kW, (US), 6 ft
-	21L3182	AR	Linecord, 3-phase, 3.5 kW, (EMEA), 14 ft
-	21L3183	AR	Linecord, 3-phase, 3.5 kW, (APG), 14 ft
-	54G2913	AR	Cable, 12 volt Frame Supply
-	54G2996	AR	Cable, EIA Grounding
-	54G3001	AR	Cable, Planar Power Distribution
-	54G3009	AR	Cable, Switch to PDU
-	54G3011	AR	Cable, Frame Supervisor Ground
-	54G3015	AR	Cable, 48 V dc Power Harness
-	54G3039	AR	Cable, +48 V dc Node Grp "A"
-	54G3040	AR	Cable, +48 V dc Node Grp "B"
-	54G3041	AR	Cable, +48 V dc Node Grp "C"
-	54G3042	AR	Cable, +48 V dc Node Grp "D"
-	54G3238	AR	Cable, I/O Planar Power
-	54G3239	AR	Cable, CPU Planar Power
-	54G3240	AR	Cable, DASD Power
-	54G3241	AR	Cable, Supervisor Card Power
-	54G3242	AR	Cable, Switch Assembly
-	54G3244	AR	Cable, CPU J39
-	54G3246	AR	Cable, Internal SCSI
-	11J3934	AR	Cable, Node 48 V Dist
-	54G3300	AR	Cable, EIA RS232, 15M 2 Cores
-	54G3301	AR	Cable, Coax 15M long 2 Cores
-	54G3304	AR	Cable, Sense/Control
-	54G3305	AR	Cable, Power Supply Chassis Power Control, "A"
-	54G3306	AR	Cable, Power Supply Chassis Power Control, "B"
-	54G3355	AR	Cable, Frame/Door Ground
-	56G7017	AR	Cable, G3 to LFCOM
-	64G5573	AR	Cable, Group "A" to Bulk
-	64G5574	AR	Cable, Group "B" to Bulk
-	64G5575	AR	Cable, Group "C" to Bulk
-	64G5576	AR	Cable, Group "D" to Bulk
-	64G5593	AR	Cable, Internal DASD (66 MHz Node Only)
-	77G0917	AR	Cable, Main Power
-	93G1094	AR	Cable, Data SW-Bulkhead, S
-	93G1095	AR	Cable, Data SW-Bulkhead, L
-	93G1096	AR	Cable, Clk To Sw 3 x 16
-	93G1098	AR	Cable, dc Power Dist.
-	12H1204	AR	Cable, Printer (F/C 2934)
-	88G4853	AR	Cable, Serial-to-Serial Port, node-to-node (F/C 3124)
-	88G4854	AR	Cable, Serial-to-Serial Port, frame-to-frame (F/C 3125)
-	30F8966	AR	Cable, Terminal, RS-422A (F/C 2945)
-	93H6549	AR	Cable, Port, EIA-232 (F/C 8137)
-	93H6563	AR	Cable, Port, RS-422 (F/C 8138)
-	40H6328	1	Cable, DB9-DB25 Converter
-	90H9795	AR	Cable, 2 m (F/C 3126), SP Expansion I/O Unit
-	21H7377	AR	Cable, 15 m (F/C 3127), SP Expansion I/O Unit
-	31L8497	AR	Cable, SCSI (F/C 1243), SP Expansion I/O Unit
-	31L8498	AR	Cable, SSA (F/C 1244), SP Expansion I/O Unit

