

RS/6000 SP



SP Switch Service Guide

RS/6000 SP



SP Switch Service Guide

Note!

Before using this information and the product it supports, read the information in "Safety and environmental notices" on page ix and "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 the "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 SP Switch by performing the following tasks:

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

RS/6000 SP hardware service library

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

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

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

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

Who should use this book

This book is intended for the product-trained Customer Engineer (CE). The procedures for RS/6000 SP and feature components described in this book represent a part of the overall support structure of the RS/6000 SP product.

User's responsibilities

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

How to use this book

This book is intended for product trained customer engineers only.

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

Beginning with the Start MAPs, isolate the problem to one or more of these RS/6000 SP components:

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

Note: If the diagnostic procedures indicate that the problem is isolated to a SP Switch, the information in *RS/6000 SP: System Service Guide* will direct you to return to this book.

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

Getting more information

This book and other RS/6000 SP hardware and software documentation are available both on-line and in printed form from the following sources:

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

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

Chapter 1. Maintenance Analysis Procedures (MAPs)

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

Lockout safety procedures

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

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

SEPBU lockout procedures

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

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

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

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

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

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

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

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

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

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

PDU lockout/tagout procedure

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

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

PDU lockout/bagout procedure

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

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

Switch Description and Problem Determination (MAP 0590)

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.

Switch MAPs

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Switch description and problem determination (MAP 0590)

Purpose of this MAP

This MAP describes the physical characteristics of each switch type and provides a table (Table 1-1 on page 1-7) containing diagnostic information.

Each switch has the following components:

- Switch adaptor cards (one per processor node)
- Switch assembly
- Switch internal clock cables (may not be required)
- Switch power cable
- Switch wrap plugs (male 77G0818 and female 46H9688 for SPS). Refer to Figure 1-2 on page 1-7 for views of the wrap plug.
- Switch external data cables (multi-frame only)

Attention:

1. Switch data plug/jack connector pins are easily bent. Check for bent pins on male plugs or bent pin guides on female jacks if a cable is difficult to plug. Problems with bent pins or pin guides can propagate to new plugs/jacks if not corrected first.
2. All connected switch assemblies must be running from the same master clock. If the switch assemblies have not been set properly, all processor nodes in a logical frame will be uninitialized. Refer to "Selecting appropriate switch clocks" on page 3-7 for these procedures.

Refer to Figure 1-1 on page 1-5 for a high-level view of the RS/6000 SP SP Switch assembly.

Switch Description and Problem Determination (MAP 0590)

Switch Connection Types

Standard Node Processor nodes in 9076 SP frames are attached to the switch assemblies with switch cables.

Dependent Node Switch adapter resides outside of the 9076 SP frame. Each dependent node is a single SP Switch Router Adapter in the 9077 Switch Router. There can be several dependent nodes in each SP Switch Router.

Switch-to-Switch Connections between switch assemblies.

Switch Assembly Types

SPS All clocks are distributed through data cables. External clock inputs are selected from J3, J4, or J5.

FRUs include: Fans, circuit breaker/LED card, switch supervisor card, switch power card(s), inner chassis cable, front chassis cable, complete assembly.

SPS-8 There are only 8 ports. All clocks are distributed through data cables.

FRUs include: Fans, circuit breaker/LED card, switch supervisor card, switch power card(s), inner chassis cable, front chassis cable, complete assembly.

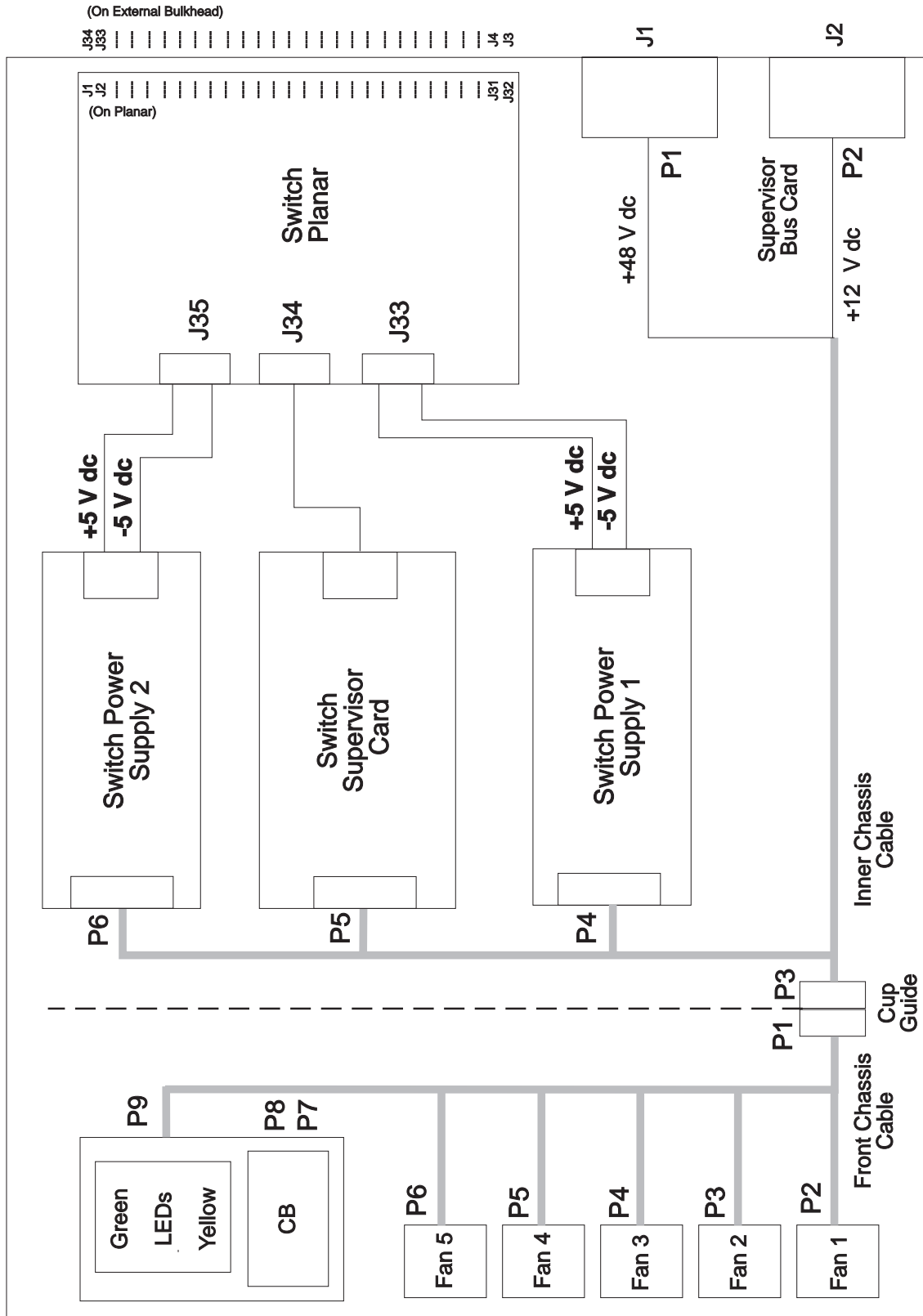


Figure 1-1. SP Assembly High-Level Diagram

There are two LEDs on the front of each switch assembly. For quick reference, their definitions are as follows:

Switch Description and Problem Determination (MAP 0590)

Environment (Yellow)

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

Power (Green)

Off	No 48 V dc power available at switch assembly.
Flashing	Power available at switch assembly, but switch logic is Off.
On	Power available at switch assembly, and logic is On.

Note: Refer to “Service position procedures” on page 3-10 for placing or removing the switch assembly into or from service position.

Step 0590–001: Read the following warning and then follow steps to ensure continuity of customer’s jobs in the queue.

Attention: Servicing a processor node or switch assembly will interrupt customer usage of the processor node and the remainder of the switch network. If the switch feature must be replaced in a multi-frame system, refer to “Removing and restoring switch resources” on page 3-8, for information on isolating the switch assembly.

Attention: It is possible that the customer has modified switch cabling from standard configurations; therefore, be careful about relying on node and frame information. Any connector jack numbers will be correct regardless of the customer’s cable configuration, so you may trace the cabling from the jack number if necessary.

1. Have customer complete all active parallel jobs or jobs using switch interface (for example, tape B/U ADSM), then remove the switch feature from the active configuration. Refer to “Removing and restoring switch resources” on page 3-8, for these procedures.
2. Check for system monitor errors indicating environmental problems with the switch feature. These can be viewed by issuing the appropriate command from the control workstation:
 - **errpt -a -N sphwlog | pg** (For SSP code levels 1.02 and higher)
 - Refer to the "Starting a service call (MAP 0100)" in *RS/6000 SP: System Service Guide* for more information on the **pg** command

Note: In a frame with processor nodes, entries for the switch will refer to “node17” or “slot17”. In a multi-switch frame, switches will be listed as even slot addresses.

3. Determine the switch assembly type (see page 1-3)
4. Refer to Table 1-1 on page 1-7 for a prioritized list of conditions. Find the first condition that describes your problem, then perform the associated action.

Table 1-1. Switch Problem Diagnostics		
Priority	Message or condition	Action
1	Environmental problems <ul style="list-style-type: none"> • Errpt: "Failure..." • Log: "Shutdown: Voltage..." • Log: "Shutdown: Fan..." • Log: "Shutdown: Temperature..." • Errpt: "Warning..." • Log: "Warning:..." • Environment (Yellow) LED- on or flashing 	Go to "Switch environment (MAP 0600)" on page 1-8.
2	Power problem <ul style="list-style-type: none"> • (Power) Green LED- off or flashing • Switch has no power • All voltages at zero 	Go to "Switch assembly power (MAP 0610)" on page 1-18.
3	Switch function problem <ul style="list-style-type: none"> • Error(s) in <code>/var/adm/SPlogs/css/out.top</code> (see note) • Problem(s) with <code>switch_responds</code> • Problem(s) returned from <code>errpt -a -N Worm</code> • Problem(s) detected by CE/customer. 	Go to "Switch function (MAP 0620)" on page 1-22.
Notes: <ol style="list-style-type: none"> 1. <code>out.top</code> is located in the primary node. To find the primary node, issue: <code>Eprimary</code> 2. Verify that the file has a valid (recent) time stamp using: <code>ls -l</code> 		

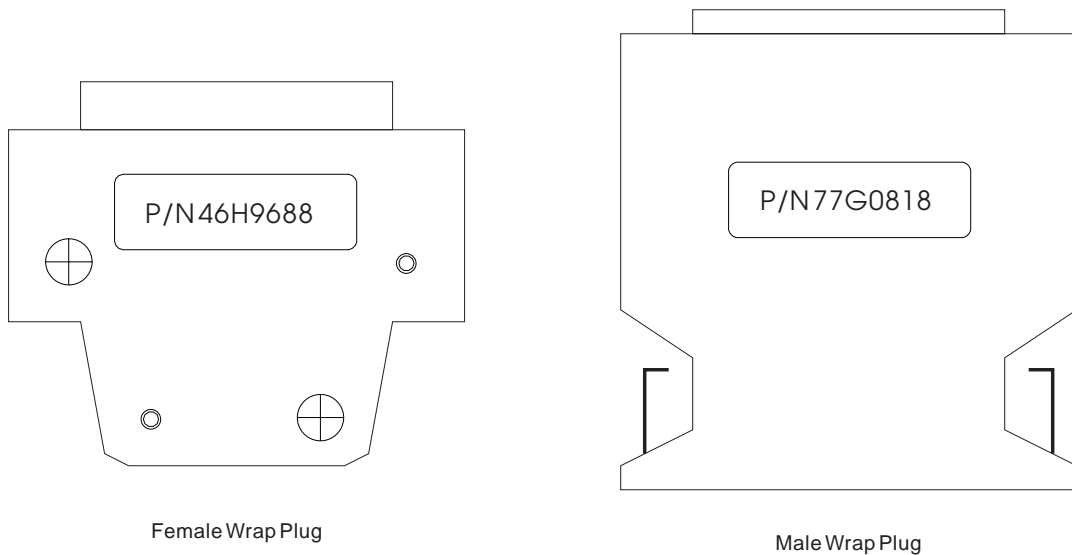


Figure 1-2. SPS Wrap Plugs

Switch Environment (MAP 0600)

Notes:

1. SPS advanced diagnostics use the 10 meter data cable provided by the SPS feature bill of material.
2. Advanced cable wrap tests will not run successfully for 15- and 20-meter SPS data cables. If 15- or 20-meter data cables are used, swap/change the suspected cable.

Switch environment (MAP 0600)

Purpose of this MAP

This MAP provides diagnostic information for switch problems that are related to the operating environment.

Note: Refer to “Service position procedures” on page 3-10 for placing a switch into the service position or for removing the switch from the service position.

Step 0600–001: You have arrived at this MAP from Table 1-1 on page 1-7.

1. Perspectives reports “Warning”, “Shutdown”, or “Failure” message associated with switch assembly.
2. Does message indicate “Shutdown” or “Failure”?
 - If yes, go to “Step 0600–003.”
 - No, the message indicates a “Warning”, go to “Step 0600–002.”

Step 0600–002: You received a switch environment “Warning”.

1. Does this same message occur on other switch assemblies or on any processor nodes mounted in the same frame as the switch?
 - If yes, call the next level of support.
 - If no, verify that the customer is not experiencing problems with this switch assembly.
 - If no problems are being experienced, or this is an N+1 fan or power supply failure, then no immediate service is required, and service can be deferred until a later date.
 - If problems *are* being experienced, service can be performed now by returning to “Step 0600–001” and treating this message as a “Shutdown” or “Failure” message.

Step 0600–003: A Perspectives message indicates a “Shutdown” or “Failure”. This means that a serious environmental condition has been detected in the switch assembly.

Note: If service action has just been completed on this switch assembly, check for loose cables or shorted conditions in this component.

1. Based on the text of the message, use the information in Table 1-2 on page 1-9 to continue service:

<i>Table 1-2. Environmental Messages for Switches</i>	
Condition	Action
"...P48OK..."	Go to "Switch assembly power (MAP 0610)" on page 1-18.
"...shutdownP5..." "...shutdownP12..." "...shutdownN5..."	Go to "Step 0600-004" on page 1-9.
"...fanfail..."	Go to "Step 0600-011" on page 1-11.
"...shutdownTemp..."	Go to "Step 0600-013" on page 1-12.
"...PS1Fail..." "...PS2Fail..." "...P33High..." "...P33Low..." "...voltP33Range..." "...PSFuseGood..."	Go to "Step 0600-018" on page 1-14.

Step 0600-004: Perspectives indicated a shutdown condition and Table 1-2 directed you to this step.

1. One or more of the following conditions exist:
 - Voltage out of range: +5 V "shutdownP5"
 - Voltage out of range: +12 V "shutdownP12"
 - Voltage out of range: -5 V "shutdownN5"
2. Have the customer remove the switch assembly from the active configuration and power off the switch assembly.
3. Put the switch into service position. Refer to "Service position procedures" on page 3-10.
4. Check the following hardware items:
 - Cable conditions at switch supervisor card S00-SP-J102
 - Cable conditions at power supply S00-PC-P4 and S00-PC-P6.
 - Cable conditions of wires, especially the inner chassis cable.
5. Leave the cable disconnected at the switch power card.
6. Does the switch supervisor control cable appear to be okay?
 - If yes, go to "Step 0600-005."
 - If the switch supervisor control cable (S00-SP-P102) appears to have a problem, go to "Step 0600-011" on page 1-11. Refer to Priority 4 and replace the cable.

Step 0600-005: After placing the switch into the service position, you performed some basic inspections and found that the switch supervisor control cable (S00-SP-P102) appears to be okay.

1. Disconnect S00-PC-P4 and S00-PC-P4 at the power supply.
2. Using a digital multimeter, measure resistance between the appropriate pins.
3. Compare results with values in Table 1-3 on page 1-10:

Switch Environment (MAP 0600)

Voltage	Measure From (positive lead)	To GND (negative lead)	Acceptable Range (in ohms)
+5 V	Pin 1	Pin 2 (black)	1K - 5M
+12 V	Pin 3	Pin 2 (black)	1K - 5M
-5 V	Pin 5 Pin 7	Pin 2 (black) Pin 2 (black)	2 - 20 2 - 20

4. Is the measured resistance in the acceptable range?

- If yes, go to “Step 0600–009.”
- If no, go to “Step 0600–006.”

Step 0600–006: The resistance value you measured in Table 1-3 **was not** within an acceptable range.

1. Replace the inner chassis cable.
2. Repeat resistance measurement from “Step 0600–005” on page 1-9.
3. Is the measured resistance in the acceptable range?
 - If yes, go to “Step 0600–017” on page 1-13 to verify fix.
 - If no, go to “Step 0600–007.”

Step 0600–007: You disconnected S00-CL-P5 at the switch clock card but the measured resistance was still outside the acceptable range.

1. Replace the front chassis cable.
2. Repeat resistance measurement from “Step 0600–005” on page 1-9.
3. Is the measured resistance now within the acceptable range?
 - If yes, go to “Step 0600–017” on page 1-13 to verify fix.
 - If no, go to “Step 0600–008.”

Step 0600–008: You replaced the inner chassis cable and the front chassis cable but the measured resistance is still outside of the acceptable range.

1. This indicates that there is still a problem.
2. Replace the switch supervisor card.
3. Go to “Step 0600–017” on page 1-13 to verify fix.

Step 0600–009: You have voltage shutdown condition, the supervisor control cable appears to be okay, and the resistance value you measured in Table 1-3 **was** within an acceptable range. Based on these symptoms, “Step 0600–005” on page 1-9 directed you to this location.

1. Reconnect cable S00-PC-P4 at switch power supply 1.
2. Repeat resistance measurement from “Step 0600–005” on page 1-9.
3. Is the measured resistance within the acceptable range?
 - If yes, replace switch power supply 1 and the switch supervisor card.
 - a. Go to “Step 0600–017” on page 1-13 to verify fix.

- If no, go to “Step 0600–010” on page 1-11.

Step 0600–010: With cable S00-PC-P4 reconnected at the switch power supply 1, the measured resistance values were still outside the acceptable range.

1. Reconnect cable S00-PC-P6 at switch power supply 2.
2. Repeat resistance measurement from “Step 0600–005” on page 1-9.
3. Is the measured resistance within the acceptable range?
 - If yes, replace switch power supply 2.
 - a. Go to “Step 0600–017” on page 1-13 to verify fix.
 - If no, the problem is in the switch supervisor card.
 - a. Go to “Step 0600–011,” Priority 3.

Step 0600–011: You arrived at this step because you received a “...fanfail...” message or you found a problem with the switch supervisor control cable (S00-SP-P102).

1. One or more of the following conditions exist:
 - Warning Fan: “fanwarning1”, “fanwarning2”, ..., “fanwarning5”
 - Shutdown Fan: “fanfail1”, “fanfail2”, ..., “fanfail5”
2. Have customer remove the switch assembly from the active configuration and power off the switch assembly.
3. Set switch circuit breaker to the Off position.
4. Unplug cables connected to J1 and J2 at the rear of the switch assembly.
5. Remove the front panel assembly from the inner chassis.
6. Use Table 1-4 to reseal or replace components:

Priority	Component	Action
1	Fan 1, 2, 3, 4 or 5	1. Check specified fans for blockages or loose cable connections. 2. Fix any obvious problems and continue at “Step 0600–012” on page 1-12. 3. If you do not find any problems, continue at Priority 2.
2	Fan 1, 2, 3, 4 or 5	1. Replace fans as described in Chapter 4, “FRU removals and replacements” on page 4-1. 2. Continue at “Step 0600–012” on page 1-12.
3	Switch supervisor card	1. Replace the card. 2. Continue at “Step 0600–012” on page 1-12.
4	Switch supervisor control cable	1. Replace the cable. Refer to Figure 1-3 on page 1-12, for cable connections. 2. Continue at “Step 0600–012” on page 1-12.
5	All replaced	Call next level of support.