Assembly 29: Miscellaneous hardware

Asm- Index	Part Number	Units	Description
29-	31G9291		Frame Weldment Assembly
-	89F4158		Latch Assembly
-	1621560		Bolt Hex Hd M10 X 20
-	2577718		Bushing Insulating Nylon
-	54G2933		Cover Main Power Switch
-	46H9140		DASD Reloc. Kit (Fast/Wide - Thin Node)
-	46H9141		DASD Reloc. Kit (Fast - Thin Node)
-	46H9142		DASD Reloc. Kit (Fast/Wide - Wide Node)
-	46H9143		DASD Reloc. Kit (Fast - Thin Node)
-	46H9143		DASD Reloc. Kit (Fast - Wide Node)
-	00G3272		Grommet Iso.
-	93G1140		Grommet, Rubber
-	6201239		Insert, Threaded M4
-	46G6959		Latch Plate, Front Cover
-	11J4797		Nameplate Frame #01
-	11J4798		Nameplate Frame #02
-	11J4799		Nameplate Frame #03
-	11J4800		Nameplate Frame #04
-	11J4801		Nameplate Frame #05
-	11J4802		Nameplate Frame #06
-	11J4803		Nameplate Frame #07
-	11J4812		Nameplate Frame #08
-	11J4813		Nameplate Frame #09
-	11J4814		Nameplate Frame #10
-	11J4815		Nameplate Frame #11
-	11J4816		Nameplate Frame #12
-	11J4817		Nameplate Frame #13
-	11J4818		Nameplate Frame #14
-	11J4819		Nameplate Frame #15
-	11J4820		Nameplate Frame #16
-	11J4821		Nameplate Frame #17
-	11J4822		Nameplate Frame #18
-	11J4823		Nameplate Frame #19
-	11J4824		Nameplate Frame #20
-	11J4825		Nameplate Frame #21
-	11J4826		Nameplate Frame #22
-	11J4827		Nameplate Frame #23
-	11J4828		Nameplate Frame #24
-	11J4829		Nameplate Frame #25
-	11J4830		Nameplate Frame #26
-	11J4831		Nameplate Frame #27
-	11J4832		Nameplate Frame #28
-	11J4833		Nameplate Frame #29
-	11J4834		Nameplate Frame #30
-	11J4835		Nameplate Frame #31
-	11J4836		Nameplate Frame #32
-	11J4837		Nameplate Frame #33
-	11J4838		Nameplate Frame #34
-	11J4839		Nameplate Frame #35

-	11J4840	Nameplate Frame #36
-	11J4841	Nameplate Frame #37
-	11J4842	Nameplate Frame #38
-	11J4843	Nameplate Frame #39
-	11J4844	Nameplate Frame #40
-	0002899	Nut, Hex 8-32
-	0034637	Nut, Hex 6-32
-	0038214	Nut, 4-40
-	0375867	Nut, Clip Self-Retaining
-	11F2033	Nut, Self-Clinching 8-32
-	1622006	Nut, Self-Clinching M3
-	1622013	Nut, Flush Clinch M4
-	1622014	Nut, Self-Clinching M4
-	1622018	Nut, Self-Clinching M5
-	1622401	Nut, Hex M3
-	1622415	Nut, Lock M3 Top Insert
-	1622431	Nut, Hex M2.5
-	1622433	Nut, Hex M3.5
-	44F0010	Nut, Pressed M3
-	4448153	Nut, Self-Clinching M3
-	54G3074	Nut, Clinch M4
-	6223132	Nut, Pressed M4
-	84X4841	Nut, Hex Flange M4
-	84X4842	Nut, Hex Flange M5
-	84X4843	Nut, Hex Flange M6
-	8893670	Nut, Clinch 6-32
-	1622403	Nut, Hex M4, DASD (F/C 2555, 2580)
-	0034637	Nut, Hex 6/32, DASD (F/C 3032, 3033, 3034)
-	00G1269	Screw, Hex Hd SL M4 X 10
-	0000641	Screw, Fil Hd 8-32 X .750
-	0002994	Screw, Fil Hd 10-32 x .625
-	0023956	Screw, Bnd Hd 10-32 x .5
-	0034512	Screw, Bnd Hd 8-32 X .375
-	0038352	Screw, Fil Hd 6-32 X .375
-	0059647	Screw, Hex Hd .25-20 X 1.0
-	1621020	Screw, Cheese Hd M3 X 6
-	1621032	Screw, Cheese Hd M3.5 X 8
-	1621163	Screw, Pan Hd M2.5 X 10
-	1621170	Screw, Slotted Pan Hd M3 X 6
-	1621192	Screw, Pan Hd M4 X 12
-	1621199	Screw, Pan Hd M4 X 4
-	1621706	Screw, Hex Set M3 X 3
-	1621761	Screw, Set M3 X 12
-	1621963	Screw, Metric Weld M3.5 X 12mm
-	1624741	Screw, Hex Fl Hd M3 X 4
-	1624743	Screw, Hex Fl Hd M3 X 6
-	78X8993	Screw, Hex Fl Hd M3 X 8
-	1624763	Screw, Hex Fl Hd M4 X 5
-	1624764	Screw, Hex Fl Hd M4 X 6
-	1624765	Screw, Hex Fl Hd M4 X 8
-	1624766	Screw, Hex Fl Hd M4 X 10
-	00G1270	Screw, Hex Fl Hd M4 X 16
-	1624770	Screw, Hex Fl Hd M4 X 20
-	1624775	Screw, Hex Fl Hd M5 X 6

-	1624776	Screw, Hex Fl Hd M5 X 8
-	1624789	Screw, Hex Fl Hd M6 X 10
-	1624793	Screw, Hex Fl Hd M6 X 20
-	1624806	Screw, Hex Fl Hd M8 X 30
-	2744605	Screw, Hex Soc Hd 6-32 X .44
-	31G9308	Screwlock, 4-40UNC
-	32G1547	Screw, Hex Fl SL Hd M4 X 5
-	54G2882	Screw Hex Flange M5 x 10
-	26H7213	Screw Hex Flange M5 x 16
-	52G2914	Screw Shoulder Soc Hd M6 x 10
-	46G2677	Screw, #2 Phil Pan Hd M3 X 6
-	54G3280	Screw, #2 Phil Pan Hd 8-32X.312 Black
-	54G3281	Screw, #2 Phil Pan Hd M5 X 12 Black
-	54G3290	Screw, Captive M3 X 7.9
-	54G3364	Screw, #2 Phil Pan 6-32 X .50
-	62X0388	Screwlock 4-40UNC-2B
-	78X8993	Screw, Slotted Hex Flange M3 X 8
-	84X4761	Screw, Hx Fl Supadrive M5 X 20
-	8483361	Screw, FIL Hd M3 X 30
-	89F7337	Screw, Flat Hd M4 X 8
-	93G1068	Screw, Hex Fl Hd M3 X 4 Black
-	9557871	Screw, Bnd Hd 4-40 X .50
-	81F7977	Shock Mount for Fan (Blk Isolator)
-	26H7315	Shock Mount bolt M4, DASD (F/C 2555, 2580)
-	26H7316	Shock Mount Bolt 6/32, DASD (F/C 3032, 3033, 3034)
-	26H7191	Spacer, DASD Mount (F/C 3032, 3033, 3034)
-	1622151	Standoff, Self-Clinching M3 X 8
-	31G9279	Standoff, Clinch M4 X 8
-	46G7010	Standoff, Clinch M3 X 12
-	46G7031	Standoff, Self-Clinching 8-32 X .31
-	54G3284	Standoff, Hex M/F Med M3 X 30
-	54G3285	Standoff, Hex M/F Long M3 X 48
-	54G3303	Standoff, Self-Clinching
-	69F6713	Standoff, 2-56 X 9.42 UNC
-	93G1058	Standoff, Hex Node Stiffener
-	93G1139	Standoff, Hex M3 X 76
-	54G2910	Stability Foot
-	1622117	Stud, Self-Clinching M4 X 12
-	1622120	Stud, Self-Clinching M4 X 20
-	31G9235	Stud, Self-Clinching M6 X 30
-	4447687	Stud, Self-Clinching M5 X 12
-	5673453	Stud, Self-Clinching M3 X 8
-	5711295	Stud, Self-Clinching 6-32 X .375
-	84X4694	Stud, Self-Clinching M4 X 6 (Mtg)
-	8993788	Stud, Self-Clinching 6-32 X .75
-	0055901	Washer, Star #8
-	0076574	Washer, Star 6.35 (.025)
-	0333769	Washer, Flat 6.35 (.025)
-	0418787	Washer, Flat #8
-	0645722	Washer, #10, Belleville
-	1622302	Washer, Flat M3
-	1622304	Washer, Flat M4
-	1622308	Washer, M10 Narrow Flat
-	1622346	Washer, Star M4

-	1622347	Washer, Star M5
-	1622348	Washer, Star M6
-	2179909	Washer, Star M3
-	2305158	Washer, Flat #6
-	2566646	Washer, Flat M4
-	2566648	Washer, Flat .312
-	2665747	Washer, Belleville M4
-	2665752	Washer, Belleville M6
-	46G7032	Washer Plate Wide Node Mtg.
-	1622304	Washer, DASD (F/C 2555, 2580)

Appendix A. SSA software and microcode errors

Service request numbers (SRNs)

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

The SRN table

Table x-x lists the SRNs and describes the actions you should perform. The table columns are:

SRN	The service reference number
FRU list	The FRU or FRUs that might be causing the problem (see also "FRU Names Used in the SRN Table")
%	How likely it is (by percentage) that the FRU is causing the problem
Problem	A description of the problem and the action you must take

Abbreviations used in the table are:

DMA	Direct memory access
FRU	Field-replaceable unit
IOCC	Input/output channel controller
POS	Programmable option select (POS registers)
POST	Power-on self-test
PAA	Represents the port connectors and the address count of the devices <ul style="list-style-type: none">• P = adapter port number<ul style="list-style-type: none">– The P values are related to the port connectors of the adapter<ul style="list-style-type: none">- 0 = connector A1- 1 = connector A2- 2 = connector B1- 3 = connector B2• AA = SSA address<ul style="list-style-type: none">– The AA value is the decimal SSA address value. This indicates the position of the device that you are trying to find (counted along the SSA loop). The first device that you reach represents SSA address count 0.