Switch Environment (MAP 0600)

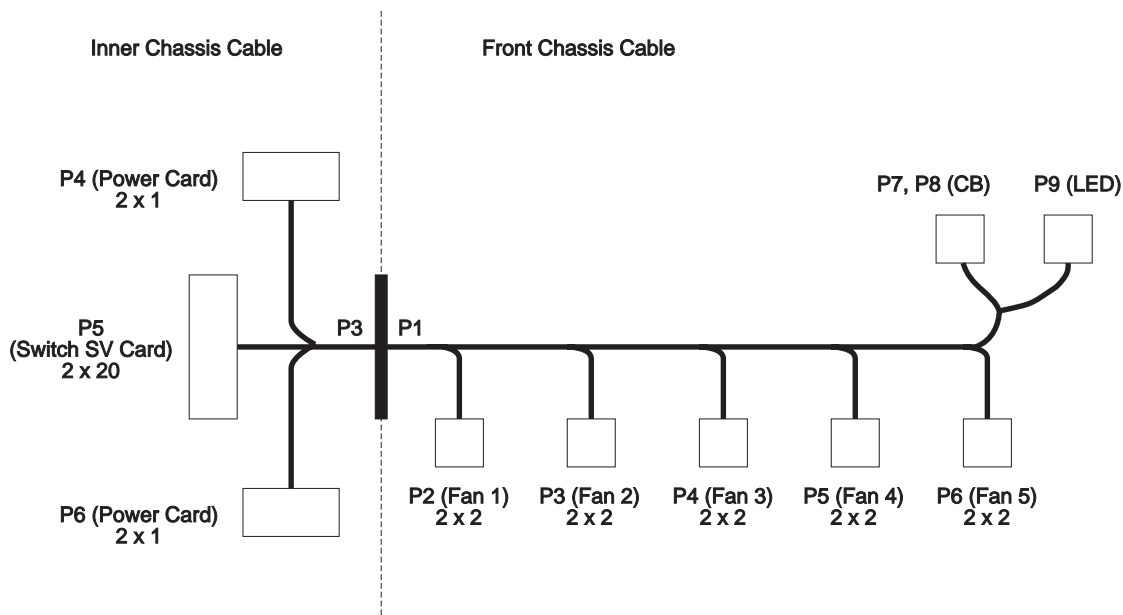


Figure 1-3. SPS Inner Chassis and Front Chassis Cables

Step 0600–012: You performed the recommended action in Table 1-4 on page 1-11.

1. Component replaced or reseated.
2. Reconnect all cables inside the switch assembly.
3. Install front panel assembly and reinstall front retaining screws (see “Service position procedures” on page 3-10).
4. Connect only power (J1) and supervisor (J2) cables at the rear of the switch assembly.
5. Put the switch assembly's circuit breaker into the On ('1') position.
6. Check the Environmental (yellow) LED for an ON or FLASHING condition.
7. Is the Environmental (yellow) LED ON or FLASHING?
 - If the Environmental LED **is** on or flashing:
 - a. Put the switch assembly's circuit breaker into the Off ('0') position.
 - b. Return to “Step 0600–011” on page 1-11 and continue service with the next highest priority.
 - If the Environmental LED **is not** on or flashing:
 - a. You have resolved the problem.
 - b. Go to “Step 0600–017” on page 1-13 to verify fix.

Step 0600–013: Perspectives indicated a shutdown temperature condition and Table 1-2 on page 1-9 directed you to this step.

Temperature is out of specified range; however, no serious electrical current or fan speed problems have been detected.

1. Check for airflow blockage at air intakes and exhaust of the switch assembly and system frame. Also, check air temperatures around the frame, looking for sources of abnormally high temperatures (above 40C or 104F).
2. Is there an obvious airflow blockage or abnormally high temperature source near air intakes?

- If yes, go to “Step 0600–016” on page 1-13.
- If no, go to “Step 0600–014.”

Step 0600–014: You have an over temperature condition but you **did not** find an obvious airflow blockage or abnormally high temperature source near air intakes. This indicates that there is a problem in the switch supervisor card.

1. Have the customer remove the switch from the active configuration and power off the switch assembly.
2. Set the circuit breaker to the Off position. Unplug cables connected to J1 and J2 at rear of the switch assembly.
3. Remove the front panel assembly from the inner chassis.
4. Replace the switch supervisor card.
5. Perform “Switch supervisor self-test” on page 3-4.
6. Does the card pass self-test?
 - If yes, go to “Step 0600–015.”
 - If the card **does not** pass self-test, check the cable connections to the switch supervisor card. If no obvious problems are found, call next level of support.

Step 0600–015: The switch supervisor card passed the self-test.

1. Check Environmental (yellow) LED for ON or FLASHING condition.
2. Is the Environmental (yellow) LED ON or FLASHING?
 - If the Environmental LED **is** on or flashing, check the cable connections to the switch supervisor card. If no obvious problems are found, call next level of support.
 - If the Environmental LED **is not** on or flashing:
 - a. You have resolved the problem.
 - b. Go to “Step 0600–017” to verify fix.

Step 0600–016: You found an obvious airflow blockage or abnormally high temperature source near air intakes.

1. Have customer remove the switch from the active configuration and power off the switch assembly.
2. Remove blockage.
3. If required, put the switch into service position (refer to “Service position procedures” on page 3-10).
4. With all cables replugged and Environmental (yellow) LED OFF, power on the switch assembly.
5. Go to “Step 0600–017” to verify fix.

Step 0600–017: You have repaired or replaced a component.

1. If necessary, reinstall switch assembly cover.
2. If required, take the switch out of the service position (refer to “Service position procedures” on page 3-10).
3. If necessary, reconnect all cables at the rear of the switch assembly.
4. Put the switch assembly's circuit breaker into the On ('1') position.

Switch Environment (MAP 0600)

5. Go to “Step 0620–043” on page 1-42.

Step 0600–018: Perspectives gave you a “Shutdown”, or “Failure” message and Table 1-2 on page 1-9 directed you to this step.

1. One or more of the following conditions exist:

- “...P33Low...”
- “...P33High...”
- “...Pvolt33Range...”
- “...PS1Fail...”
- “...PS2Fail...”
- “...PSFuseGood...”

2. Have the customer remove the switch assembly from the active configuration and power off the switch assembly.

3. Switch off the circuit breaker.

4. Unplug cables connected to J1 and J2 at rear of the switch assembly.

5. Remove the front panel assembly from the inner chassis.

6. Put the switch into service position (refer to “Service position procedures” on page 3-10).

7. What problem type is given in the condition?

- If the condition states that you have a P33 type problem (P33Low, P33High, or voltP33Range), go to “Step 0600–019.”
- If the condition states that you have a PSxFail or PSxFuseGood problem, go to “Step 0600–023” on page 1-15.

Step 0600–019: The condition states that you have a P33 type problem (P33Low, P33High, or voltP33Range).

1. Check cable conditions at switch supervisor card S00-SC-P5

2. Check cable conditions at switch power supply S00-PC-P4 and S00-PC-P6.

3. Do the inner chassis cables appear to be okay?

- If the inner chassis cables appear to be okay **and** the condition is **P33low or voltP33Range**, go to “Step 0600–020.”
- If the inner chassis cables appear to be okay **and** the condition is **P33High**, go to “Step 0600–027” on page 1-16.
- If the inner chassis cables **do not** appear to be okay, go to “Step 0600–011” on page 1-11, Priority 4 and replace the cables.

Step 0600–020: You have a P33low or voltP33Range condition and the inner chassis cables appear to be okay.

1. Disconnect connectors S00-PC-P4, S00-PC-P6 at the power cards and S00-PC-P5 at the supervisor card.

2. Remove the switch supervisor card (refer to “Removing the switch supervisor card” on page 4-5).

3. Using a digital multimeter, measure resistance at the planar connection for the supervisor card, between pins 12A and 12B.

- The resistance should be in a range of 4 to 20 ohms.

4. Is the measured resistance in the acceptable range?

- If yes:
 - a. Replace supervisor card as described in “Replacing the switch supervisor card” on page 4-6.
 - b. Go to “Step 0600–017” on page 1-13.
- If no, go to “Step 0600–021.”

Step 0600–021: With connectors S00-PC-P4, S00-PC-P6 disconnected, the measured resistance between pins 12A and 12B is outside the specified range.

1. Remove power supply card PS1 (refer to “Removing the switch power cards” on page 4-7).
2. Repeat the resistance measurement from “Step 0600–020” on page 1-14.
3. Is the measured resistance in the acceptable range?

- If yes:
 - a. Replace the power supply card (refer to “Replacing the switch power cards” on page 4-8).
 - b. Go to “Step 0600–017” on page 1-13.
- If no, go to “Step 0600–022.”

Step 0600–022: Connectors S00-PC-P4 and S00-PC-P6 are disconnected and you removed power supply card PS1 but the measured resistance between pins 12A and 12B is still outside the specified range.

1. If this is the first time through this step:
 - a. Remove power supply card PS2
 - b. Go to “Step 0600–020” on page 1-14 and repeat the resistance measurement
2. If you have already been through this step:
 - a. Replace the switch assembly. Go to “Step 0600–017” on page 1-13.

Step 0600–023: You arrived at this location from “Step 0600–018” on page 1-14 where you found a condition state reporting a PSxFail or PSxFuseGood problem.

1. If you have a **PSFuseGood** problem, go to “Step 0600–027” on page 1-16.
2. If you have a **PS1Fail** problem, go to “Step 0600–025” on page 1-16.
3. If you have a **PS2Fail** problem, go to “Step 0600–024.”

Step 0600–024: You have a PS2Fail problem.

1. Replace power supply card PS2.
2. Reinstall the SPS front panel assembly, being careful to align the guide pins on the P1 to the inner chassis cup guide.
3. Replug the power cable (J1) and supervisor cable (J2) to the rear of the assembly.
4. Put the circuit breaker in the On (‘1’) position.
5. Does the PS2Fail condition still exist?
 - If yes, go to “Step 0600–026” on page 1-16.
 - If no, go to “Step 0600–017” on page 1-13.

Switch Environment (MAP 0600)

Step 0600–025: You have a PS1Fail problem

1. Replace power supply card PS1.
2. Reinstall the SPS front panel assembly, being careful to align the guide pins on the P1 to the inner chassis cup guide.
3. Replug the power cable (J1) and supervisor cable (J2) to the rear of the assembly.
4. Put the circuit breaker in the On ('1') position.
5. Does the PS1Fail condition still exist?
 - If yes, go to "Step 0600–026."
 - If no, go to "Step 0600–017" on page 1-13.

Step 0600–026: After replacing the power supply card you still have a PSxFail condition.

1. Put the circuit breaker in the Off ('0') position.
2. Remove the power cable (J1) and supervisor cable (J2) from the rear of the switch assembly.
3. Remove the front panel assembly.
4. Replace the supervisor card.
5. Reinstall the SPS front panel assembly, being careful to align the guide pins on the P1 to the inner chassis cup guide.
6. Replug the power cable (J1) and supervisor cable (J2) to the rear of the assembly.
7. Put the circuit breaker in the On ('1') position.
8. Does the PSxFail condition still exist?
 - If yes:
 - a. Replace the SP Switch inner chassis assembly.
 - b. Go to "Step 0600–017" on page 1-13.
 - If no, go to "Step 0600–017" on page 1-13.

Step 0600–027: You have a PSFuseGood problem.

1. Remove power supply PS1 (refer to "Removing the switch power cards" on page 4-7).
2. Reinstall the SPS front panel assembly, being careful to align the guide pins on the P1 connector to the inner chassis.
3. Replug the power cable (J1) and supervisor cable (J2) at the rear of the assembly.
4. Put the circuit breaker in the On ('1') position.
5. Does the failure condition still exist?
 - If yes, go to "Step 0600–029" on page 1-17.
 - If no, go to "Step 0600–028" on page 1-17.

Step 0600–028: You have a PSFuseGood problem that went away when you removed power supply PS1.

1. Put the circuit breaker in the Off ('0') position.
2. Remove power cable (J1) and supervisor cable (J2) from the rear of the switch assembly.
3. Remove the front panel assembly.
4. Replace power supply PS1.
5. Take the switch out of the service position (refer to "Service position procedures" on page 3-10).
6. Go to "Step 0600–017" on page 1-13.

Step 0600–029: You have a PSFuseGood problem that **did not** go away when you removed power supply PS1.

1. Put the circuit breaker in the Off ('0') position.
2. Remove power cable (J1) and supervisor cable (J2) from the rear of the switch assembly.
3. Remove the front panel assembly.
4. Replug power supply PS1 and remove power supply PS2.
5. Reinstall the SPS front panel assembly, being careful to align the guide pins on the P1 connector to the inner chassis.
6. Replug the power cable (J1) and supervisor cable (J2) at the rear of the assembly.
7. Put the circuit breaker in the On ('1') position.
8. Does the failure condition still exist?
 - If yes, go to "Step 0600–031."
 - If no, go to "Step 0600–030."

Step 0600–030: You have a PSFuseGood problem that went away when you removed power supply PS2.

1. Put the circuit breaker in the Off ('0') position.
2. Remove power cable (J1) and supervisor cable (J2) from the rear of the switch assembly.
3. Remove the front panel assembly.
4. Replace power supply PS2.
5. Take the switch out of the service position (refer to "Service position procedures" on page 3-10).
6. Go to "Step 0600–017" on page 1-13.

Step 0600–031: You have a PSFuseGood problem that **did not** go away when you removed power supply PS2.

1. Put the circuit breaker in the Off ('0') position.
2. Remove power cable (J1) and supervisor cable (J2) from the rear of the switch assembly.
3. Remove the front panel assembly.
4. Replug power supply PS2 and replace the switch supervisor card.
5. Reinstall the SPS front panel assembly, being careful to align the guide pins on the P1 connector to the inner chassis.

Switch Assembly Power (MAP 0610)

6. Replug the power cable (J1) and supervisor cable (J2) at the rear of the assembly.
7. Put the circuit breaker in the On ('1') position.
8. Does the failure condition still exist?
 - If yes:
 - a. Replace the SP switch inner chassis assembly.
 - b. Go to "Step 0600–017" on page 1-13.
 - If no, go to "Step 0600–017" on page 1-13.

Switch assembly power (MAP 0610)

Purpose of this MAP

This MAP provides diagnostic information for problems related to the SP Switch power supply.

Note: Refer to "Service position procedures" on page 3-10 for placing the switch into the service position or removing it from the service position.

Step 0610–001: A message in Perspectives indicated that you have a power problem and Table 1-1 on page 1-7 or Table 1-2 on page 1-9 directed you to this MAP.

1. From a Perspectives window on the control workstation or by looking at the switch assembly, check the Power (green) LED for this switch assembly.
2. The definition of the Power (green) LED is as follows:

Power (Green)	
Off	No 48 V dc power available at switch assembly.
Flashing	Power available at switch assembly, but switch logic is Off.
On	Power available at switch assembly, and logic is On.

3. Is Power (green) LED Off?
 - If yes, go to "Step 0610–004" on page 1-19.
 - If no, go to "Step 0610–002."

Step 0610–002: You found the switch Power (green) LED was lit. This indicates that the switch assembly is getting 48 V dc power.

1. Is Power (green) LED flashing?
 - If yes, go to "Step 0610–003" on page 1-19.
 - If the Power LED is lit **and** it **is not** flashing:
 - a. This indicates that you do not have a power supply problem.
 - b. Verify that you have the proper switch assembly, then restart "Switch description and problem determination (MAP 0590)" on page 1-3.
 - c. If this is the proper switch assembly, call the next level of support.

Step 0610–003: The Power LED is lit **and** it is flashing.

1. This indicates that the switch assembly is getting power.
2. Power up switch logic from the virtual front panel on the control workstation.
3. Does Power (green) LED light and stay lit?
 - If yes, the switch logic is getting power.
 - a. Go to “Switch function (MAP 0620)” on page 1-22 and refer to “Step 0620–043” on page 1-42.
 - If the Power LED **does not** stay lit, the switch assembly is not responding to the command.
 - a. Go to “Frame supervisor not responding (MAP 0110)” in *RS/6000 SP: System Service Guide*.

Step 0610–004: From either a Perspectives window or by looking at the switch assembly, you determined that the Power (green) LED is Off.

1. Check the switch assembly's circuit breaker.
2. Put this circuit breaker in the On ('1') position if it is not already in that position.
3. Does the circuit breaker go (trip) to the Off ('0') position?
 - If yes, go to “Step 0610–005.”
 - If no, go to “Step 0610–006.”

Step 0610–005: When you put the circuit breaker into the On ('1') position, the circuit breaker went (tripped) into the Off ('0') position.

1. Have the customer remove the switch assembly from the active configuration and power off the switch assembly.
2. Put the switch into service position (refer to “Service position procedures” on page 3-10).
3. Go to “Step 0610–010” on page 1-20

Step 0610–006: When you put the circuit breaker into the On ('1') position, the circuit breaker stayed in the On ('1') position.

1. From the control workstation or switch assembly, check Power (green) LED for this switch.
2. Is the Power (green) LED lit?
 - If the Power (green) LED **is not** lit, go to “Step 0610–007.”
 - If the Power (green) LED **is lit**:
 - a. You have resolved the switch assembly problem.
 - b. Go to “Switch function (MAP 0620)” on page 1-22 and refer to “Step 0620–043” on page 1-42.

Step 0610–007: The Power (green) LED **is not** lit.

1. Check processor nodes or switch assemblies on any other dc power harness for any that are powered on.
2. Ensure that the other processor node or switch assembly has its circuit breaker in the On ('1') position.
3. Check the Power (green) LED for an On or Flashing condition.

Switch Assembly Power (MAP 0610)

4. Processor nodes and switch assemblies receive 48-volt power from one of five power harnesses. 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

5. Is the Power (green) LED on other processor nodes or switch assemblies On or Flashing?
 - If yes, go to "Step 0610-008."
 - If no, go to "Main power (MAP 0450)" in *RS/6000 SP: System Service Guide*.

Step 0610-008: You found that the Power (green) LED on other processor nodes or switch assemblies is On or Flashing

1. If there is only one switch assembly on the dc power harness, skip the next item and answer "Yes" to the question below.
2. Check all other switch assemblies on the same dc power harness as the failing switch assembly and look for the same symptom.
 - Look for the circuit breaker on but the Power (green) LED is not lit.
3. Is this the only switch assembly showing this symptom?
 - If yes, go to "Step 0610-009."
 - If no, you have a problem with 48 V dc power distribution.
 - a. Go to "Open in 48 V dc distribution (MAP 0560)" in *RS/6000 SP: System Service Guide*.

Step 0610-009: Only one switch assembly is showing the circuit breaker on but the Power (green) LED is not lit.

1. Check cable connections at the frame power unit (see "Step 0610-007" on page 1-19) and at switch assembly bulkhead (BH-J1) for good connections.
2. Are the connections good?
 - If yes:
 - a. Have the customer remove the switch assembly from the active configuration and power off the switch assembly.
 - b. Go to "Step 0610-010."
 - If no:
 - a. Fix any cable connection problems.
 - b. Return to "Step 0610-006" on page 1-19.

Step 0610-010: You have an SP type switch that is either tripping the circuit breaker to the Off position or the circuit breaker is on but the Power (green) LED is not lit.

1. Turn off the circuit breaker.
2. Unplug cables connected to J1 and J2 at rear of the switch assembly.
3. Remove the front panel assembly from the inner chassis.
4. Unplug inner chassis cable from the switch power cards S00-PC-P4, S00-PC-P6 and the switch supervisor card S00-SP-P5.

- Using a digital multimeter, check for inner chassis cable continuity from the switch tailgate and the connectors in Table 1-5 on page 1-21:

<i>Table 1-5. Inner Chassis Cable Continuity</i>	
From	To
S00-BH_J1 pin 5&9	P6 pin 2
S00-BH-J1 pin 5&9	P4 pin 2
S00-BH-J1 pin 1&6	P3 pin 16
P3 pin 17	p6 pin 1
P3 pin 17	p4 pin 1

- On the fan assembly, with circuit breaker in the On ('1') position, check for front chassis cable continuity between the connectors in Table 1-6:

<i>Table 1-6. Front Chassis Cable Continuity</i>	
From	To
P1 pin 17	P1 pin 16

- Is there continuity?