Using the SRN table

Important: You should have been sent here from "SSA Maintenance Analysis Procedures (MAPs)". Do not start problem determination from the SRN table; always go to "SSA Maintenance Analysis Procedures (MAPs)" first.

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

2. Read carefully the "Action" you must perform for the problem. *Do not exchange FRUs unless you are instructed to do so.*
3. Normally exchange only one FRU at a time, starting from the top of the FRU list for that SRN. Always use instructions given in the page reference when exchanging FRUs. After each FRU is exchanged, go to "End of call" on page 1-144 in to verify the repair.

Software and microcode errors

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

1. Make a note of the contents of the error log for the device that has the problem.
2. Go to the using-system service aids and select Display Vital Product Data to display the VPD of the failing system. Make a note of the VPD for all the SSA adapters and disk drive modules.
3. Report the problem to your support center. The center can tell you whether you have a known problem and can, if necessary, provide you with a correction for the software or microcode.

FRU names used in the SRN table

This section provides a glossary of the FRU names used.

FRU Name in table Definition

Backplane assembly The disk drive modules, blank disk drive modules, and internal SSA cables, are connected to the backplane assembly.

Disk drive module A disk drive assembly to a carrier that plugs into the backplane in the system unit.

Blank disk drive module This module must be installed in a slot that does not contain a disk drive module. This completes the SSA loop through the system unit.

External SSA cable A cable that connects the bulkhead to the SSA adapter or to an SSA subsystem.

Internal SSA cable Attaches the backplane to the SSA adapter card.

SSA adapter card The SSA adapter card, which is located in the using system.

Table A-1 contains a listing of SRNs for SSA DASD.

SRN	FRU List	%	Problem
10101	Disk drive module (See the removal and replacement instructions for the specific device.)	100	Description: Disk drive motor stopped. The disk drive module is bad. Action: If this SRN was received by one disk drive module only, then exchange that disk drive module.
10112	None	—	Description: Format degraded. A format operation has been ended before it has completed. Action: Use the Format service aid to format the disk drive module.
1xxxx	Disk drive module (See the removal and replacement instructions for the specific device.)	100	Description: Disk drive module error. Action: Exchange the FRU for a new FRU. Note: In this SRN, an x represents a digit from 0 to F.

Table A-1 (Page 2 of 8). Service Request Numbers for SSA DASD

SRN	FRU List	%	Problem
20PAA	Disk drive module (See the removal and replacement instructions for the specific device.)	45	<p>Description: An open SSA link has been detected.</p> <p>Action: Run the Link Verification Service Aid to isolate the failure. If the SSA service aids are not available:</p> <ul style="list-style-type: none"> When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures" on page 1-148. When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
	SSA adapter card (See the installation and service guide for the using system)	45	
	External SSA cables	6	
	Backplane assembly	2	
	Internal SSA cable	2	
21PAA to 29PAA	Disk drive module (See the removal and replacement instructions for the specific device.)	45	<p>Description: An SSA threshold-exceeded link error has been detected.</p> <p>Action: Run the Link Verification Service Aid to isolate the failure. If the SSA service aids are not available:</p> <ul style="list-style-type: none"> When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures" on page 1-148 When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
	SSA adapter card (See the installation and service guide for the using system)	45	
	External SSA cables	6	
	Backplane assembly	2	
	Internal SSA cable	2	
2A002	Disk drive module (See the removal and replacement instructions for the specific device.)	50	<p>Description: Async code 02 has been received. A software error has probably occurred.</p> <p>Action: Refer to the "<i>Users Guide and Maintenance Information</i>" for the SSA adapter.</p>
	SSA adapter card (See the installation and service guide for the using system)	50	
2A003	Disk drive module (See the removal and replacement instructions for the specific device.)	50	<p>Description: Async code 03 has been received. A software error has probably occurred.</p> <p>Action: Refer to the "<i>Users Guide and Maintenance Information</i>" for the SSA adapter.</p>
	SSA adapter card (See the installation and service guide for the using system)	50	
2A004	Disk drive module (See the removal and replacement instructions for the specific device.)	50	<p>Description: Async code 04 has been received. A software error has probably occurred.</p> <p>Action: Refer to the "<i>Users Guide and Maintenance Information</i>" for the SSA adapter.</p>
	SSA adapter card (See the installation and service guide for the using system)	50	