- If you **have** continuity on **all** cables, go to "Step 0610-013" on page 1-22.
- If you **do not have** continuity on an **inner chassis** cable, go to "Step 0610-011."
- If you **do not have** continuity on an **front chassis** cable, go to "Step 0610-012."

Step 0610-011: An inner chassis cable failed the continuity test.

- Replace inner chassis cable.
- Return to "Step 0610-004" on page 1-19 to verify the replacement cable.

Step 0610-012: An front chassis cable failed the continuity test.

- Ensure that the circuit breaker is in the On ('1') position.
- Check for continuity between the tabs of the circuit breaker.
- Is there continuity?
 - If yes:
 - Replace the front chassis cable.
 - Return to "Step 0610-004" on page 1-19 to verify the replacement cable.
 - If no:
 - Replace the circuit breaker.
 - Return to "Step 0610-004" on page 1-19 to verify the replacement breaker.

Switch Function (MAP 0620)

Step 0610–013: You have continuity on all cables.

1. If this is the first time through this step, replace the supervisor card.
 - Return to “Step 0610–004” on page 1-19 to verify the replacement breaker.
 - Refer to “Replacing the switch supervisor card” on page 4-6.
2. If this is the second time through this step, replace the switch inner chassis.
 - Return to “Step 0610–004” on page 1-19 to verify the replacement breaker.
 - Refer to “Procedures for switch assemblies” on page 4-2.
3. If you have already replaced the supervisor card and the inner chassis, go to "Open in 48 V dc distribution (MAP 0560)" in *RS/6000 SP: System Service Guide*.

Switch function (MAP 0620)

Purpose of this MAP

This MAP provides diagnostic information for problems related to the SP Switch function.

Notes:

1. Refer to “Appendix A” in *RS/6000 SP: Installation and Relocation* for frame-to-frame or switch-to-switch cables. Logical frame to physical frame translation information can also be found in this appendix.
2. Refer to “Service position procedures” on page 3-10 for placing or removing the switch into or from service position.

Step 0620–001: A message in Perspectives indicated that you have a switch function problem and Table 1-1 on page 1-7 directed you to this MAP.

Note: If **out.top** does not match the physical switch configuration, run **Eannotator**. (Refer to the Installation section of *IBM RS/6000 SP: Scalable POWERparallel Switch Support for the IBM PSSP for AIX (GC23-3998)*).

1. To complete the following procedures, you will need to have primary node root access. (Customer may enter root password when required.)
2. If either of the following two conditions is true:
 - **Estart** has not been run by the customer
 - The CE has already replaced components that might affect the switch.

then from the control workstation of the “primary” processor node, enter:

Estart

You should receive a message indicating successful initialization at the primary node. If you receive any other message, consult the “Diagnosing High Performance Switch Problems” section of *IBM Parallel System Support Programs for AIX: Diagnosis Guide*

3. Determine the primary node number. From an AIX window on the control workstation, enter:

Eprimary

4. Determine the host name for this node by checking “reliable_hostname” for the node number with the command:

```
splstdata -n | pg
```


- From the system file server, log into “primary” processor node as root using the **telnet** command:

```
telnet PrimaryNodename
```

- Check **errpt -a -N Worm | pg** for any switch related problems. If any errors are listed, use the error information, with this MAP, to help isolate the problem.

- Check the functional state of the switch in the **out.top** file by issuing the following command on the “primary” processor node:

```
pg /var/adm/SPlogs/css/out.top
```

Notes:

- Verify that the timestamp on the **out.top** file is current (using **ls -l /var/adm/SPlogs/css/out.top**).
 - Refer to "Starting a service call (MAP 0100)" in *RS/6000 SP: System Service Guide* for information on using the **pg** command.
- Problems are indicated at the end of a text line by the following sequence:

```
-# ErrorMessage
```

Examples of error messages:

```
-1 uninitialized
-3 R: faulty link from VOP
```

- Does **/var/adm/SPlogs/css/out.top** file report any problems?
 - If yes, use the SPS Error Conditions table (Table 1-7 on page 1-24) to continue service.
 - If no, go to “Step 0620–002.”

Step 0620–002: No functional problems found.

- Have you replaced any components or fixed problems?
 - If yes:
 - You have resolved the switch problem.
 - Go to "End of call (MAP 0650)" in *RS/6000 SP: System Service Guide*.
 - If no, go to “Step 0620–003.”

Step 0620–003: You did not find any functional problems and you did not fix or replace anything.

- Did **Estart** command start okay?
 - If yes, call the next level of support.
 - If no:
 - Consult the “Diagnosing Switch Problems” section of *IBM RS/6000 SP: PSSP Diagnosis Guide*.
 - Return to “Step 0620–001” on page 1-22.

Switch Function (MAP 0620)

Table 1-7 (Page 1 of 3). SPS Error Conditions		
Error #	Message/Condition	Description and Action
2 (SPS)	Initialized	<p>Description: Initialization detected a wrapped port where a processor node or dependent node was expected (this may result from isolation procedures), or else a disconnected cable.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If this is an unexpected condition, check cabling against the configuration file var/adm/SPlogs/css/out.top. 2. If the processor node or dependent node can be reconnected, remove the wrap plug and connect the data cable between the switch assembly and the processor node or dependent node. 3. If the processor node or dependent node is to be permanently removed, have the customer update the switch topology. 4. Repeat "Step 0620-001" on page 1-22 for next problem or go to "Step 0620-043" on page 1-42 to verify fix.
1 (SPS)	Link status: Operational	<p>Description: Link status is operational.</p> <p>Action: Repeat "Step 0620-001" on page 1-22 for next problem or go to "Step 0620-043" on page 1-42 to verify fix.</p>
0 (SPS)	Uninitialized	<p>Description: Switch adapter has not been initialized. Processor node may not recognize adapter due to hardware failure or bad software configuration.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If there are any other errors in the var/adm/SPlogs/css/out.top file, address those errors first. <ul style="list-style-type: none"> Note: If the problem is on all nodes in the frame, check for any hardware problems with the switch assembly. Also check for switch-to-switch problems on all jacks of the switch assembly. 2. If all the nodes are uninitialized except for the primary node, verify that the primary node is connected to the correct port. 3. Have customer verify that the correct switch software is installed and running on this node. rc.switch or css_restart_node starts the fault_service_Worm_RTG_SP daemon and the fs_monitor daemon. 4. Log into processor node and enter: <pre>lscfg grep css</pre> 5. If you get no result, try swapping in another switch adapter. Repeat step 3. If you get a result, the problem is probably resolved; repeat "Step 0620-001" on page 1-22 for next problem or go to "Step 0620-043" on page 1-42 to verify fix. 6. The problem is probably the switch assembly. Go to "Step 0620-004" on page 1-26.

Table 1-7 (Page 2 of 3). SPS Error Conditions		
Error #	Message/Condition	Description and Action
-1 (SPS)	Device status: Device not responding Link status: Link as been removed from network, other stage faulty	Description: Possible hardware problem. Action: Go to "Step 0620-004" on page 1-26.
-2 (SPS)	Link status: Wrap plug is installed	Description: Initialization detected a wrap plug or cable rather than the expected cabling. Action: Repeat "Step 0620-001" on page 1-22 for next problem or go to "Step 0620-043" on page 1-42 to verify fix.
-3 (SPS)	Device status: Device has been removed from network because of a bad signature Link status: Not operational	Description: Possible hardware problem. Action: Go to "Step 0620-004" on page 1-26.
-4 (SPS)	Device status: Device has been removed from network, faulty Link status: Link has been removed from network or mis-wired, faulty	Description: Switch network not wired as specified in switch topology or problem with connection between switch and device. Note: You may get this error number for a jack which could connect to a node, but instead has a wrap plug. In this case, this message is a warning only and can be ignored. Action: 1. Check this connection against the actual hardware cabling. 2. If the cabling does not match , correct the cabling problem, then go to step 5 below. 3. Check the processor node's hostname and switch node number against the configuration using the command: splstdata -s pg SDRGetObjects DependentNode 4. If this occurs on all nodes of a frame, check for a logical-to-physical frame number mismatch. 5. If there is a mismatch, have the customer update the configuration, or you can correct the cabling, as appropriate. 6. Go to "Step 0620-004" on page 1-26.
-5 (SPS)	Send packet from local node failed	Description: Possible hardware problem. Action: Go to "Step 0620-004" on page 1-26.
-6 (SPS)	Device status: Device has been removed from network, no AUTOJOIN Link status: Link has been removed from network, no AUTOJOIN	Description: AUTOJOIN was not selected for node during removal. Action: 1. If there is an obvious problem, like node powered off or disconnected, fix that problem first. Then issue Eunfence for this processor node or dependent node. 2. If problem was resolved, repeat "Step 0620-001" on page 1-22 for next problem or go to "Step 0620-043" on page 1-42 to verify fix. 3. If problem was not resolved, go to "Step 0620-004" on page 1-26.

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Table 1-7 (Page 3 of 3). SPS Error Conditions		
Error #	Message/Condition	Description and Action
-7 (SPS)	Device status: Device has been removed from network for not responding Link status: Link has been removed from network, fenced	Description: Possible hardware problem. Action: Go to "Step 0620-004" on page 1-26.
-8 (SPS)	Device status: Device has been removed from network because of a miswire Link status: Link has been removed from network, probable miswire	Description: Initialization of this link detected a different switch node number than the one expected. Action: <ol style="list-style-type: none"> 1. Check this connection against the actual hardware cabling. 2. If the cabling does not match, correct the cabling problem, then go to step 5. 3. Check the node's hostname (or IP address) and switch node number against the configuration using the command: splstdata -s pg (standard node) SDRGetObjects DependentAdapter (dependent node) 4. If this occurs on all nodes of a frame, check for a logical-to-physical frame number mismatch. 5. Have the customer update the configuration, or you can correct the cabling, as appropriate. 6. Repeat "Step 0620-001" on page 1-22 for next problem or go to "Step 0620-043" on page 1-42 to verify fix.
-9 (SPS)	Device status: Destination not reachable Link status: Link has been removed from network, not connected	Description: Possible hardware problem. Action: Go to "Step 0620-004" on page 1-26.

Step 0620-004: You were directed here by an Error Condition listed in Table 1-7 on page 1-24 which lists functional problems reported in **/var/adm/SPIlogs/css/out.top** file. This file lists all switch data connections with comment lines indicating the various types.

1. Check the entire **/var/adm/SPIlogs/css/out.top** file for errors before proceeding to the prioritized table.
2. Use the following prioritized table to service problems reported in the **/var/adm/SPIlogs/css/out.top** file. The messages are from comment lines preceding the error.

Notes:

- a. Be aware that wrap plugs or terminators used in the following steps can potentially fail; therefore, exercise caution before performing major replacements to make sure that a diagnostic wrap plug or terminator is not faulty.
- b. Where applicable, frame and switch assembly jack numbers are indicated on each line of the **out.top** file. (Refer to "Format structure" on page 2-1 for more information on the nomenclature.)

For example:

L01-S00-BH-J18	identifies Logical frame 1, S00-BH-J18
E02-S00-BH-J18	identifies Physical frame 2, S00-BH-J18
L03-N01	identifies Logical frame 3, Node 1

- E02-N04** identifies Physical frame 2, Node 4
- S01-S02-BH-J3** identifies Multi-switch frame 1, slot 2, BH-J3

Refer to notes at beginning of “Switch function (MAP 0620)” on page 1-22 for more information on cable connections and logical-to-physical frame translations.

- c. Be aware that for logical frames consisting of two physical frames, all **out.top** even-numbered nodes represent nodes physically located in the expansion frame (F/C 1010) but at the next lower slot number. For example, L01-N04 (logical frame 1, node 4) could be physically located at E02-N03 (physical frame 2, slot 3).

Priority	Message/Condition	Action
1	<ul style="list-style-type: none"> • “On board connections...” 	Go to “Step 0620–041” on page 1-42 to replace the switch assembly.
2	<ul style="list-style-type: none"> • “Primary node connection...” • “Node connections...” on same switch as primary node 	<ul style="list-style-type: none"> • If this is a standard node, go to “Step 0620–005” to check “primary” or “secondary” processor node connection. • If this is a dependent node (connection to router), go to “Dependent node (MAP 0630)” in <i>RS/6000 SP: System Service Guide</i>.
3	<ul style="list-style-type: none"> • “Wrapped ports” • “frame # to frame #” • “switch # to switch #” • “Switch connections...” 	Go to “Step 0620–021” on page 1-34 to check the wrapped port or external switch connection.
4	<ul style="list-style-type: none"> • “Node connections...” not on same switch as primary node. 	<ul style="list-style-type: none"> • If this is a standard node, go to “Step 0620–005” to check “secondary” processor node connection. • If this is a dependent node (connection to router), go to “Dependent node (MAP 0630)” in <i>RS/6000 SP: System Service Guide</i>.
5	<ul style="list-style-type: none"> • All problems in /var/adm/SPIlogs/css/out.top file have been addressed. 	Go to “Step 0620–043” on page 1-42.

Step 0620–005: The **/var/adm/SPIlogs/css/out.top** file indicates a problem with a “Primary node” or “Secondary node” connection.

1. Open frame rear cover and check the cable connection from the indicated switch assembly jack to the processor node.
2. Is there a cable connected to the indicated jack on the switch assembly?
 - If yes, go to “Step 0620–008” on page 1-28.
 - If no, go to “Step 0620–006.”

Step 0620–006: No cable connected at the indicated jack on the switch assembly (refer to the tables in “Switch data cables” on page 2-12).

1. Should there be a cable connecting the indicated jack to a processor node?
 - If yes:
 - a. Connect a switch data cable from this jack to the proper processor node.
 - b. Go to “Step 0620–043” on page 1-42.

Switch Function (MAP 0620)

- If no, go to “Step 0620–007” on page 1-28.

Step 0620–007: A switch cable is not required on the indicated jack.

1. Make sure a wrap plug is properly installed on the connector. Refer to Figure 1-2 on page 1-7 for views of the switch wrap plugs.
2. Have customer check (and update if necessary) the switch configuration file appropriately before continuing:
 - For code level 1.02 and higher, use the **Etopology** command.
3. Did you just correct a problem with a wrap plug or correct the switch configuration?
 - If yes, go to “Step 0620–043” on page 1-42.
 - If no, go to “Step 0620–041” on page 1-42 to service or replace the switch assembly.

Step 0620–008: You have a switch cable connected to the indicated jack on the switch assembly.

1. Check cable connection at switch assembly and processor node.
2. Does the cable appear to be fully connected at the switch assembly and the processor node?
 - If yes, go to “Step 0620–009.”
 - If no:
 - a. Fix the cable connection problem.
 - b. Go to “Step 0620–043” on page 1-42.

Step 0620–009: The cable appears to be fully connected at both the switch assembly and at the processor node.

1. From the front of the RS/6000 SP frame or from the control workstation, check the Power (green) LED on the processor node to make sure it is lit.
2. Is the Power (green) LED lit, indicating the processor node is powered on?
 - If yes, go to “Step 0620–011” on page 1-29.
 - If no, go to “Step 0620–010.”

Step 0620–010: The processor must be powered on for the switch to recognize the port.

1. Power on this processor node, and check the Power (green) LED.
2. Does the Power (green) LED stay lit, indicating the processor node is powered on?
 - If yes, go to “Step 0620–043” on page 1-42.
 - If no:
 - a. The processor node has a power problem.
 - b. Go to "Processor node diagnostics and descriptions (MAP 0130)" in *RS/6000 SP: System Service Guide* to fix problem.

Step 0620–011: The Power (green) LED is lit, indicating the processor node is powered on.

1. Run advanced diagnostics in service mode on device “css0” on this processor node and its associated switch port.

- Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide* and "Running diagnostics on a switch port" on page 3-13.

Notes:

- a. Advanced cable wrap tests will not run successfully for 15- and 20-meter SPS data cables. If 15- or 20-meter data cables are used, swap or change the suspected cable.
- b. Advanced “css0” diagnostics will require a male and a female wrap plug to perform the card wrap and cable wrap tests. When testing the SPS adapter, cable part number 46H9699 will also be required to perform card diagnostics. This cable is part of the SPS feature bill of materials.
- c. If unable to run diagnostics, reseal or replace the card.

2. Do you get a Service Request Number (SRN) from “css0” diagnostics?

- If yes:
 - a. An SRN was obtained from diagnostics.
 - b. Use the following SRN table (Table 1-9) to continue service.
 - c. After using Table 1-9, go to “Step 0620–012” on page 1-32.
- If no:
 - a. The diagnostics did not detect a problem, therefore the problem is in switch assembly.
 - b. Go to “Step 0620–041” on page 1-42.

Table 1-9 (Page 1 of 4). Service Request Number (SRN) Table for Switch Adapters

Service Request Number	SRN Source	Failing Component(s)	Description
762-100 through 762-199	D	SPS adapter software system or I/O planar	Problem detected with device or device data corrupted. You may need to reinstall “ssp.css” code.
762-200 through 762-299	D	external clock SPS adapter (wrap plug)	Problem detected with external clock.
762-2A0 through 762-2A9	D	SPS adapter	Problem detected with internal clock.
762-300 through 762-399	D	SPS adapter system or I/O planar	Problem detected with POS registers.
762-400 through 762-499	D	SPS adapter software	TBIC test failed.
762-500 through 762-599	D	SPS adapter	SRAM test failed.
762-600 through 762-699	D	SPS adapter	Microprocessor test failed.

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Table 1-9 (Page 2 of 4). Service Request Number (SRN) Table for Switch Adapters

Service Request Number	SRN Source	Failing Component(s)	Description
762-700 through 762-799	D	SPS adapter	Interrupt test failed.
762-800 through 762-899	D	SPS adapter	FIFO test failed.
762-900 through 762-999	D	SPS adapter I/O planar data cable	DMA engine test failed.
762-Ax3 (See note)	D	SPS adapter (terminator)	Card wrap test failed.
762-Ax4 (See note)	D	SPS data cable (wrap plug)	Cable wrap test failed.
763-1xx (See note)	D	SPS MX adapter software system or I/O planar	Problem detected with a device or device data corrupted. Note: You may need to reinstall ssp.css software.
763-200 through 763-299 (except 763-282)	D	ext clock SPS MX adapter wrap plug	Problem detected with the external clock (SP switch).
763-282	D	switch cable	Adapter is good but switch cable is not attached.
763-2A0 through 763-2A9	D	SPS MX adapter	Problem detected with the internal clock.
763-3xx (See note)	D	SPS MX adapter system or I/O planar	Problem detected with POS registers.
763-4xx (See note)	D	SPS MX adapter software	TBIC test failed.
763-5xx (See note)	D	SPS MX adapter	SRAM test failed.
763-6xx (See note)	D	SPS MX adapter	Microprocessor test failed.
763-7xx (See note)	D	SPS MX adapter	Interrupt test failed.
763-8xx (See note)	D	SPS MX adapter	FIFO test failed.
763-9xx (See note)	D	SPS MX adapter switch cable system or I/O planar	DMA engine test failed.
763-Ax3 (See note)	D	SPS MX adapter (terminator)	Card wrap test failed.