Table A-1 (Page 3 of 8). Service Request Numbers for SSA DASD

SRN	FRU List	%	Problem
2A005	Backplane assembly	—	<p>Description: Async code 05 has been received. This code indicates that a disk drive module has detected a loss of power.</p> <p>Action: Use the Link Verification Service Aid to determine if any devices are missing from the SSA link.</p> <ul style="list-style-type: none"> • If a device is missing, go to “SSA Maintenance Analysis Procedures” on page 1-148 to isolate the problem. • If no device is missing, the problem might have been caused by a temporary, or partial, loss of power to the SSA Hot-Swap Disk Drive.
2A006	Disk drive module (See the removal and replacement instructions for the specific device.)	70	<p>Description: Async code 06 has been received. This code indicates that a disk drive module has detected the loss of one of its power inputs</p> <p>Action:</p> <ul style="list-style-type: none"> • If the failing device is an SSA Hot Swap Disk Drive, go to “SSA Maintenance Analysis Procedures” on page 1-148, exchange the disk drive module. • If the failing device is not an SSA Hot Swap Disk Drive, go to the service information for that device.
	Backplane assembly	30	
2A106	Backplane assembly	100	<p>Description: Async code 06 has been received. This code indicates that multiple disk drive modules have detected the loss of one of their power inputs.</p> <p>Action:</p> <ul style="list-style-type: none"> • If the failing devices are SSA Hot Swap Disk Drives, exchange the backplane. • If the failing devices are not SSA Hot Swap Disk Drives, go to the service information for those devices.
2A206	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: A disk drive module has detected that one of its SSA links has failed the POSTs.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Use the Link Verification Service Aid to determine where the SSA link is broken. 2. Run diagnostics in the system verification mode to the two disk drive modules that are nearest to, and on each side of, the place where the link is broken. The diagnostics show which disk drive module detected the problem.

Table A-1 (Page 4 of 8). Service Request Numbers for SSA DASD

SRN	FRU List	%	Problem
2FFFF	None	—	<p>Description: An async code that is not valid has been received.</p> <p>Action: Refer to the "Users Guide and Maintenance Information" for the SSA adapter.</p>
300C0	Backplane assembly	100	<p>Description: A disk drive module has detected the loss of one of its power inputs.</p> <p>Action:</p> <ul style="list-style-type: none"> • If the failing device is an SSA Hot Swap Disk Drive, exchange the backplane. • If the failing device is not an SSA Hot Swap Disk Drive, go to the service information for that device.
301C0	Backplane assembly	100	<p>Description: Multiple disk drive modules have detected the loss of one of their power inputs.</p> <p>Action:</p> <ul style="list-style-type: none"> • If the failing devices are SSA Hot Swap Disk Drives, exchange the backplane. • If the failing devices are not SSA Hot Swap Disk Drives, go to the service information for those devices.
303FF	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: A SCSI status that is not valid has been received.</p> <p>Action: Refer to the "Users Guide and Maintenance Information" for the SSA adapter.</p>
40000	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: The SSA adapter card has failed.</p> <p>Action: Exchange the FRU for a new FRU.</p>
43PAA	Disk drive module (See the removal and replacement instructions for the specific device.)	90	<p>Description: An SSA device on the link is preventing the completion of the link configuration.</p> <p>Action: If the SSA service aids are available, run the Link Verification Service Aid to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)</p>
	SSA adapter card (See the installation and service guide for the using system)	10	
44PAA	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: A disk drive module has failed.</p> <p>Action: If the SSA service aids are available, run the Link Verification Service Aid to find the failing disk drive module.</p> <ul style="list-style-type: none"> • Before you exchange the failing disk drive module, run diagnostics in the system verification mode to the module to determine the cause of the problem.

Table A-1 (Page 5 of 8). Service Request Numbers for SSA DASD

SRN	FRU List	%	Problem
45PAA	Disk drive module (See the removal and replacement instructions for the specific device.)	40	<p>Description: The SSA adapter has detected an open SSA link. This problem is caused either by a disk drive module that is failing, or by a disk drive module that has been switched off from another using system on the same SSA link. (That using system has itself been switched off.)</p> <p>Action: If the SSA service aids are available, run the Link Verification Service Aid to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)</p>
	External SSA cables	40	
	Backplane assembly	20	
48000	None	—	<p>Description: The SSA adapter has detected a link configuration resource that is not valid.</p> <p>Action: Go to "SSA Loop Configurations That Are Not Valid" on page A-9.</p>
50000	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: The SSA adapter failed to respond to the device driver.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50001	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: A data parity error has occurred.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50002	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: An SSA adapter direct memory access (DMA) error has occurred.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50004	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: A channel check has occurred.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50005	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: A software error has occurred.</p> <p>Action: Refer to the "Users Guide and Maintenance Information" for the SSA adapter.</p>
50006	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: A channel check has occurred.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50007	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: The input/output channel controller (IOCC) detected an internal error.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50008	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: Unable to read or write the POS registers.</p> <p>Action: Exchange the FRU for a new FRU.</p>
50010	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: An SSA adapter or device drive protocol error has occurred.</p> <p>Action: Refer to the "Users Guide and Maintenance Information" for the SSA adapter.</p>

Table A-1 (Page 6 of 8). Service Request Numbers for SSA DASD

SRN	FRU List	%	Problem
50012	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: The SSA adapter microcode is in a suspended state.</p> <p>Action: Run diagnostics in System Verification mode to the SSA adapter.</p> <ul style="list-style-type: none"> • If the diagnostics fail, exchange the FRU for a new FRU. • If the diagnostics do not fail, refer to the "Users Guide and Maintenance Information" for the SSA adapter.
50100	None	—	<p>Description: An attempt was made to log an error against a pdisk that is not available to the using system.</p> <p>Action: This problem has occurred for one of the following reasons:</p> <ul style="list-style-type: none"> • A user has deleted a pdisk from the system configuration. In such an instance, the hdisk that is related to the pdisk continues to operate normally. If the disk drive module tries to log an error, however, this SRN (50100) is produced. Enter the cfgmgr command to return the pdisk to the system configuration. • A disk drive module has tried to log an error during system configuration. To find the failing disk drive module, run diagnostics to the disk drive modules that are connected to this SSA adapter.
60000	SSA adapter card (See the installation and service guide for the using system)	100	<p>Description: The SSA adapter is missing from the expected configuration.</p> <p>Action: Verify that the SSA adapter card is installed in the expected slot of the using-system.</p> <ul style="list-style-type: none"> • If it is in the expected slot, exchange the FRU for a new FRU. • If it is not in the expected slot, enter the diag -a command, and answer the questions that are displayed.
7xxxx	Disk drive module (See the removal and replacement instructions for the specific device.)	80	<p>Description: An SP module is missing from the expected configuration of the SSA loop.</p> <p>Action: Replace the FRUs one at a time. Go to "Repair Checkout" in <i>Diagnostic Information for Multiple Bus Systems</i> to verify each repair.</p>
	Backplane assembly	20	

Table A-1 (Page 7 of 8). Service Request Numbers for SSA DASD

SRN	FRU List	%	Problem
D0000	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: The using system cannot configure the disk drive module. This is probably a software problem.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Try again to configure the disk drive module. 2. If the problem remains, refer to the "<i>Users Guide and Maintenance Information</i>" for the SSA adapter.
D0100	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: Unable to clear a disk drive module reservation.</p> <p>Action: Exchange the FRU for a new FRU</p>
D0101	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: The disk drive module has been reserved since the diagnostics started. The disk drive module is in use.</p> <p>Action: Release the disk drive module and run the diagnostics again.</p>
D0200	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: The disk drive module timed out while the diagnostics were running.</p> <p>Action: Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.</p>
D0300	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: The disk drive module failed the diagnostic test.</p> <p>Action: Exchange the FRU for a new FRU.</p>
D0400	Disk drive module (See the removal and replacement instructions for the specific device.)	100	<p>Description: The disk drive module is not ready while the diagnostics are running.</p> <p>Action: Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.</p>
D0450	None	—	<p>Description: A format operation is in progress. The format operation that was started on this disk drive module has not yet finished. A format operation can take up to 30 minutes to run.</p> <p>Action: Wait for the format operation to finish before you run the diagnostics again. You can observe the progress of the format operation by running the format service aid again on this disk drive module.</p>
D0460	None	—	<p>Description: A format operation has been degraded. The format operation that was started on this disk drive module did not finish. Possibly, the disk drive module was switched off while the format operation was running.</p> <p>Action: Run the format service aid to format this disk drive module.</p>