Table 1-9 (Page 3 of 4). Service Request Number (SRN) Table for Switch Adapters

Service Request Number	SRN Source	Failing Component(s)	Description
763-Ax4 (See note)	D	switch cable (wrap plug)	Cable wrap test failed.
763-xx2 (See note)	D	SPS MX adapter	Bad adapter (except SRN 763-282).
763-xx3	D	SPS MX Adapter	Bad adapter.
763-xx4	D	SPS MX Adapter Switch Cable	Bad switch cable.
764-1xx (See note)	D	SP System Attachment Adapter software system or I/O planar	Problem detected with a device or device data corrupted. Note: You may need to reinstall ssp.css software.
764-200 through 764-299 (except 764-282)	D	ext clock SP System Attachment Adapter wrap plug	Problem detected with the external clock (SP switch).
764-282	D	switch cable	Adapter is good but switch cable is not attached.
764-2A0 through 764-2A9	D	SP System Attachment Adapter	Problem detected with the internal clock.
764-3xx (See note)	D	SP System Attachment Adapter system or I/O planar	Problem detected with POS registers.
764-4xx (See note)	D	SP System Attachment Adapter software	TBIC test failed.
764-5xx (See note)	D	SP System Attachment Adapter	SRAM test failed.
764-6xx (See note)	D	SP System Attachment Adapter	Microprocessor test failed.
764-7xx (See note)	D	SP System Attachment Adapter	Interrupt test failed.
764-8xx (See note)	D	SP System Attachment Adapter	FIFO test failed.
764-9xx (See note)	D	SP System Attachment Adapter switch cable system or I/O planar	DMA engine test failed.
764-Ax3 (See note)	D	SP System Attachment Adapter (terminator)	Card wrap test failed.
764-Ax4 (See note)	D	switch cable (wrap plug)	Cable wrap test failed.
764-xx2 (See note)	D	SP System Attachment Adapter	Bad adapter (except SRN 764-282).
764-xx3	D	SP System Attachment Adapter	Bad adapter.

Switch Function (MAP 0620)

<i>Table 1-9 (Page 4 of 4). Service Request Number (SRN) Table for Switch Adapters</i>			
Service Request Number	SRN Source	Failing Component(s)	Description
764-xx4	D	SP System Attachment Adapter Switch Cable	Bad switch cable.
80x-762	D	Software SPS Adapter	Error occurred while running the diagnostics.
Note: An 'x' in an SRN indicates a "don't care" digit.			

Step 0620–012: An SRN was obtained and Table 1-9 on page 1-29 was used to determine the list of possible failing components.

1. From the list of possible failing components, use the following prioritized table (Table 1-10) to perform service.

<i>Table 1-10 (Page 1 of 2). Switch Problem Priority Listing</i>		
Priority	Failing Component	Action
1	Software	<ol style="list-style-type: none"> 1. Have customer verify that the software is configured and operating correctly for this processor node/system. 2. If no problem is found, continue with next highest priority item in the list for this SRN. 3. Otherwise, power off this processor node and continue service at "Step 0620–017" on page 1-34.
2	External clock	<ol style="list-style-type: none"> 1. Check to see if a switch clock cable is connected at switch adapter of this processor node. 2. If clock cable exists, reseal switch clock cable; otherwise reseal switch data cable. 3. Run advanced diagnostics on the device "css0" and its associated switch port. 4. If diagnostics fail with the previous SRN, check at least one other processor node for indication of a clock problem. If necessary, run advanced diagnostics on this other node, using the device "css0" and its associated switch port. 5. If more than one node has a clock problem, go to "Step 0620–013" on page 1-33. 6. Replace the switch clock cable or switch data cable that was just reseated in step 2 above. 7. Continue service at "Step 0620–018" on page 1-34.
3	Data cable	<ol style="list-style-type: none"> 1. Reseat switch data cable at switch adapter of this processor node. 2. Run advanced diagnostics on the device "css0" and its associated switch port. 3. If diagnostics fail with the previous SRN, replace switch data cable. 4. Continue service at "Step 0620–018" on page 1-34.

Table 1-10 (Page 2 of 2). Switch Problem Priority Listing		
Priority	Failing Component	Action
4	SPS Adapter SP System Attachment Adapter	<ol style="list-style-type: none"> 1. Replace the switch adapter card on this processor node. 2. Reconnect all cables to the processor node. 3. Continue service at "Step 0620-018" on page 1-34. <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>
5	System or I/O planar	<ol style="list-style-type: none"> 1. Run advanced diagnostics on the "Base System" or I/O planar. If a problem is detected, use SRN to service. 2. Replace the system or I/O planar on this processor node. Make sure to reinstall all parts and cables. 3. Reconnect all cables to the processor node. 4. Continue service at "Step 0620-018" on page 1-34.
6	Wrap plug or Terminator	Check the wrap plug or terminator again to make sure that it is not at fault.
7	All components replaced.	Call next level of support.

Step 0620-013: An SRN listed in Table 1-9 on page 1-29 indicated that you have a switch clock problem and Priority 2 in Table 1-10 on page 1-32 directed you to this step.

1. Check the switch clock selections on the "problem" switches .
2. Do the clock settings on the "problem" switch assemblies appear to be okay?
 - If yes, go to "Step 0620-014."
 - If no
 - a. Change the clock selections on the appropriate switches (refer to "Selecting appropriate switch clocks" on page 3-7).
 - b. Go to "Step 0620-043" on page 1-42 to verify fix.

Step 0620-014: The clock settings on the "problem" switch assemblies appear to be okay.

1. Is an external clock selected?
 - If yes, go to "Step 0620-016" on page 1-34.
 - If no, go to "Step 0620-015."

Step 0620-015: An external clock **is not** selected. This indicates that you have a defective master clock card.

1. Is this the only switch in this system?
 - If yes:
 - a. Replace the switch assembly.
 - b. Go to "Step 0620-043" on page 1-42 to verify fix.
 - If this **is not** the only switch in this system, go to "Step 0620-016" on page 1-34.

Switch Function (MAP 0620)

Step 0620–016: The system you are working on either has an external clock or the system uses more than one switch.

1. Have the customer select an alternate clock (via the **Eclock** command).
2. Issue the **Estart** command.
3. Does the switch run?
 - If yes, go to “Step 0620–018.”
 - If no:
 - a. Replace the switch assembly.
 - b. Go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–017: An SRN listed in Table 1-9 on page 1-29 indicated that you have a software problem and Priority 1 in Table 1-10 on page 1-32 directed you to this step.

1. From the node front panel on the control workstation, put the node in the SERVICE mode.
2. Power-on this processor node.
3. Go to “Step 0620–018.”

Step 0620–018: At this point, you must run the advanced diagnostics in service mode on the device “css0” and its associated switch port.

1. Did you get an SRN from the diagnostics?
 - If yes, go to “Step 0620–020.”
 - If no, go to “Step 0620–019.”

Step 0620–019: Since the diagnostics did not return an SRN, no problem was detected.

1. Have you just reseated, repaired, or replaced a component?
 - If yes, go to “Step 0620–043” on page 1-42 to verify fix.
 - If no:
 - a. Problem is in the switch assembly.
 - b. Go to “Step 0620–041” on page 1-42 to service or replace switch assembly.

Step 0620–020: The advanced diagnostics returned an SRN indicating that the diagnostics detected a problem.

1. Is this SRN the same as the previous SRN?
 - If yes, go to “Step 0620–011” on page 1-29 to perform service on the next highest priority component in the list for this SRN.
 - If no, go to “Step 0620–012” on page 1-32 to service the new SRN.

Step 0620–021: An error message in the `/var/adm/SPIlogs/css/out.top` file indicated that you either have an external switch connection problem or a problem with a wrapped port. Priority 3 in Table 1-8 on page 1-27 directed you to this step.

1. Check the specified jacks at rear of switch assemblies for an obvious problem such as a loose connection.
2. Pay special attention to cables that may have been moved recently.

3. Do connections appear to be okay?
 - If yes, go to “Step 0620–022.”
 - If no:
 - a. Fix the obvious connection problem.
 - b. Go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–022: The `/var/adm/SPlogs/css/out.top` file indicated a switch problem and all connection appeared to be okay.

Note: Be aware that in large systems, connections for switch assemblies not in the multi-switch frame are usually scattered throughout the `out.top` file.

1. If this is a **multi-frame system**, check the indicated jacks against the wiring charts for multi-frame switch systems.
2. Is this a multi-frame system with problems reported on all switch data cables from one or more switches?
 - If yes:
 - a. The problem may be caused by clocking or grounding between frames.
 - b. Go to “Step 0620–024” on page 1-36.
 - If no, go to “Step 0620–023.”

Step 0620–023: Some but not all switch data cables appear to be having problems.

1. Depending on whether the problem is a **wrapped port** or a **switch-to-switch** connection, perform one of the following steps:
 - **wrapped port** (wrap plug installed): Remove the existing wrap plug. Install a different wrap plug on the jacks indicated.
 - **switch-to-switch** connection: Disconnect the switch data cable from both ports indicated. Install wrap plugs on the jacks indicated.

Note: When unplugging the two ends of the suspect cable, check `/var/adm/SPlogs/css/out.top` to verify only two (2) ports were lost. If four (4) ports were lost, then two cables were swapped across that switch to switch connection. Connect the cables correctly and check `/var/adm/SPlogs/css/out.top` for any other errors.
2. If this is a **switch-to-switch** connection, have customer update the switch configuration file appropriately (to show wrap plugs) before continuing:
 - For code level 1.02 and higher, use the **Etopology** command.
3. Make sure processor nodes that were put in “Service” mode are returned to “Normal” mode. Make sure all processor nodes are IPLed completely.
4. Have customer verify that the switch code is running on all processor nodes.
5. From the control workstation of the “primary” processor node, type **Estart** followed by **ENTER**.
6. Check `/var/adm/SPlogs/css/out.top` file for problems regarding the jacks indicated.
7. Does `out.top` file show a problem on any jacks indicated?
 - If yes:
 - a. Problem is in the switch assembly which is still reporting a problem.
 - b. Go to “Step 0620–041” on page 1-42 to service or replace the switch assembly.

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- If no:
 - a. If this is a **switch-to-switch** connection, remove both wrap plugs from the switch assemblies.
 - b. Replace the frame-to-frame switch data cable that was disconnected before.
 - c. Go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–024: Problem reported with all switch data cables from one or more frames. This may be caused by a clocking or grounding problem between frames.

Note: The “**master-clock**” **switch** indicates the switch which is supplying the master clock for the system—the master clock will have the clock input multiplexor set to “internal clock” (0). A “**problem**” **switch** indicates any switch which is experiencing problems.

1. Check the switch clock selections on the “problem” switches (refer to “Selecting appropriate switch clocks” on page 3-7).
2. Do the clock settings on the “problem” switch assemblies appear to be okay?
 - If yes, go to “Step 0620–025.”
 - If no:
 - a. Change the clock selections on the appropriate switches (refer to “Selecting appropriate switch clocks” on page 3-7).
 - b. Go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–025: The clock settings on the “problem” switch assemblies appear to be okay.

1. Is the problem switch in a frame with processor nodes?
2.
 - If yes, go to “Step 0620–032” on page 1-39.
 - If no, go to “Step 0620–026.”

Step 0620–026: Problem switch is in a switch frame (contains switches only, no processor nodes).

1. From Perspectives on the control workstation, open the Switch Front Panel window for this switch.
2. Check the clock selection to see if it is set to Internal or to one of the following external clocks:
 - **For SP switch types:** “Jack3”, “Jack4”, or “Jack5”.
3. Is the clock selection set to one of the External clocks?
 - If yes, go to “Step 0620–027” on page 1-37.
 - If no:
 - a. The problem switch is providing the master clock for the system.
 - b. Have customer use the **Eclock** command to select a different master clock for the system.
 - c. Go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–027: The clock selection is set to one of the External clocks.

1. Select a different external clock for this switch assembly.
2. From the control workstation of the primary node reinitialize the switch by entering:

Estart

3. Check **/var/adm/SPlogs/css/out.top** file to see if problems are still reported on all data cables connected to this switch assembly.
4. Have some of the problems reported on data cables connected to this switch assembly been resolved?
 - If yes, go to “Step 0620–029.”
 - If no, go to “Step 0620–028.”

Step 0620–028: None of the problems reported on data cables connected to this switch assembly been resolved by selecting a different external clock. This indicates a probable problem with switch clock card or switch planar in this switch assembly.

1. Replace the clock card in this switch assembly.
2. Make sure to reconnect all cables connected to the clock card.
3. Reconnect cables S00-BH-J1, S00-BH-J2, S00-BH-J3, S00-BH-J5, and S00-BH-J7 at tailgate of this switch assembly.
4. Set the switch clock selection on this switch assembly to the original (correct) setting.
5. From the control workstation of the primary node reinitialize the switch by entering:

Estart

6. Check **/var/adm/SPlogs/css/out.top** file to see if problems are still reported on all data cables connected to this switch assembly.
7. Are there still problems reported on all data cables connected to this switch assembly?
 - If yes:
 - a. You have a problem with switch planar.
 - b. Go to “Step 0620–041” on page 1-42 to replace switch assembly.
 - If no:
 - a. Clock problem resolved for this switch assembly.
 - b. Go to “Step 0620–042” on page 1-42.

Step 0620–029: Some of the problems reported on data cables connected to this switch assembly been resolved by selecting a different external clock. This indicates a probable problem with the original external clock source.

1. Based on the original external clock selection, locate the frame which was sourcing the switch clock.
2. Locate a “test” processor node in this frame which can be used for service.
3. Disconnect the switch data cable for this processor node at the tailgate of the switch assembly.
4. Using the switch cabling list, locate the switch data cable at the frame containing the processor node. One of the following cables sources the clock to the failing switch assembly:
 - S00-BH-J3
 - S00-BH-J5

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- S00-BH-J7
 - S00-BH-J9
5. Disconnect the switch data cable at the tailgate of the frame containing the processor node.
 6. Connect the end of the processor node data cable to the jack.
 7. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform the cable wrap test.**
 - Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide*.
 8. Look for an SRN indicating a clock problem (such as “External clock”).
 9. Do the “css0” diagnostics fail with an indication of a clock problem?
 - If yes, go to “Step 0620–031.”
 - If no, go to “Step 0620–030.”

Step 0620–030: The “css0” diagnostics **do not** fail with an indication of a clock problem. This indicates that the problem is either in a cable or in the reported switch assembly.

1. Replace switch data cable that originally supplied the switch clock to the failing switch assembly.
2. Set the switch clock selection on this switch assembly to the original (correct) setting.
3. From the control workstation of the primary node reinitialize the switch by entering:

Estart

4. Check `/var/adm/SPlogs/css/out.top` file to see if problems are still reported on all data cables connected to this switch assembly.
5. Are there still problems reported on all data cables connected to this switch assembly?
 - If yes:
 - a. You have isolated the clock problem to the reported switch assembly.
 - b. Return to “Step 0620–028” on page 1-37.
 - If no:
 - a. Clock problem resolved for this switch assembly.
 - b. Go to “Step 0620–042” on page 1-42.

Step 0620–031: The “css0” diagnostics **fail** with an indication of a clock problem. This indicates that there is a problem with switch clock source switch assembly.

1. Replace clock card in the clock source switch assembly.
2. Make sure to reconnect all cables connected to the clock card.
3. Set the switch clock selection on this switch assembly to the original (correct) setting.
4. Return to “Step 0620–028” on page 1-37.

Step 0620–032: The clock settings on the problem switch appear to be okay and the problem switch is mounted in a frame that also contains processor nodes.

1. Check the ground straps connected to the “problem” frames.
 - Ground straps are connected at bolts near the cable escapes inside the bottom rear of each frame.
 - For a view of a ground strap connection, refer to “RS/6000 SP Installation Instructions”, in *IBM RS/6000 SP: Maintenance Information Volume 1, Installation and Relocation*.
2. Do all ground straps connecting the frames make adequate contact at both ends?
 - If yes, go to “Step 0620–033.”
 - If no:
 - a. Fix or replace ground strap between the frames.
 - b. Go to “Step 0620–043” on page 1-42.

Step 0620–033: All ground straps connecting the frames make adequate contact at both ends.

1. Disconnect clock source data cable at S00-BH-J3, J5, J7, or J9, then reconnect to switch assembly. (This is done to eliminate clocking noise from cable.)
2. Find a processor node in the “problem” frame which is usable for service. This will be used as the “test” processor node.
3. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform cable wrap test.**
 - Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide*.
4. Look for an SRN indicating a clock problem, such as “External clock” being listed as one of the failing components.

Note: Do not exit from diagnostics at this time, as it may be used in the following steps.
5. Do the “css0” diagnostics fail with an indication of a clock problem?
 - If yes, go to “Step 0620–036” on page 1-40.
 - If the diagnostics **did not** fail with an indication of a clock problem:
 - a. If this the first time at this step, go to “Step 0620–034.”
 - b. If this the second time through this step, go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–034: The first time you went through “Step 0620–033,” the diagnostics **did not** fail with an indication of a clock problem.

1. Disconnect the switch data cable corresponding to the selected clock at the switch assembly.
2. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform cable wrap test.**
 - Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide*.
3. Look for an SRN indicating a clock problem, such as “External clock” being listed as one of the failing components.

Note: Do not exit from diagnostics at this time, as it may be used in the following steps.
4. Do the “css0” diagnostics fail with an indication of a clock problem?

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- If yes:
 - a. Problem is not in the switch assembly.
 - b. Replace the switch data cable corresponding to the selected clock, reconnecting it at both switch assemblies.
 - c. Go to “Step 0620–040” on page 1-41.
- If no, go to “Step 0620–035.”

Step 0620–035: The “css0” diagnostics **did not** fail with an indication of a clock problem. This indicates that the problem is related to the clock selection in this switch assembly.

1. Replace the clock card in this switch assembly.
 - Make sure to connect all cables connected to the clock card.
2. Reinstall only the two switch data cables which are not selected and the switch data cable to the “test” processor node.
 - Do not connect the remaining switch data cables at this time.
3. Reconnect cables S00-BH-P1 and S00-BH-P2 at the rear of the switch assembly.
4. Put the switch assembly's circuit breaker into the On ('1') position.
5. Set the switch clock selections on the “problem” switches (refer to “Selecting appropriate switch clocks” on page 3-7).
6. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform cable wrap test.**
 - Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide*.
7. Look for an SRN indicating a clock problem, such as “External clock” being listed as one of the failing components.

Note: Do not exit from diagnostics at this time, as it may be used in the following steps.
8. Do the “css0” diagnostics fail with an indication of a clock problem?
 - If yes, the clock problem is resolved. Go to “Step 0620–043” on page 1-42 to verify fix.
 - If no, go to “Step 0620–041” on page 1-42 to replace the problem switch assembly.

Step 0620–036: The “css0” diagnostics failed at “Step 0620–033” on page 1-39 and indicated a clock problem.

1. Record current clock setting for the switch (internal/external).
2. From the control workstation, select the internal clock for this switch assembly.
3. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform cable wrap test.**
 - Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide*.
4. Look for an SRN indicating a clock problem, such as “External clock” being listed as one of the failing components.
5. Do the “css0” diagnostics fail with indication of a clock problem?
 - If yes, go to “Step 0620–037” on page 1-41.
 - If no, go to “Step 0620–037” on page 1-41.

Step 0620–037: You have run the “css0” diagnostics.

1. At the switch assembly, check the data cable interposer (if present) and the switch data cable corresponding to the original external clock selection for any obvious problem such as a loose cable connection or swapped cables.
2. Determine which connection is the other end of the switch data cable checked in the step above.
 - Refer to Appendix A in *RS/6000 SP: Maintenance Information Volume 1*.
3. Check the switch data cable at the other switch assembly for any obvious problem such as a loose cable connection or swapped cables.
4. Do the switch data cables and any data cable interposers appear to be okay?
 - If yes, go to “Step 0620–038.”
 - If no:
 - a. Fix the obvious cable connection problem.
 - b. Go to “Step 0620–043” on page 1-42 to verify fix.

Step 0620–038: The switch data cables and the data cable interposers appear to be okay.

1. If this is an SP type switch assembly, swap the data cable with another one at S00-BH-J3, S00-BH-J4, or S00-BH-J5.
2. To provide a good clock, swap the SP type switch data cable at the switch assembly with another one.
3. Reset the clock setting to that recorded in “Step 0620–036” on page 1-40.
4. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform cable wrap test.**
 - Refer to “Running diagnostics in a processor node” in *RS/6000 SP: System Service Guide*.
5. Look for an SRN indicating a clock problem, such as “External clock” being listed as one of the failing components.
6. Do the “css0” diagnostics fail with indication of a clock problem?
 - If yes:
 - a. Problem is the clock selection in this switch assembly.
 - b. Return to “Step 0620–035” on page 1-40.
 - If no, go to “Step 0620–039.”

Step 0620–039: The “css0” diagnostics **did not** fail. This indicates that the problem is not in this switch assembly.

1. Return all cables to their original positions.
2. Return to “Step 0620–034” on page 1-39.

Step 0620–040: The clock settings on the problem switch appear to be okay and the problem switch is mounted in a frame that also contains processor nodes. The ground straps appeared to be okay so you set up a test processor node and went through the “css0” advanced diagnostics. The diagnostics passed on the first run through so you disconnected the switch data cable and ran the diagnostics a second time. On the second run, the diagnostics failed. This indicated that the problem was not in the switch assembly.

1. Make certain that you replaced the switch data cable corresponding to the selected clock at both switch assemblies.

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2. Run advanced diagnostics on “css0” on the “test” processor node and its associated switch port.
 - **Do not perform cable wrap test.**
 - Refer to "Running diagnostics in a processor node" in *RS/6000 SP: System Service Guide*.
3. Look for an SRN indicating a clock problem, such as “External clock” being listed as one of the failing components.
4. Do the “css0” diagnostics fail with indication of a clock problem?
 - If yes, go to “Step 0620–041.”
 - Replace the “master-clock” switch assembly.
 - If no:
 - a. Interframe clock problem resolved.
 - b. Go to “Step 0620–043” to verify fix.

Step 0620–041: You have determined that there is a problem in the switch assembly and that you need to replace the switch assembly.

1. Put the switch assembly's circuit breaker into the Off ('0') position.
2. Disconnect all switch data cables (also clock cables and data cable interposers, if present) from the bulkhead of the switch assembly.
3. Replace the switch inner chassis.
4. Replace the switch planar.
5. Reinstall all cables inside the switch assembly.
6. Reinstall the top cover.
7. Reinstall the switch assembly.
8. Go to “Step 0620–042.”

Step 0620–042: You have replaced switch components and need to complete a final check before verifying the fix.

1. Be careful to reconnect all cables according to the appropriate wiring chart or labels, and put wrap plugs on any unused data ports (S00-BH-J3 through S00-BH-J34).
2. Put the switch assembly's circuit breaker into the On ('1') position.
3. Go to “Step 0620–043” to verify fix.

Step 0620–043: You have replaced switch components and need to verify that the problem has been fixed.

1. Make sure any processor node(s) that was put in **SERVICE** mode is returned to **NORMAL** mode. Make sure all processor node(s) are IPLed completely in **NORMAL** mode.
2. If any processor nodes that lost switch clocks before or during service (due to unplugging node data/clock cable, loss of clock at switch assembly connected to processor nodes, or so on), you will need to include them in the following command. From the control workstation, enter:

```
dsh -w nodelist /usr/lpp/ssp/css/css_restart_node
```

OR, if all processor nodes have lost switch clocks, enter:

```
dsh -a /usr/lpp/ssp/css/css_restart_node
```

where *nodelist* is a list of node names separated by commas.

Example:

```
dsh -w fr2n03,fr2n04,fr3n01 /usr/lpp/ssp/css/css_restart_node
```

Attention: Issuing this command on processor nodes that did *not* lose a clock may cause unpredictable results, possibly requiring relPL.

3. Have customer verify that the switch code is running on all processor nodes **OR** from the control workstation, enter:

Estart

4. Check **/var/adm/SPlogs/css/out.top** file.
5. Go to “Step 0620–001” on page 1-22 to verify that there are no other switch problems.

Switch Function (MAP 0620)

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

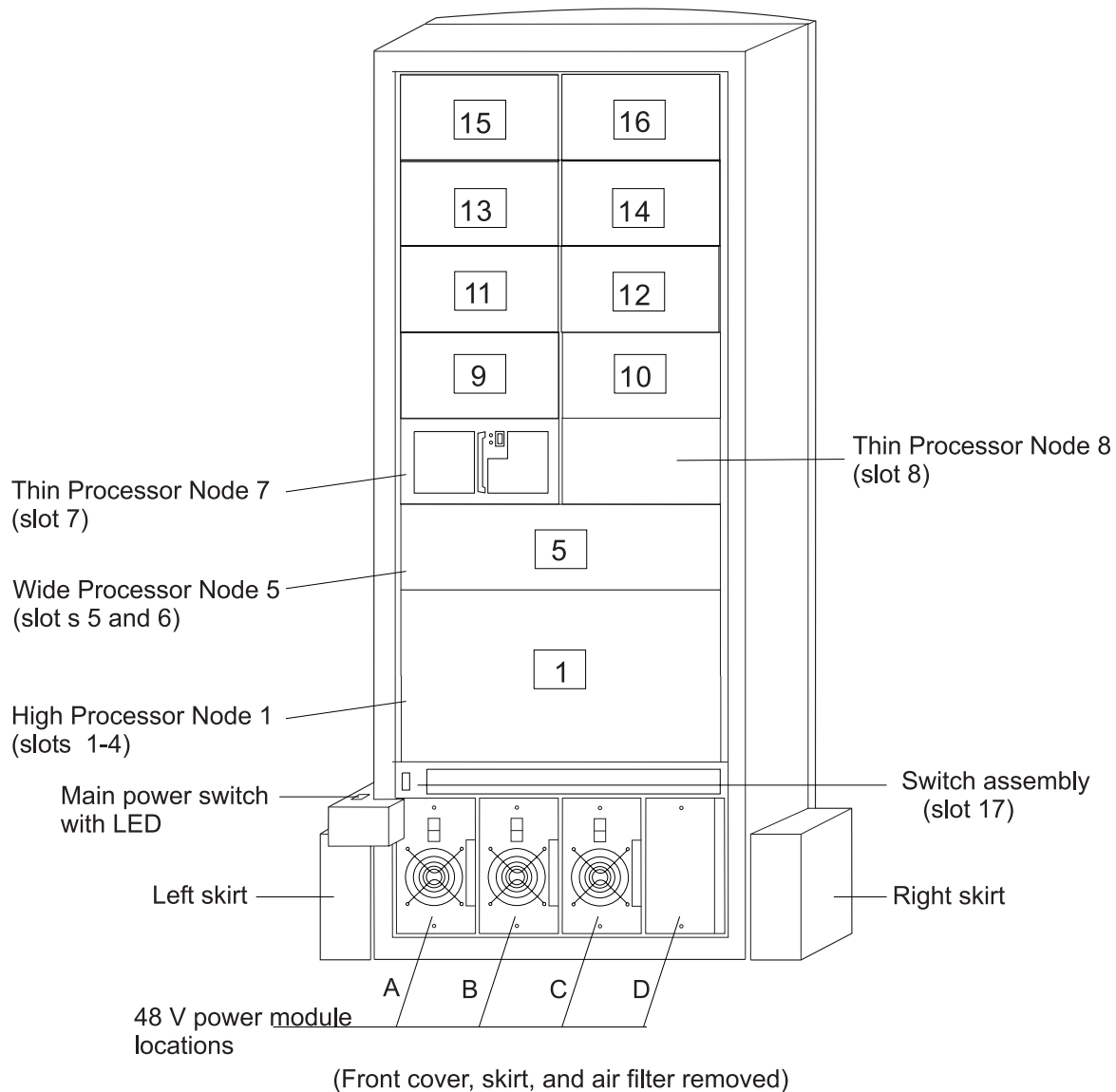


Figure 2-1. Front view of frame locations. See notes below.

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.

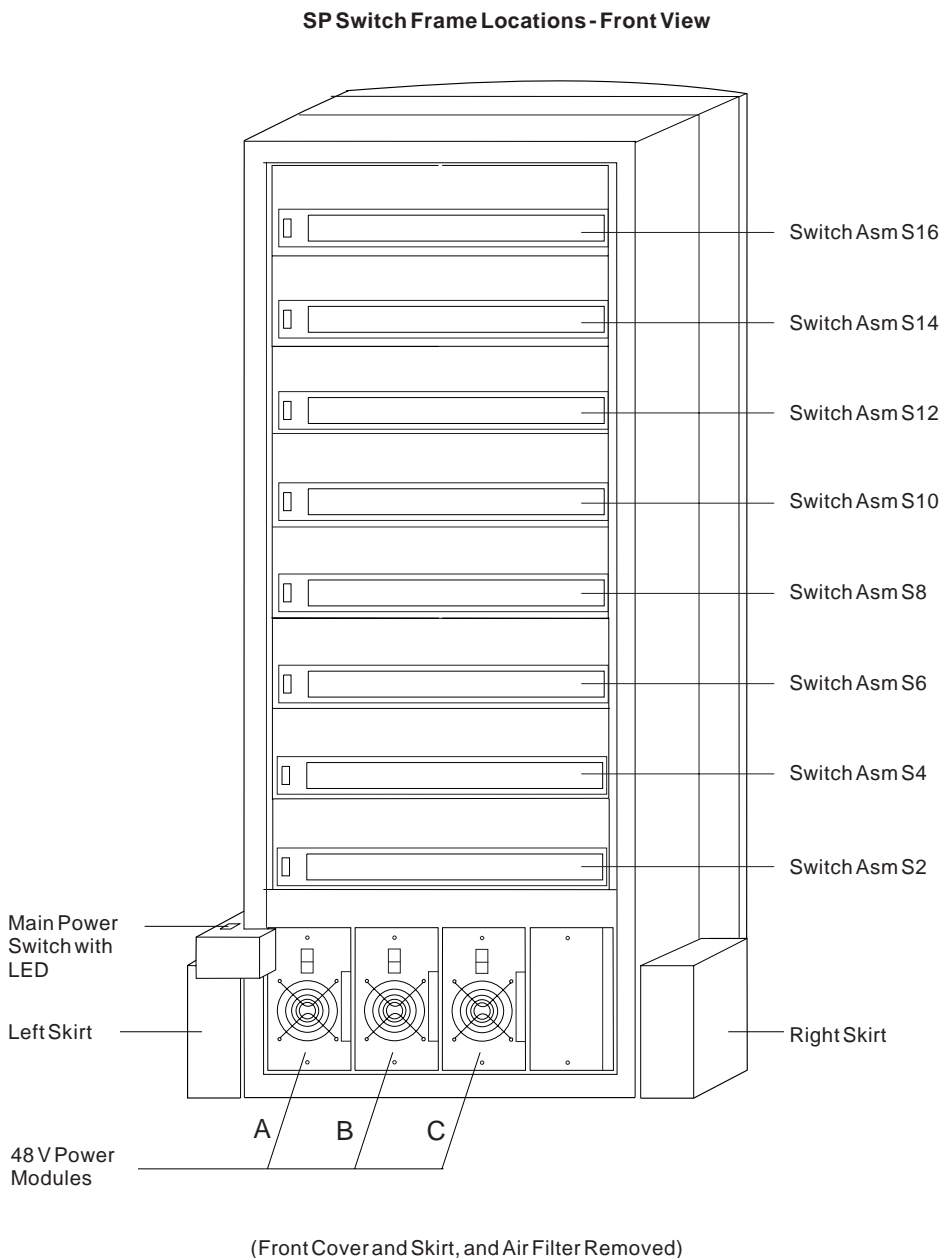


Figure 2-2. Front view of multi-switch frame locations

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

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

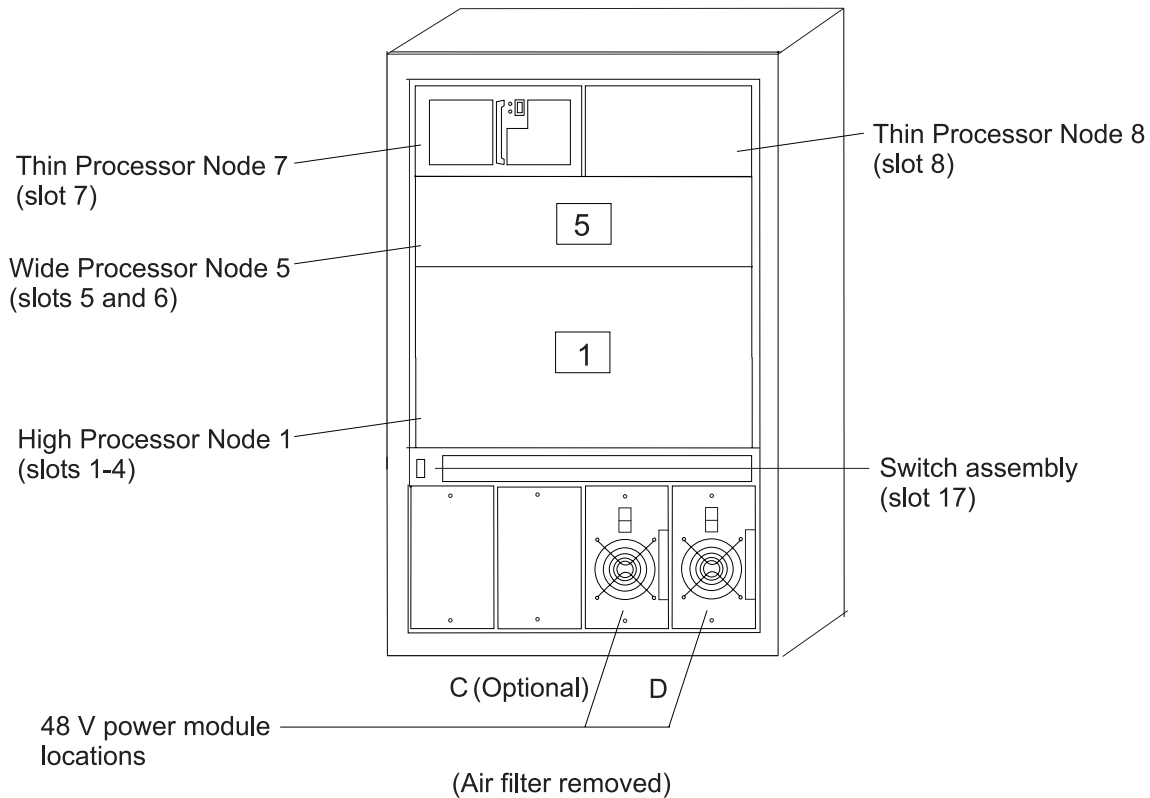


Figure 2-3. Front view of 49-inch frame locations. See notes below.

Figure notes:

1. Wide processor nodes take up an entire shelf position (two thin processor node slots). They are identified by the odd numbered position.
2. In a F/C 2030/1 frame, switch assemblies take up an entire shelf partition. (They are identified by the even-numbered position.)
3. Processor node slots are numbered up to N8.
4. The single-phase SEPBU power unit must have a power module in position “D” (right-most slot). For N+1 operation, a power module may be installed in position “C” (next to slot “D”).
5. There are no skirts on the 49-inch frame.
6. A High node or SMP High node takes up 2 shelf positions (slots). It is identified by the least odd number position of the occupied slots.
7. The switch assembly is not available in the 1.4 m frame.

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

SP Frame Locations - Rear View

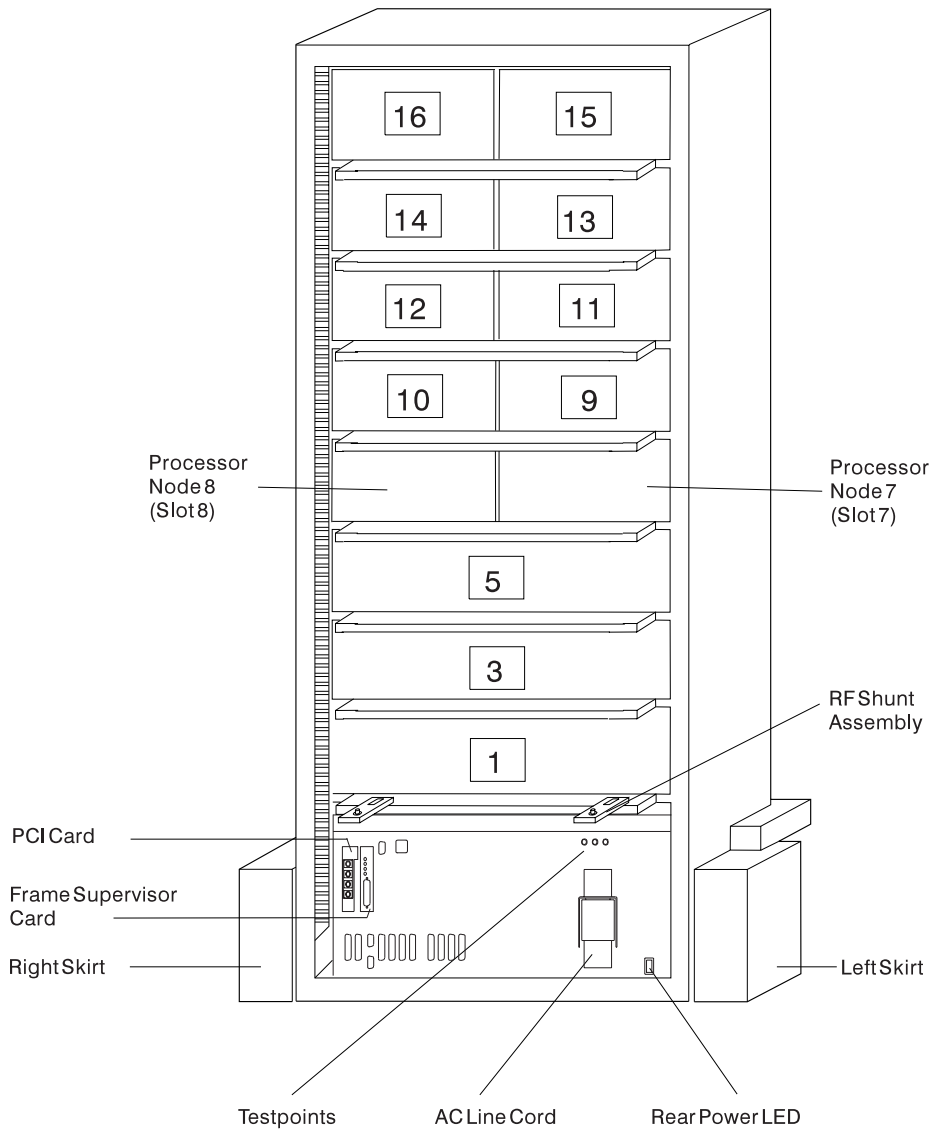


Figure 2-4. Rear view of frame locations

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

Frame locations

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

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

- G1: Right-hand rear ground
- G2: Left-hand rear ground
- G3: PDU ac ground
- G4: PDU dc ground

G5: Input cable ground
G6: Front door ground
G7: Rear door ground
G8: Ground
SW: Power-on switch
LD: LED card
FC: Front cover
RC: Rear cover

Example: E01-FRA-G1

Switch assembly locations

The following figures show the SP Switch assembly:

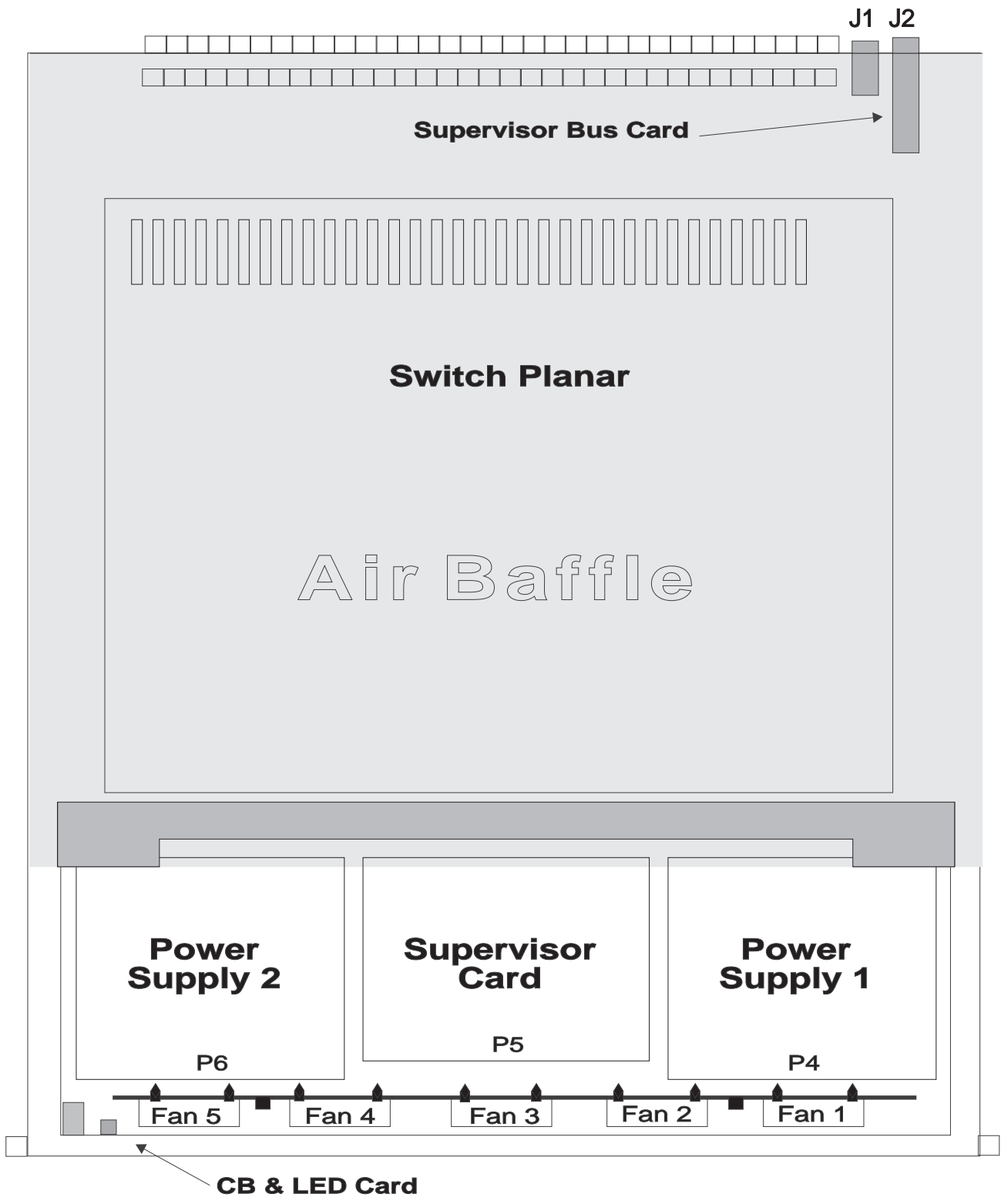


Figure 2-5. SPS/SPS-8 assembly

Connector details

Figure 2-6 on page 2-9 shows RS/6000 SP component connector details.