<i>Table A-1 (Page 8 of 8). Service Request Numbers for SSA DASD</i>			
SRN	FRU List	%	Problem
D4000	SSA adapter card (See the installation and service guide for the using system)	100	Description: The diagnostics cannot configure the SSA adapter. Action: Exchange the FRU for a new FRU.
D4100	SSA adapter card (See the installation and service guide for the using system)	100	Description: The diagnostics cannot open the SSA adapter. Action: Exchange the FRU for a new FRU.
D4300	SSA adapter card (See the installation and service guide for the using system)	100	Description: The diagnostics have detected an SSA adapter POST failure. Action: Exchange the FRU for a new FRU.
D44xx	SSA adapter card (See the installation and service guide for the using system)	100	Description: The diagnostics have detected that the SSA adapter has corrupted the microcode, but cannot download a new version of the microcode. Action: Exchange the FRU for a new FRU. Note: In this SRN, an x represents a digit 0 through F.
DFFFF	SSA adapter card (See the installation and service guide for the using system)	100	Description: A command or parameter that has been sent or received is not valid. This problem is caused either by the SSA adapter or by an error in the microcode. Action: Refer to the "Users Guide and Maintenance Information" for the SSA adapter.

SSA Loop Configurations That Are Not Valid

Note: This section is related to SRN 48000 in Table A-1 on page A-2.

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

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

1. Switch off the using system.
2. Review the configuration that you are trying to make, and determine why that configuration is not valid.
3. Review "Rules for SSA Loops".
4. Correct your configuration by reconfiguring the SSA cables or by removing the excess devices or adapters from the loop.
5. Switch on the using system.

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

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

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

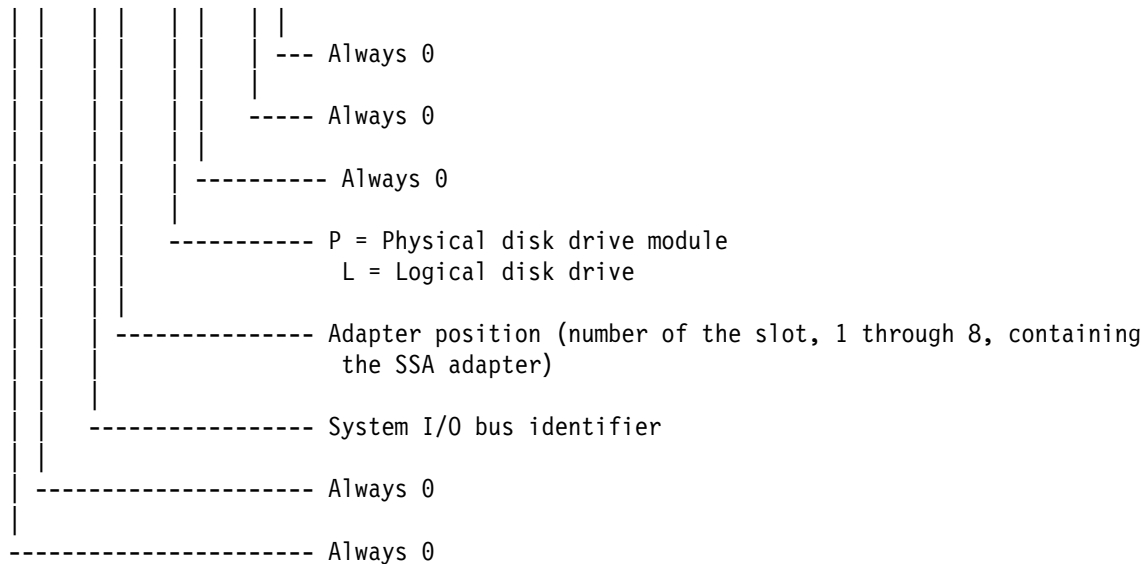
2. Review "Rules for SSA Loops".

3. Review the configuration that you are trying to make, and determine why that configuration is not valid.
4. Correct your system to a valid configuration.

SSA Location Code Format

Location codes identify the locations of adapters and devices in the using system and their attached subsystems and devices. These codes are displayed when the diagnostic programs isolate a problem. For information about the location codes that are used by the using system, see the operator guide for the using system.

A B - C D - E F - G H



The location code shows only the position of the SSA adapter in the using system and the type of device that is attached. Use a service aid to find the location of the device (disk drive module). For more information, see "Using the Service Aids" in *RS/6000 Enterprise Server Model H Series User's Guide*.

SSA Loops and Links

The disk drive modules of the system unit are connected through two SSA links to an SSA adapter that is located in the using system. The disk drive modules, SSA links, and SSA adapter are configured in loops. Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (SSA cable) to the disk drive modules. The path continues through the disk drive modules, then returns through another link to a second connector on the SSA adapter.

The SSA adapter

The system unit can be attached to an SSA adapter. The adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair.

The SSA links must be configured as loops. The loop is connected to the internal connectors at the SSA adapter card. These connectors *must* be a valid pair (that is, A1 and A2, or B1 and B2); otherwise, the disk drive modules on the loop are not fully configured, and the diagnostics fail. Operations to all the disk drive modules on a particular loop can continue if that loop breaks at any one point.

Each pair of connectors has a green light that indicates the operational status of its related loop:

Status of Light	Meaning
Off	Both SSA connectors are inactive. If disk drive modules are connected to these connectors, either those modules are failing, or their SSA links have not been enabled.
Permanently on	Both SSA links are active (normal operating condition).
Slow flash	Only one SSA link is active.

Disk Drive Module Strings

In the system unit, the disk drive modules are arranged in a string of two to six disk drive modules. This string has its own two SSA connectors. This string is connected through an internal SSA cable to a pair of connectors on the SSA adapter to make an SSA loop. (The SSA cables provide the SSA links.)

The following diagram shows the relationships between the SSA connectors and the disk drive module string in a system unit.

Pdisks, Hdisks, and disk drive module identification

The *physical disk drives* (**pdisks**) in an SSA subsystem can be configured as logical units (LUNs). A LUN is also known as an **hdisk**, and can consist of one or more physical disk drives. An hdisk in an SSA subsystem might, therefore, consist of one pdisk or several pdisks.

The configuration software also allocates an identification (hdisk and pdisk number) to each disk drive module during the configuration of the SSA link. The disk drive modules do not have fixed physical addresses.

The configuration software first recognizes the disk drive module by the machine-readable serial number that is written on the disk. Then, it assigns an identification that is related to the position of the disk drive-module in the SSA string. After configuration, the disk drive module always has the same identification. It can be moved to any position on the SSA link, but can always be found by the software.

Service actions are always related to physical disk drives. For this reason, errors that occur on SSA disk drives are always logged against the physical disk drive (pdisk).

The numeric identifier of pdisks, hdisks, and disk drive module slots of the system unit are not related to each other. For example, pdisk1 is not necessarily installed in slot 1 of the six-pack.

The disk drive module serial number, on the label on the front of the carrier, is also displayed by the service aids. It is the last eight digits of the drives IEEE SSA unique ID, which is stored on the drives electronics card.

Rules for SSA loops

The following are rules for SSA loops:

- The SSA loop must be connected to the internal pair of connectors on the SSA adapter.
- Only one pair of adapter connectors can be connected to a particular SSA loop.
- A maximum of 18 disk drive modules can be connected in a particular SSA loop.
- A maximum of three dummy disk drive modules can be connected next to each other in a particular SSA loop.

Loops and data paths

All devices that are attached to an SSA adapter card are connected through SSA links. The SSA links are configured as loops. Data and commands to a particular device pass through all other devices on the link between the adapter and the target device.

Data can travel in either direction around a loop. The adapter can, therefore, access the disk drive modules through two data paths. The using system cannot detect which data path is being used.

If a disk drive module fails or is turned off, the loop is broken and one of the data paths to a particular module is no longer available. The disk drive modules on the loop continue to work, but an error is reported to the using system.

The following diagram shows that the disk drive module in slot 3 has failed. The disk drive modules in slots 1 and 2 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive modules in slots 4, 5, and 6 can communicate only through connector A2 of the SSA adapter.

If two or more disk drive modules are turned off, fail, or are removed from the loop, some modules might become isolated from the SSA adapter.

The following diagram shows that the disk drive modules in slots 2 and 4 have failed. The disk drive module in slot 1 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive module in slots 5 and 6 can communicate with the using system only through connector A2 of the SSA adapter. The disk drive module in slot 3 is isolated from the SSA adapter.

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United Kingdom telecommunications safety requirements

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

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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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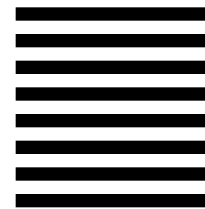
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