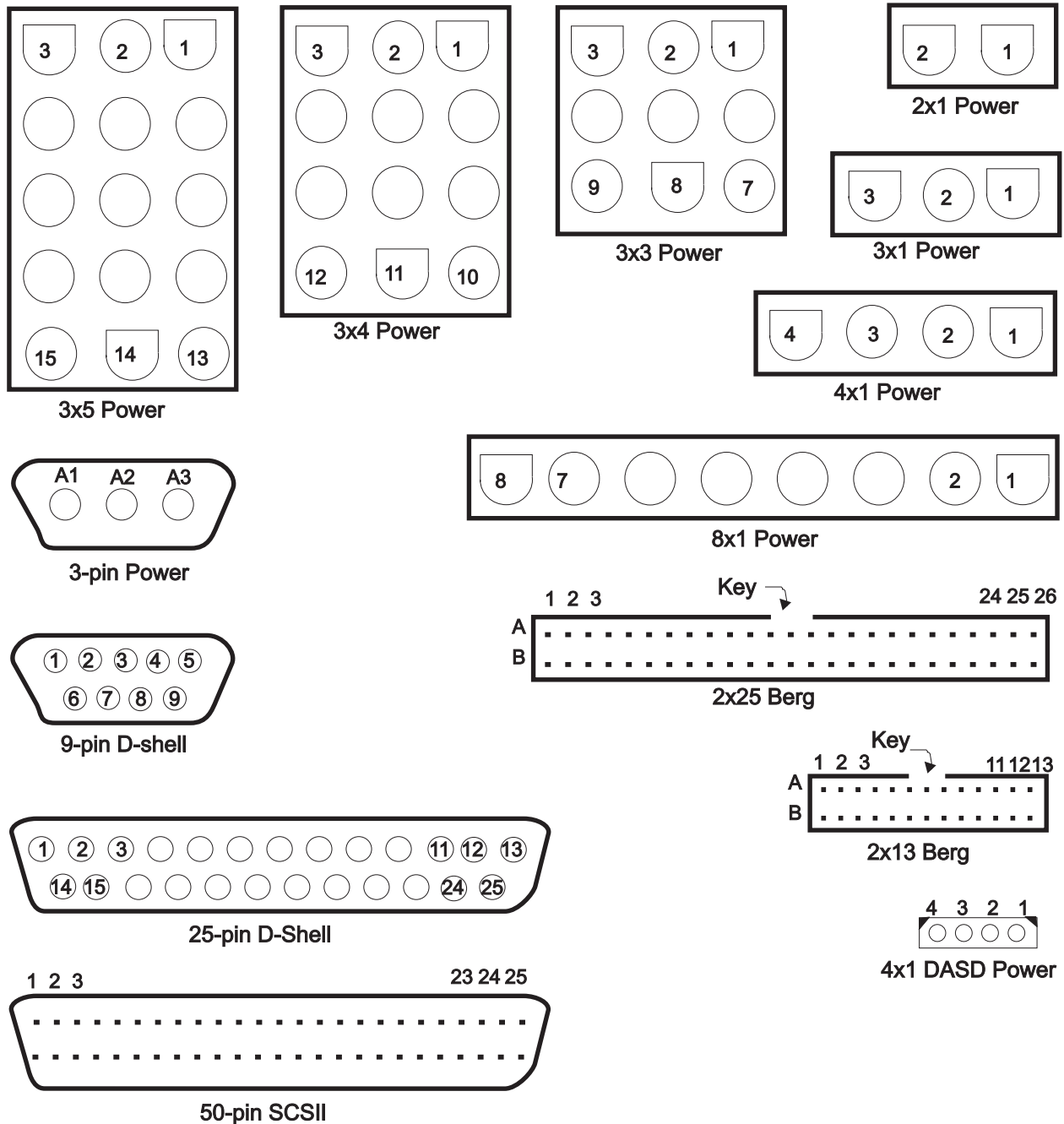


Figure 2-6. RS/6000 SP connector details (as seen at receiving ends, not at cable ends)

Cable routing

Figure 2-7 on page 2-10 and Figure 2-8 on page 2-10 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.

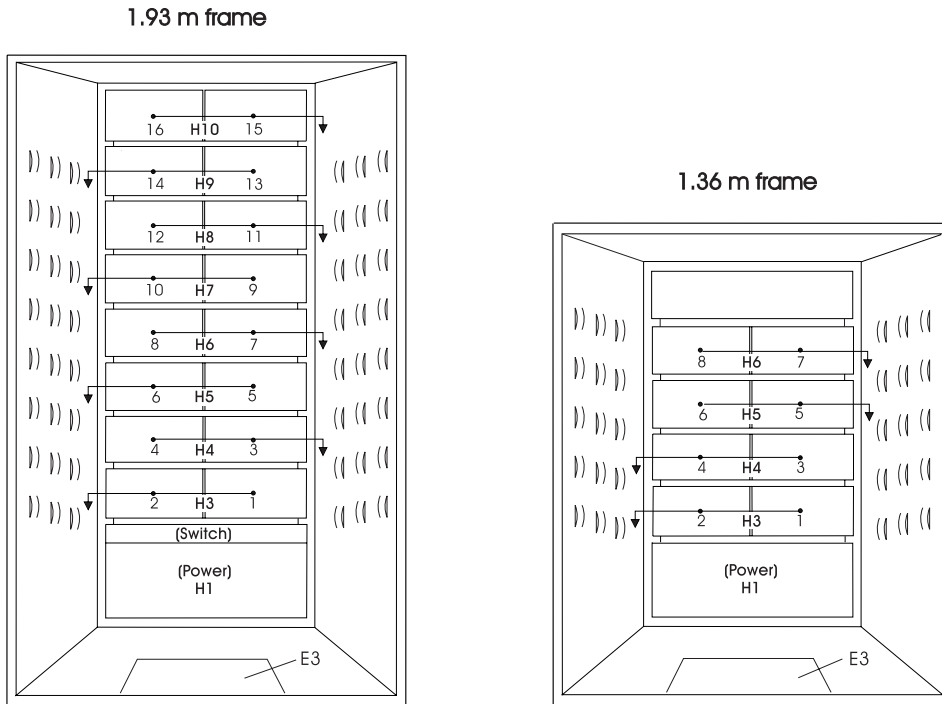


Figure 2-7. Frame cabling routing path in rear of RS/6000 SP frame — 1.93 m frame

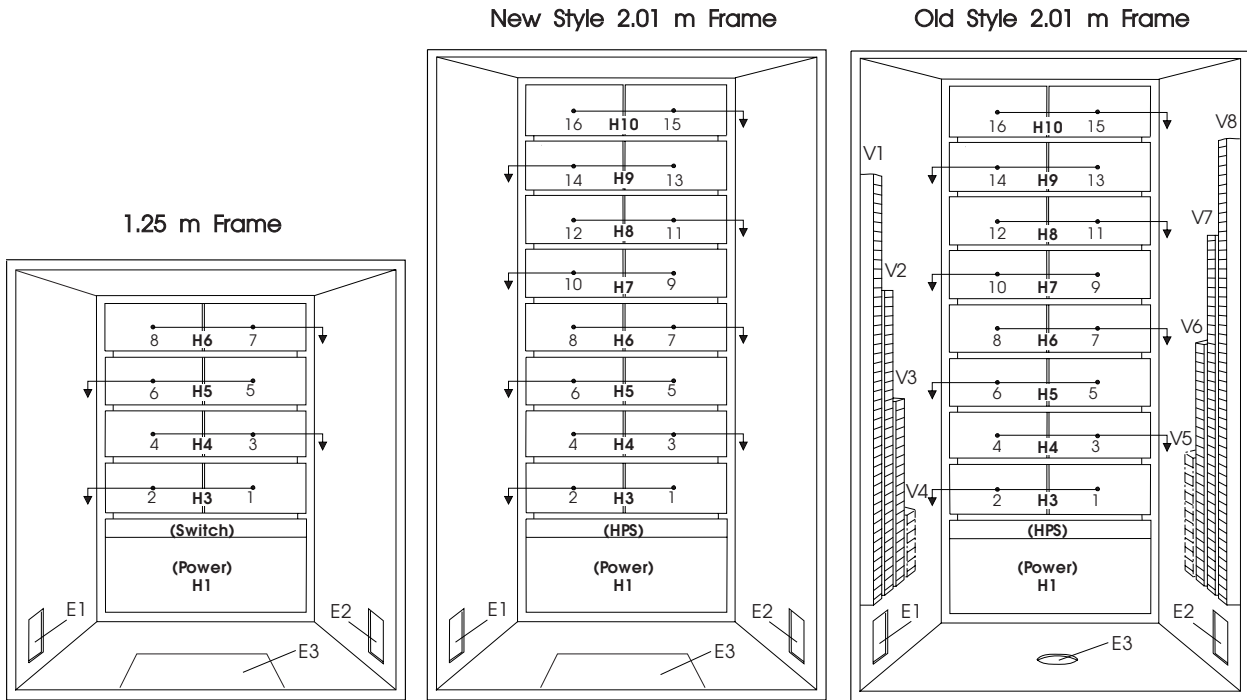


Figure 2-8. Frame cabling routing path in rear of RS/6000 SP frame — 2.01 m frame

Note: For a multi-switch frame (F/C 2030/1), refer to Figure 2-7.

Table 2-1 on page 2-11 shows external cable routing in a RS/6000 SP frame populated with 16 processor nodes. (Refer to “Cable routing” on page 2-9 to see the routing paths.)

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

Cable routing in a multi-switch frame (F/C 2030/1)

Figure 2-9 on page 2-12 and Figure 2-10 on page 2-12 show back views of the RS/6000 SP multi-switch frame with frame extension, showing the horizontal and vertical paths of cable routing from connector-to-connector. The depths has been amplified on the drawing.

Note:

- W1 consists of vertical raceways V1-V4.
- W5 consists of vertical raceways V5-V8.

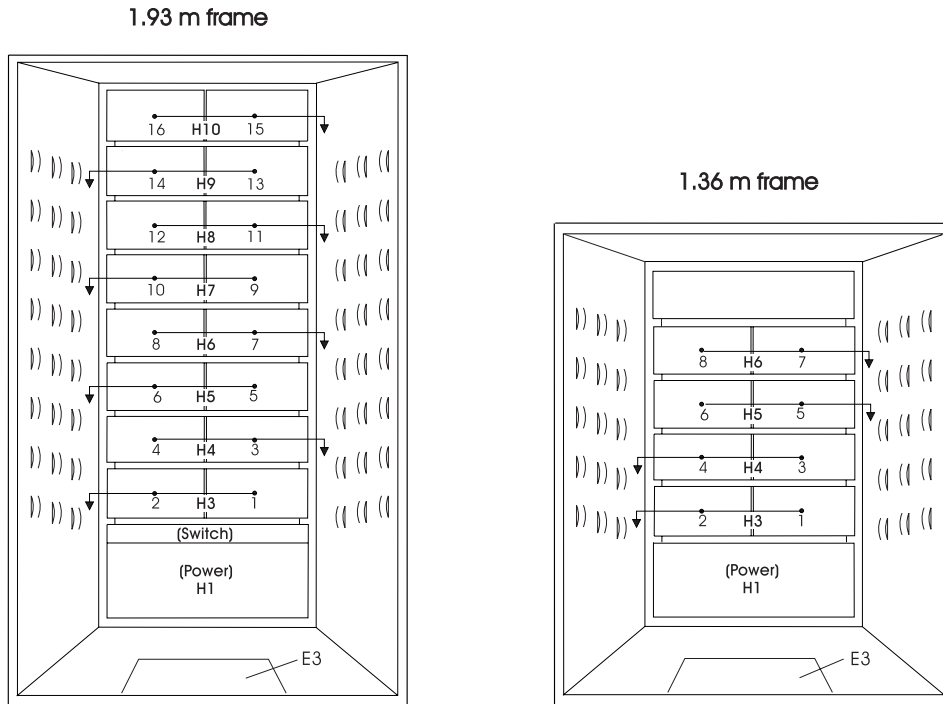


Figure 2-9. Frame cable routing paths in rear of RS/6000 SP multi-switch frame (F/C 2030/1) — 1.93 m frame

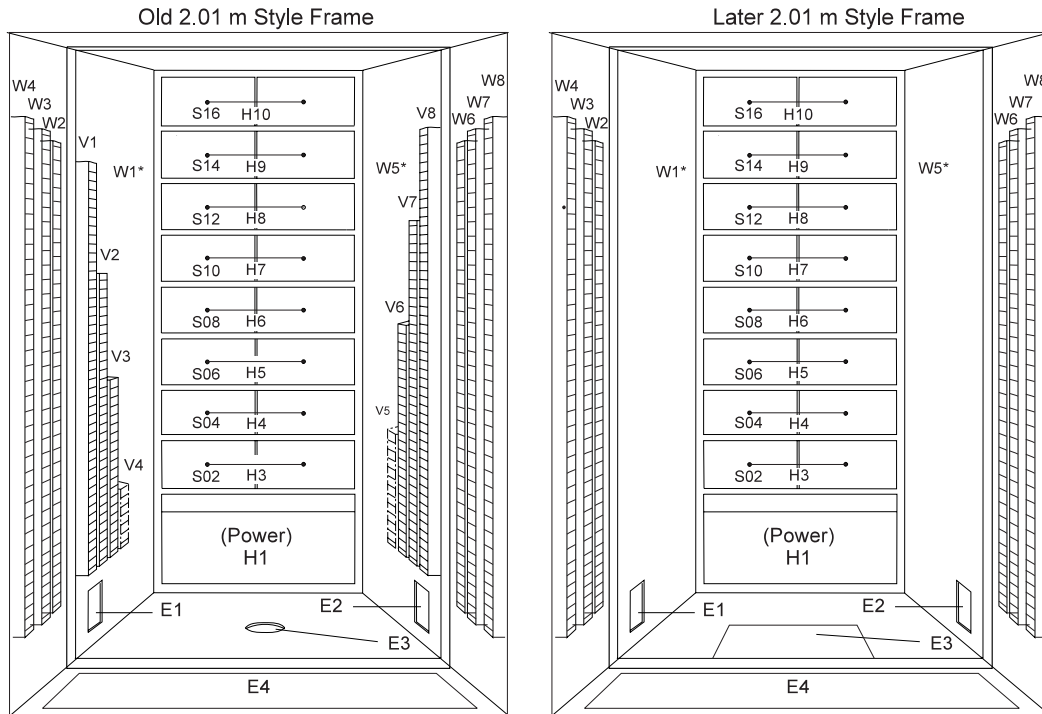


Figure 2-10. Frame cable routing paths in rear of RS/6000 SP multi-switch frame (F/C 2030/1) — 2.01 m frame

Switch data cables

SPS data cables: Table 2-2 on page 2-13 describes the attachment locations and routing for the internal SPS Switch data cables:

<i>Table 2-2. SPS Switch data cable chart</i>		
Cable Part Number	Plug from Location	Plug to Location
46H9710	E00-S00-BH-J7	E00-N01-BH-PA
46H9711	E00-S00-BH-J8	E00-N02-BH-PA
46H9712	E00-S00-BH-J26	E00-N03-BH-PA
46H9713	E00-S00-BH-J25	E00-N04-BH-PA
46H9714	E00-S00-BH-J9	E00-N05-BH-PA
46H9715	E00-S00-BH-J10	E00-N06-BH-PA
46H9716	E00-S00-BH-J24	E00-N07-BH-PA
46H9717	E00-S00-BH-J23	E00-N08-BH-PA
46H9718	E00-S00-BH-J31	E00-N09-BH-PA
46H9719	E00-S00-BH-J32	E00-N10-BH-PA
46H9720	E00-S00-BH-J18	E00-N11-BH-PA
46H9721	E00-S00-BH-J17	E00-N12-BH-PA
46H9722	E00-S00-BH-J33	E00-N13-BH-PA
46H9723	E00-S00-BH-J34	E00-N14-BH-PA
46H9724	E00-S00-BH-J16	E00-N15-BH-PA
46H9725	E00-S00-BH-J15	E00-N16-BH-PA
Note: "PA" refers to connector on SPS adapter.		

Note: For external frame-to-frame cable locations, see *RS/6000 SP: Installation and Relocation*.

SPS-8 data cables: Table 2-3 describes the attachment locations and routing for the internal SPS-8 Switch data cables:

<i>Table 2-3. SPS-8 Switch data cable chart</i>		
Cable Part Number	Plug from Location	Plug to Location
46G9690	E00-S00-BH-J7	E00-N01-BH-PA
46G9691	E00-S00-BH-J8	E00-N02-BH-PA
46G9692	E00-S00-BH-J26	E00-N03-BH-PA
46G9693	E00-S00-BH-J25	E00-N04-BH-PA
46G9694	E00-S00-BH-J9	E00-N05-BH-PA
46G9695	E00-S00-BH-J10	E00-N06-BH-PA
46G9696	E00-S00-BH-J24	E00-N07-BH-PA
46G9697	E00-S00-BH-J23	E00-N08-BH-PA
Note: PA refers to connector on SPS adapter.		

Chapter 3. Service procedures

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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.

<i>Table 3-1. Service procedure tools</i>		
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/SPIlogs/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, diagnostic tests) 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
vdi1.out
worm.trace

```

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

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

- If less than 10% of **/var** is free, **css.snap** exits.
- If the CSS portion of **/var** is more than 30% of the total space in **/var**, **css.snap** erases old snap files until the CSS share sinks below 30%. If successful, **css.snap** proceeds. If not, it exits.

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

Switch supervisor self-test

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

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

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

Self-test Conditions

Pass sequence

1. Both LEDs light (about 10 seconds)
2. Green LED stays lit, while yellow LED goes off (about two seconds)
3. Green LED stays lit, while yellow LED flashes node address
4. Both LEDs turn off (about two seconds)
5. Both LEDs light (about one second)

Fail conditions

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

Verification tests using Perspectives

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

Node supervisor verification

From the Hardware Perspectives window:

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

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

Frame supervisor verification

From the Hardware Perspectives window:

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

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

Switch supervisor verification

From the Hardware Perspectives window:

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

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

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

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 3-4 on page 3-8, 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 3-4. 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.

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 3-9.

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 3-7.
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 select a new master clock. Refer to “Selecting appropriate switch clocks” on page 3-7.
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 select 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 3-7.)
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*.)

Service position procedures

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

Placing a switch assembly into service position

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

Replacing a switch assembly from service position

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

Resetting the clock and bootlist after servicing a node

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

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

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

This will display the current bootlist.

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

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

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

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

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

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

10. On the control workstation, use Perspectives to power off the node and then power it back on.

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

Installing firmware updates on SP nodes

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.


```
buffcreate -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.

Running diagnostics on a switch port

Before running diagnostic tests on a switch to diagnose node to switch problems, you must identify the port number. For example:

Bulkhead jack 6 on switch 17 frame 1 is identified as **E01-S17-BH-J6**

To run the test from the control workstation for this example the syntax of the command is:

```
/usr/lpp/ssp/bin/spd/wrap_test -j E01-S17-BH-J6
```

Chapter 4. FRU removals and replacements

Handling static-sensitive devices	4-1
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Removing the switch assembly	4-2
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Attention: Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers. (See “Personal ESD requirements” on page xiii 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.

Procedures for Switch Assemblies

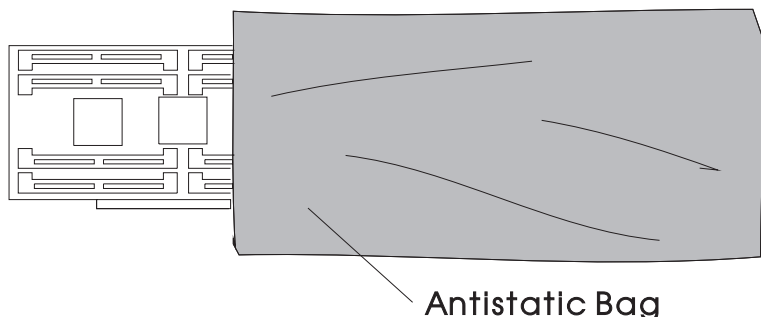


Figure 4-1. Handling an anti-static device

Procedures for switch assemblies

CAUTION:

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

Attention: Components in the frame are susceptible to damage from static discharge. Always use an ESD wristband when working inside frame covers. (See “Personal ESD requirements” on page xiii for more details.) Do not touch the pins or circuitry on these components.

Note

There are different levels of the switch assembly hardware. The following lists indicate serviceable FRUs for each level of switch assembly:

- | | |
|--------------|---|
| SPS | Fans, circuit breaker, LED card, switch supervisor card, switch power card(s), fan assembly cable, supervisor/power cable, complete assembly. |
| SPS-8 | Fans, circuit breaker, LED card, switch supervisor card, switch power card(s), fan assembly cable, supervisor/power cable, complete assembly. |

Removing the switch assembly

Perform these procedures to remove the switch assembly:

1. Ensure that the switch is offline (shutdown) from the control workstation and powered off from the control workstation.

Attention: Removing power from one switch assembly may affect other switch assemblies and processor nodes attached to it.

2. Turn the power switch on the switch assembly to Off ('0').
3. Detach all cables from rear of switch assembly noting where external frame cables are attached. If wrap plugs are installed, remove them and save for the new switch.
4. If this is a switch drawer (in multi-switch frame F/C 2030/1) and you are replacing the switch assembly, remove the two screws at the rear of the switch assembly.
5. Remove four screws from front of switch assembly and slide switch assembly out of the front of the frame.
6. Remove the front chassis and then remove the inner chassis from the outer chassis sleeve.
7. Return to the procedure that directed you here.

Replacing the switch assembly

Perform these procedures to replace the switch assembly:

1. Replace the inner chassis into the outer chassis sleeve and then replace the front chassis.
2. If wrap plugs are installed, they can be plugged on the new switch.
3. Slide switch through the front of the frame and reinstall four screws that hold the switch to the frame.
4. If this is a switch drawer (in F/C 2030/1) and you are reinstalling the switch assembly, reinstall the two screws at the rear of the switch assembly.
5. Reattach all cables to rear of switch assembly.
6. Turn the power switch on the switch assembly to On ('1').
7. Refer to "Restoring a switch assembly to the active configuration" on page 3-9.
8. Return to the procedure that directed you here.

Removing the switch fans

Note: Refer to "Handling static-sensitive devices" on page 4-1 before removing or installing ESD sensitive devices.

Perform these procedures to remove a fan from an SP Switch assembly:

1. Perform "Placing a switch assembly into service position" on page 3-10 to place the switch assembly into the service position.
2. Remove the top cover of the switch assembly by removing the screws.
3. Locate the fan.
4. Push shock mounts toward center of fan.
5. Pull fan out of the fan bracket. Keep the shock mounts for mounting the new fan.
6. Disconnect fan cable from supervisor control cable.

Replacing the switch fans

Perform these procedures to replace a fan in an SP Switch assembly:

1. Transfer shock mounts from the old fan to the new fan.
2. Using another fan as an example, route the fan cable and orient the fan with airflow indicator pointing toward the rear of the switch assembly.
3. Mount fan in the fan bracket by pulling the shock mounts through the holes in the fan bracket.
4. Push shock mounts outward to lock in place.
5. Reconnect fan cable to the supervisor control cable.
6. Reinstall top cover of switch assembly and reinstall all screws.
7. Perform "Replacing a switch assembly from service position" on page 3-10 to remove the switch assembly from the service position.

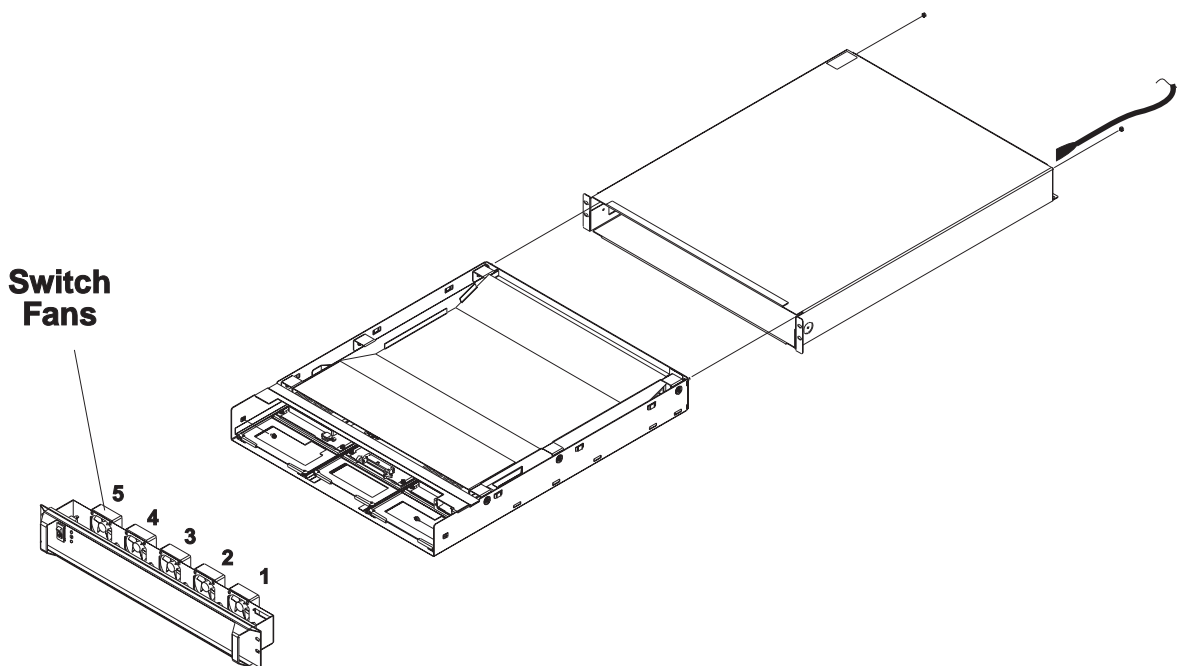


Figure 4-2. Removing the SP Switch fans

Removing the switch front chassis cable

Note: Refer to “Handling static-sensitive devices” on page 4-1 before removing or installing ESD sensitive devices.

Perform these procedures to remove the fan control cable from an SP Switch assembly:

1. Perform “Placing a switch assembly into service position” on page 3-10 to place the switch assembly into the service position.
2. Unplug connectors P7, P8 and P9. Remove cable by unhooking retaining material along raceway, and unplugging the Fan connectors P2, P3, P4, P5 and P6. Using fingertip pressure, remove connector P1 by removing screws. Retain these screws for new cable installation.
3. Remove cable by unhooking retaining material along raceway.

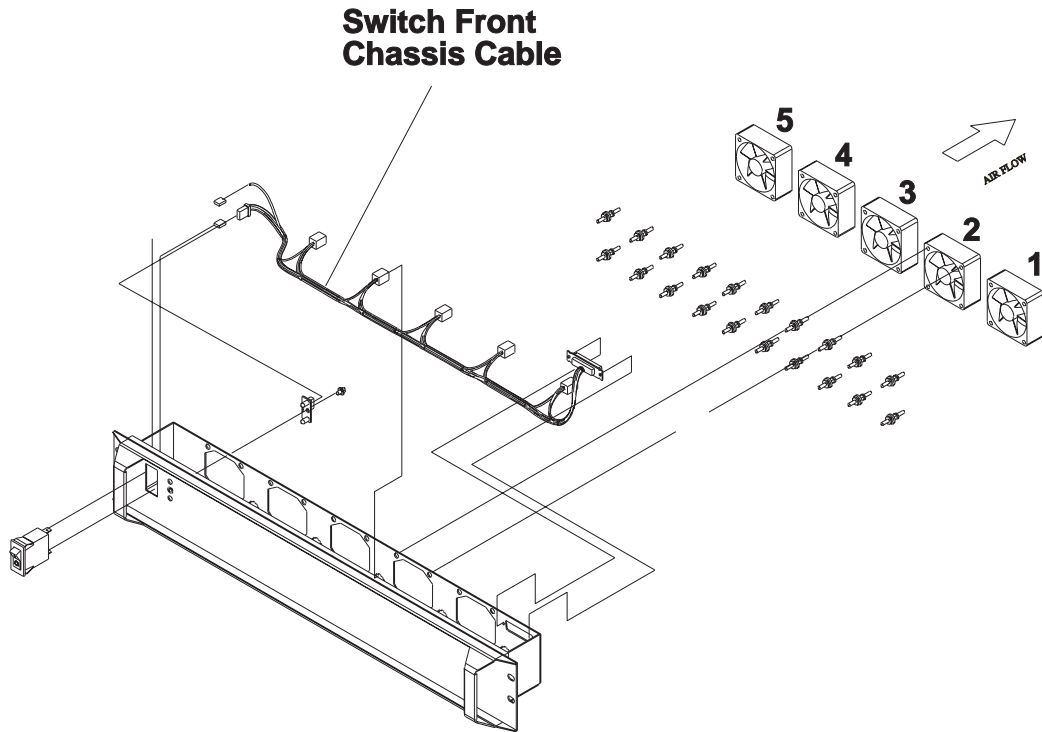


Figure 4-3. Removing the SP Switch fan control cable

Replacing the switch front chassis cable

Perform these procedures to replace the fan control cable in an SP Switch assembly:

1. Using fingertip pressure attach connector P1 with screws retained in the removal procedure. Route cable along raceway, hooking retaining material where needed and plugging Fan connectors P2, P3, P4, P5 and P6. Plug connectors P7, P8 and P9.
2. Perform “Replacing a switch assembly from service position” on page 3-10 to remove the switch assembly from the service position.

Removing the switch supervisor card

Note: Refer to “Handling static-sensitive devices” on page 4-1 before removing or installing ESD sensitive devices.

Attention: The hexhead retaining screws require a 4 mm socket.

Perform these procedures to remove the supervisor card from an SP Switch assembly:

1. Perform “Placing a switch assembly into service position” on page 3-10 to place the switch assembly into the service position.
2. Unplug connector P5.
3. Rotate card thumb locks outward to unseat card.
4. Remove supervisor card.

Replacing the switch supervisor card

Perform these procedures to replace the supervisor card in an SP Switch assembly:

1. Insert supervisor card.
2. Rotate card thumb locks inward to seat card.
3. Plug connector P5.
4. Perform “Replacing a switch assembly from service position” on page 3-10 to remove the switch assembly from the service position.

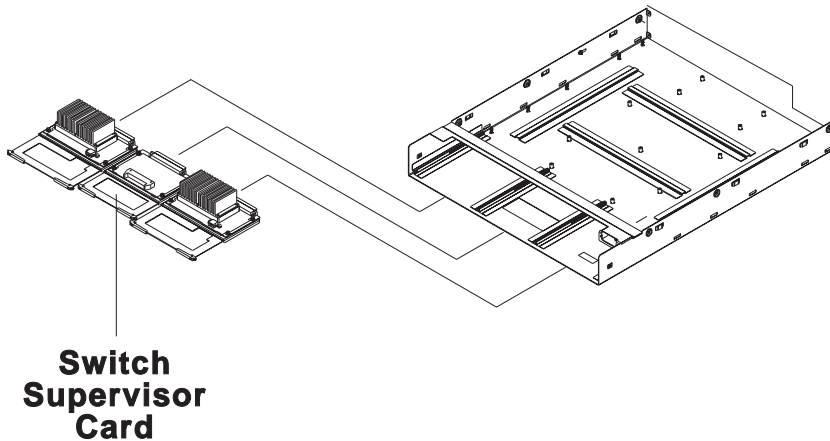


Figure 4-4. Removing the SP Switch supervisor card

Removing the switch inner chassis cable

Note: Refer to “Handling static-sensitive devices” on page 4-1 before removing or installing ESD sensitive devices.

Perform these procedures to remove the supervisor power cable from an SP Switch assembly:

1. Perform “Placing a switch assembly into service position” on page 3-10 to place the switch assembly into the service position.
2. Remove screws from connector P1 at the rear of the switch assembly, and retain them for new cable installation. Remove cable by unhooking retaining material along raceway. Unplug connectors P3, P4, P5 and P6.

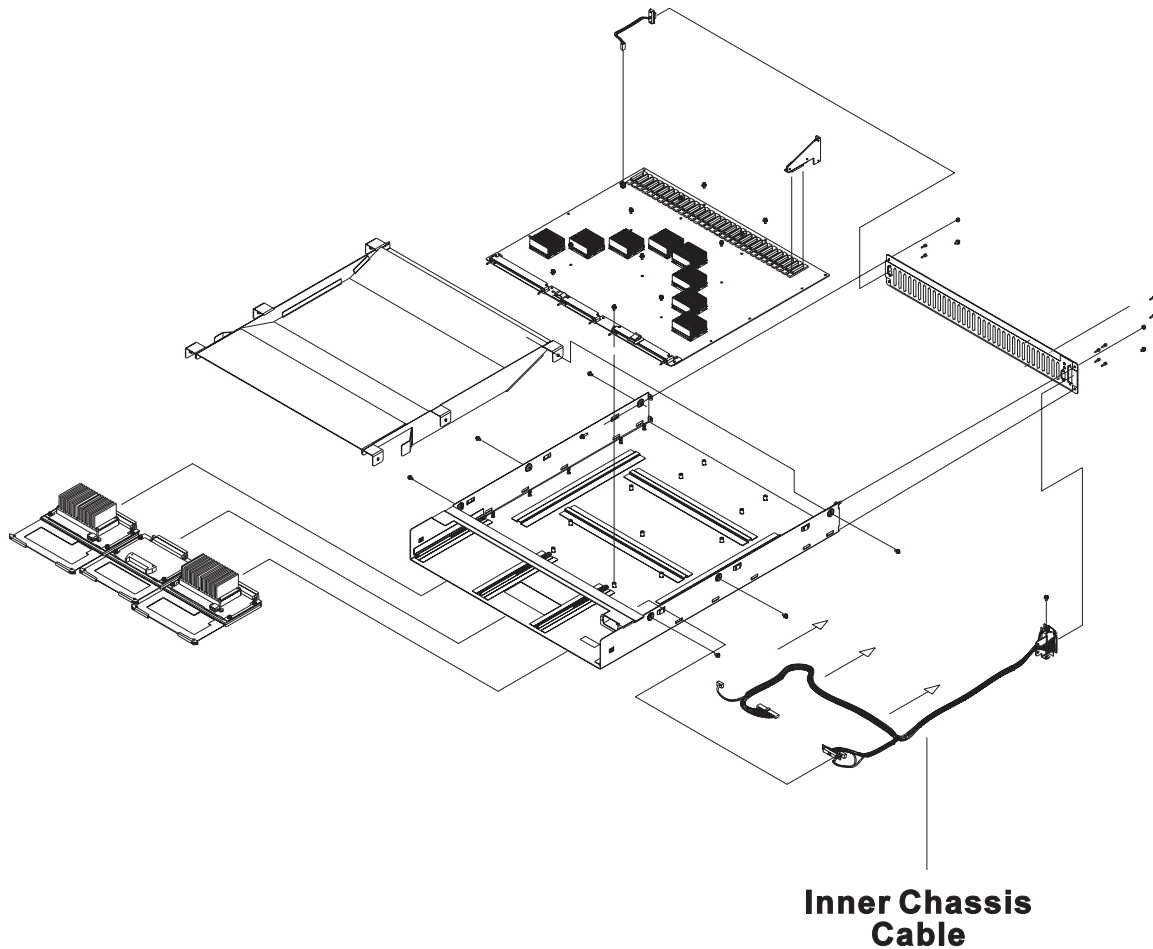


Figure 4-5. Removing the SP Switch inner chassis cable

Replacing the switch inner chassis cable

Perform these procedures to replace the supervisor power cable from an SP Switch assembly:

1. Plug connectors P3, P4, P5 and P6. Route cable along the raceway, hooking retaining material where needed. Attach P1 connector to the rear of the switch assembly with screws retained in the removal procedure.
2. Perform “Replacing a switch assembly from service position” on page 3-10 to remove the switch assembly from the service position.

Removing the switch power cards

Note: Refer to “Handling static-sensitive devices” on page 4-1 before removing or installing ESD sensitive devices.

Attention: The hexhead retaining screws require a 4 mm socket.

Perform these procedures to remove the switch power cards from an SP Switch assembly:

1. Perform “Placing a switch assembly into service position” on page 3-10 to place the switch assembly into the service position.
2. Unplug connector P4 (PS1) or P6 (PS2).
3. Rotate card thumb locks outward to unseat card.
4. Remove power supply card.

Replacing the switch power cards

Perform these procedures to replace the switch power cards) in an SP Switch assembly:

1. Insert power supply card.
2. Rotate card thumb locks inward to seat card.
3. Plug connector P4 (PS1) or P6 (PS2).
4. Perform "Replacing a switch assembly from service position" on page 3-10 to remove the switch assembly from the service position.

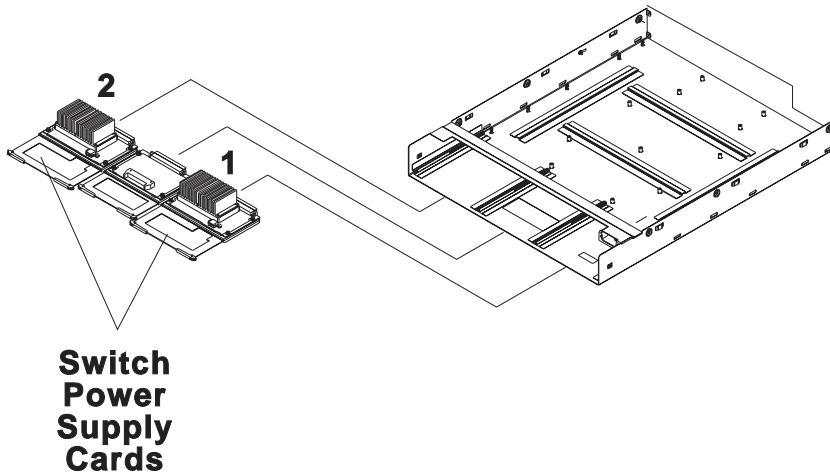


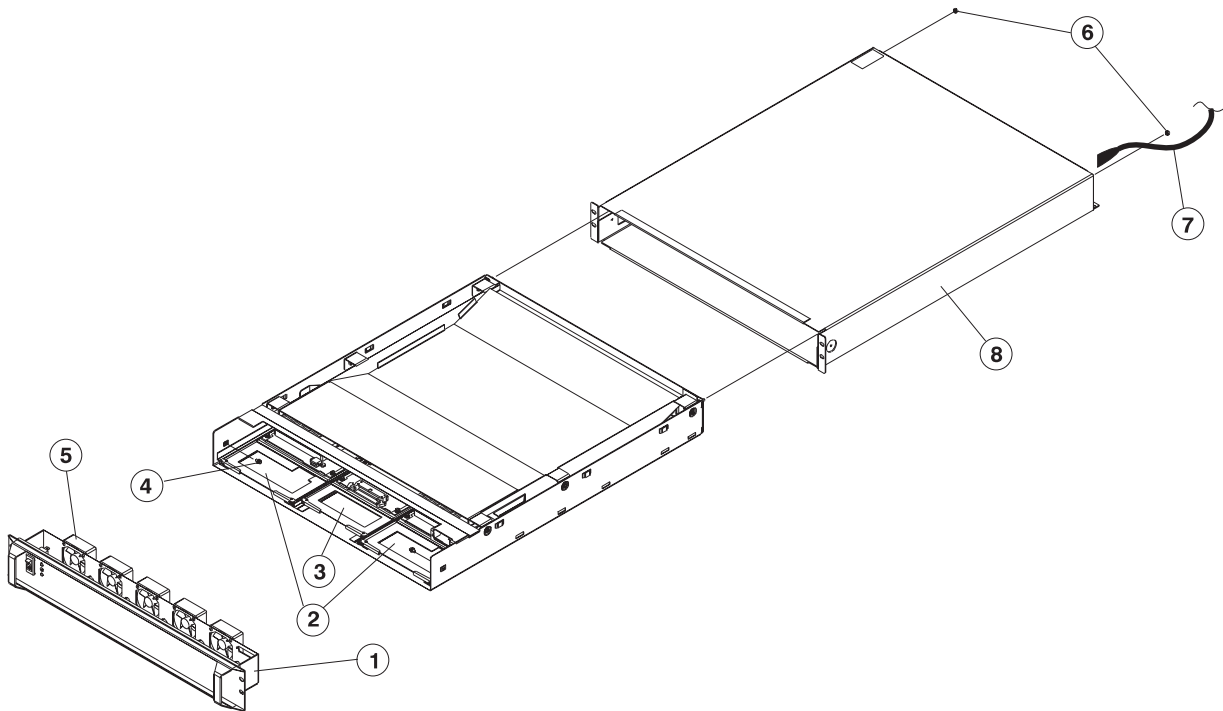
Figure 4-6. Removing the SP Switch power supply cards

Chapter 5. Parts catalog

This chapter presents the Parts Catalog, listing all RS/6000 SP Switch parts and FRUs, with corresponding figures containing indexed descriptions.

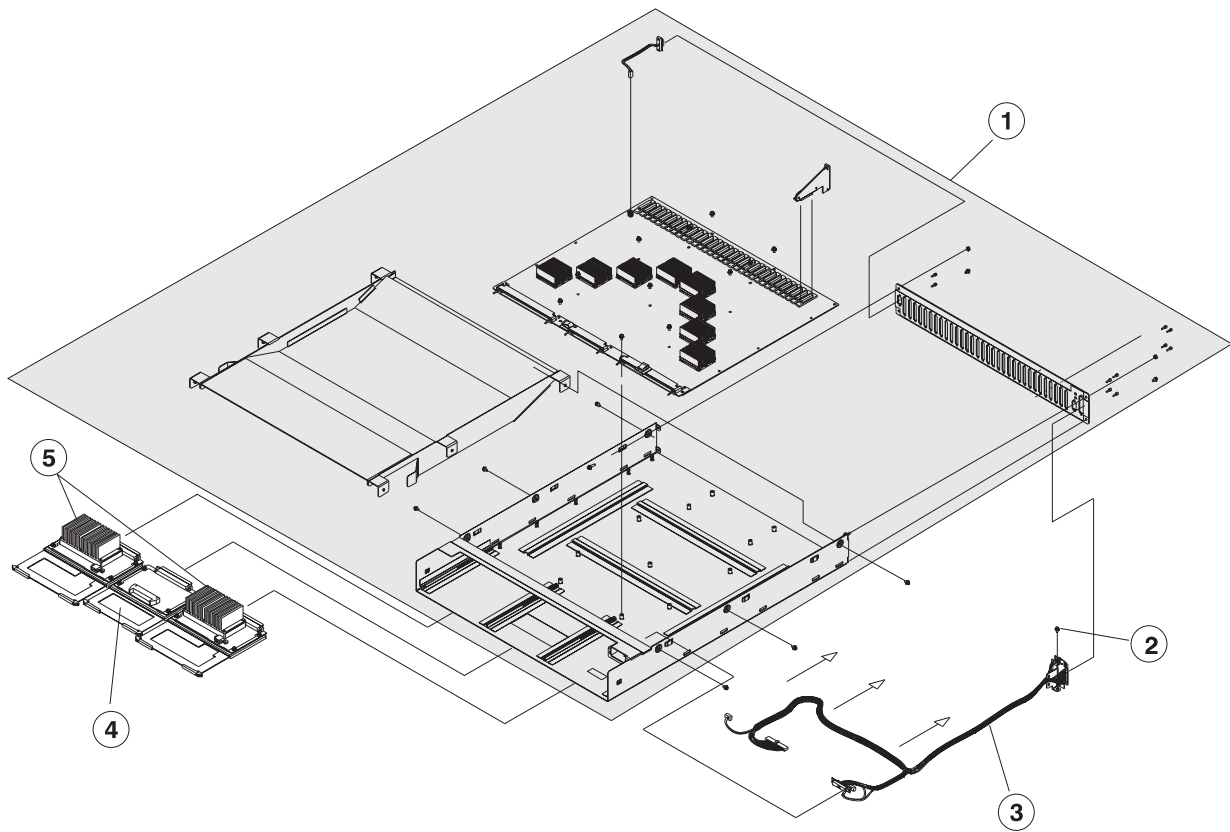
Multi-switch frame (F/C 2030/1)	5-10
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SPS, SPS-8 Switch asm (feature) (view 2)	5-4
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Switch cables (feature)	5-8

Assembly 1: SPS, SPS-8 Switch asm (feature) (view 1)



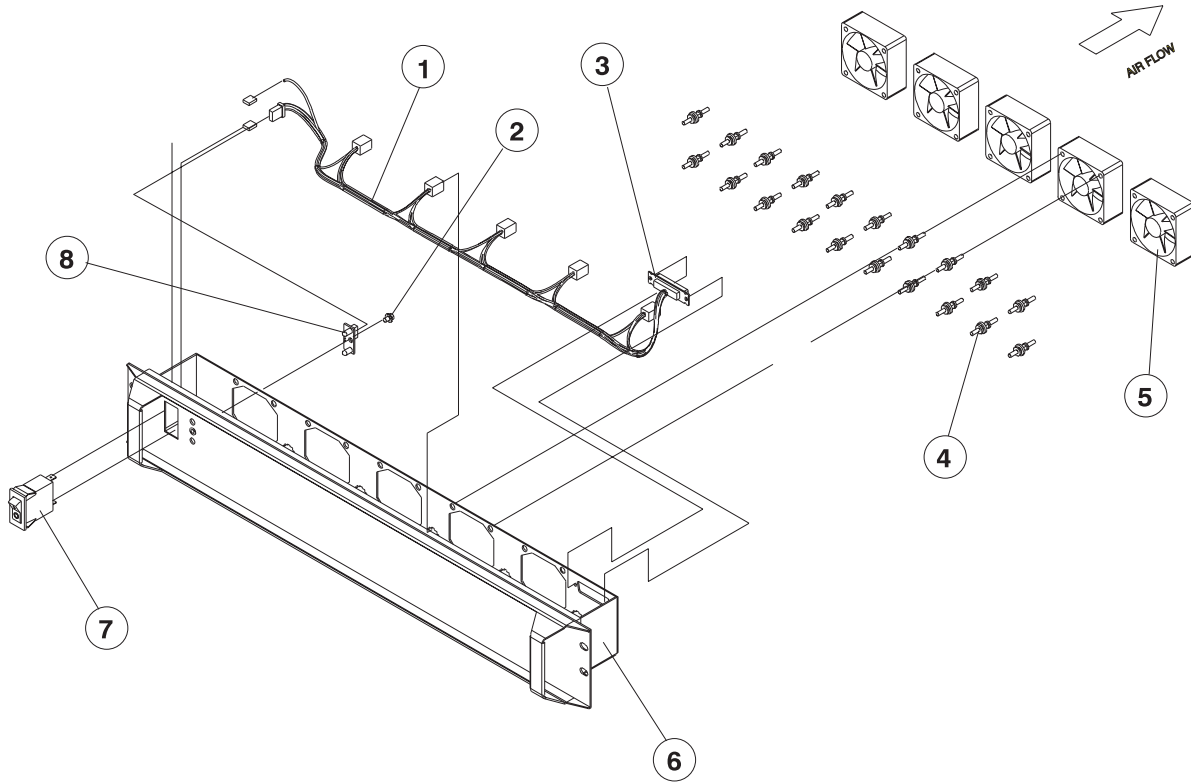
Asm- Index	Part Number	Units	Description
1-			SPS Switch Assembly (reference only)
-			SPS-8 Switch Assembly (reference only)
-1	26H7255	1	• Front Chassis Asm.
-2	77G0961	1	• Card, Power
-3	46H9305	1	• Card, Switch Supervisor
-4	26H7212	2	• Screw, Hex Hd M4 x 6
-5	26H7395	1	• Fan Asm.
-6	84X4841	2	• Nut, Hex M4
-7	46G5686	1	• Cable, Power
-8	46H9730	1	• Outer Chassis
-	77G0818	1	• Wrap, SPS (not shown)
-	46H9220	1	• Wrap, SPS-8 (not shown)

Assembly 2: SPS, SPS-8 Switch asm (feature) (view 2)



Asm- Index	Part Number	Units	Description
2-			SPS Switch Assembly (reference only)
-			SPS-8 Switch Assembly (reference only)
-1	46H9327	1	• Inner Chassis Asm. SPS (Includes all asm. in shaded area)
-1	46H9679	1	• Inner Chassis Asm. SPS-8 (Includes all asm. in shaded area)
-2	1624766	1	• Screw, 6 mm
-3	26H7389	1	• Cable, Inner Chassis
-4	46H9305	1	• Card, Switch Supervisor
-5	77G0961	1	• Card, Power

Assembly 3: SPS, SPS-8 Switch asm (feature) (view 3)

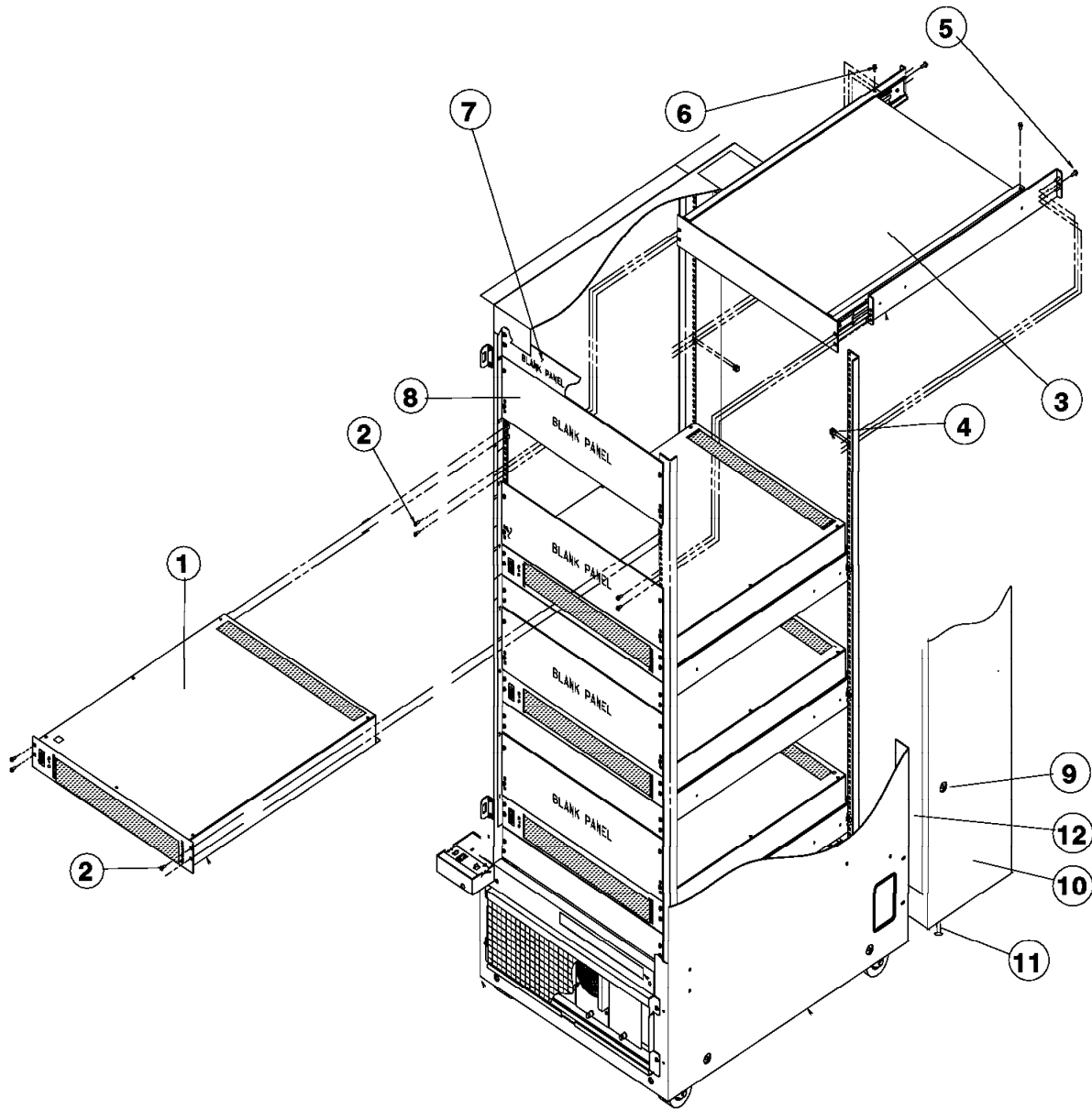


Asm- Index	Part Number	Units	Description
3-			SPS Switch Assembly (reference only)
-			SPS-8 Switch Assembly (reference only)
-1	26H7391	1	• Cable, Front Chassis
-2	32G1547	1	• Screw, Hex M4 x 5
-3	77G1078	2	• Cup Guide (2.01 m, order Kit)
-3	77G1079	2	• Pin Guide (2.01 m, order Kit)
-3	46H9778	2	• Cup Guide (New style)
-3	46H9779	2	• Pin Guide (New style)
-3	51H9428	2	• Kit, Cup and Pin Guide (New style)
-4	81F7977	20	• Mount, Fan Shock
-5	26H7395	1	• Fan Asm.
-6	26H7255	1	• Front Chassis Weld
-7	31G9309	1	• Circuit Breaker
-8	67G4985	1	• Card, LED

Assembly 4: Switch cables (feature)

Asm- Index	Part Number	Units	Description
4-			SP Switch Data Cables (SPS)
-			-----
-	11J6091	AR	Cable, Switch Data Node 01 - (1345 mm)
-	11J6092	AR	Cable, Switch Data Node 02 - (1040 mm)
-	11J6093	AR	Cable, Switch Data Node 03 - (1320 mm)
-	11J6094	AR	Cable, Switch Data Node 04 - (1400 mm)
-	11J6095	AR	Cable, Switch Data Node 05 - (1675 mm)
-	11J6096	AR	Cable, Switch Data Node 06 - (1370 mm)
-	11J6097	AR	Cable, Switch Data Node 07 - (1700 mm)
-	11J6098	AR	Cable, Switch Data Node 08 - (1780 mm)
-	11J6099	AR	Cable, Switch Data Node 09 - (1780 mm)
-	11J6100	AR	Cable, Switch Data Node 10 - (1855 mm)
-	11J6101	AR	Cable, Switch Data Node 11 - (2110 mm)
-	11J6102	AR	Cable, Switch Data Node 12 - (1805 mm)
-	11J6103	AR	Cable, Switch Data Node 13 - (2110 mm)
-	11J6104	AR	Cable, Switch Data Node 14 - (2165 mm)
-	11J6105	AR	Cable, Switch Data Node 15 - (2165 mm)
-	11J6106	AR	Cable, Switch Data Node 16 - (2310 mm)
-			
-			
-			
-			
-			SP Switch Data Cables (SPS-8)
-			-----
-	11J3975	AR	Cable, Switch Data Node 01 - (1030 mm)
-	11J3976	AR	Cable, Switch Data Node 02 - (1640 mm)
-	11J3977	AR	Cable, Switch Data Node 03 - (1800 mm)
-	11J3978	AR	Cable, Switch Data Node 04 - (2200 mm)
-	11J3979	AR	Cable, Switch Data Node 05 - (2210 mm)
-	11J3980	AR	Cable, Switch Data Node 06 - (2340 mm)
-	11J3981	AR	Cable, Switch Data Node 07 - (2060 mm)
-	11J3982	AR	Cable, Switch Data Node 08 - (2260 mm)
-			
-			
-			
-			
-			SP Switch External Data Cables (SPS - SPS-8)
-			-----
-	46G5686	AR	Cable, Switch Power
-	46H9698	AR	Cable, S - S External 5 m
-	46H9699	AR	Cable, S - S External 10 m
-	46H9700	AR	Cable, S - S External 15 m
-	46H9701	AR	Cable, S - S External 20 m

Assembly 5: Multi-switch frame (F/C 2030/1)



Asm- Index	Part Number	Units	Description
5-1			SPS Switch Assembly
-2	54G3281	16	• Screw, Phil Pan Hd M5 x 12
-3	93G1065	AR	• Shelf Assembly
-4	0375867	8	• Nut, Clip
-5	84X4761	8	• Screw, Hex FI Hd Supradrive
-6	17H5026	8	• Screw, SI Hex FI Hd M5 x 6
-7	54G2877	4	• Panel, Switch Blank
-8	54G2947	4	• Panel, Blank 7-inch
-9	1624776	18	• Screw, Hex FI Hd M5 x 12
-10	26H7198	1	• Extender Frame
-	08J5557	4	• Chocks, Rubber
-12	04H9469	6	• Duct, Long

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European Union (EU) statement

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

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

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

United Kingdom telecommunications safety requirements

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

Industry Canada compliance statement

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

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

For installations in Japan:

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

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

Electromagnetic interference (EMI) statement - Taiwan

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

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

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

Radio protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

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

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

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

Hinweis

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

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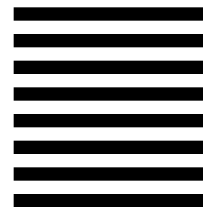
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